Appendix N

Visual Resource Assessment

POINT THOMSON PROJECT EIS

Appendix N – Visual Resource Assessment

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Acronyms and Abbreviations

ADNR	Alaska Department of Natural Resources
ANILCA	Alaska National Interest Lands Conservation Act
Arctic Refuge	Arctic National Wildlife Refuge
BLM	Bureau of Land Management
Corps	U.S. Army Corps of Engineers
DEW Line	Distant Early Warning Line
EIS	environmental impact statement
ExxonMobil	Exxon Mobil Corporation
GIS	Geographic Information System
KOPs	Key observation points
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
USFWS	U.S. Fish and Wildlife Service

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Chapter 1. Summary

The Point Thomson Project proposed for the North Slope of Alaska, halfway between Deadhorse and Kaktovik, and within a few miles of the Arctic National Wildlife Refuge (Arctic Refuge) boundary, is located in an undeveloped and uninhabited area. Arctic Refuge lands, managed in part for their wilderness qualities, are visually sensitive. Adjacent state lands for which the project is proposed have the same qualities but are moderately sensitive because they are not managed for visual values. The entire area is considered a single scenic quality rating unit. Under methods described in Bureau of Land Management (BLM) Manual 8400, scenic quality ratings were A in summer and B in winter, reflecting less visual variety in winter. Overall visual resource classification under the BLM method was class I for Arctic Refuge lands and class III for state lands, reflecting strong visual values throughout the area. The BLM method weights the land status differently, because state lands are managed for oil and gas production and Arctic Refuge lands are managed for wilderness qualities and values. (See Section 2.3 below for further information on Arctic Refuge management.)

Proposed new industrial facilities, particularly drilling rigs, communications towers, flare stacks, support facilities, air traffic, and facility lights are expected to create strong “visual contrast” when compared to baseline conditions (pre-2009). The vertical lines of towers in an environment of principally horizontal lines; contrasting colors and dark silhouettes against bright water, ice, or sky backgrounds; and bulky boxy forms not reflected in the baseline condition are the principal contrasts that make the industrial developments visually prominent, even at substantial distances. Key observation points (KOPs) associated with travel corridors on the Canning River and along the Beaufort Sea coast at graduated distances from proposed facilities (a few hundred feet, 0.8 mile, 1.8 mile, 5 miles, 8 miles, and 20 miles) indicated strong visual contrasts in the foreground-middle ground distance zone (up to about 5 miles), moderate contrasts in the background distance zone (8 miles) except for strongly contrasting lights, and very weak to no visual contrast in the seldom-seen distance zone (20 miles), except for project lights in dim dark conditions.

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Chapter 2. Introduction and Methods

Exxon Mobil Corporation's (ExxonMobil's) proposed Point Thomson Project is located on the northern edge of Alaska, east of the Prudhoe Bay oil fields and immediately west of the Arctic Refuge (see Figure 1). The area is principally undeveloped (no roads or communities) but sees some use for subsistence hunting and gathering, local transportation, recreation, and oil and gas exploration. Use levels are low, much lower than highly-viewed areas that are the subject of many visual assessments. The sensitivity of most viewers, with the exception of industrial workers, is high. The project aims to produce hydrocarbons from a large, high pressure reservoir that lies beneath a portion of the Beaufort Sea and a portion of the mainland and requires construction of multiple wells, processing facilities, housing, an airport, an elevated pipeline, and other structures. The environmental impact statement (EIS) for the project describes the proposed action and alternatives in detail. Construction of new human elements in a mostly natural landscape would change the appearance of the area. This visual assessment characterizes the existing landscape and its visual value, and illustrates the proposed changes in an effort to assess potential visual impacts and to determine if mitigation is necessary.

The lead federal agency for the EIS is the U.S. Army Corps of Engineers (Corps). The following are federal and state cooperating agencies in the EIS effort: U.S. Fish and Wildlife Service (USFWS), as manager of the Arctic Refuge; the Environmental Protection Agency, because of its permit and oversight responsibilities; and the State of Alaska Department of Natural Resources, as land owner of the project site.

Discussion of wilderness as defined in a dictionary and discussion of the National Wilderness Preservation System (federally designated wilderness) recur in this document because state lands where the project is proposed and adjacent federal lands are principally undeveloped and wild, and because the Mollie Beattie Wilderness, designated by Congress in the Alaska National Interest Lands Conservation Act (ANILCA), occurs within the boundaries of the Arctic Refuge and visual impacts there have been a subject of interest for the land manager. The nearest corner of the Mollie Beattie Wilderness lies about 30 miles from the arctic coast and proposed project site. However, wilderness qualities, including natural scenery, are an important part of the refuge and its management even outside the designated wilderness area. These qualities exist in those portions of the 1002 Area (so-called after ANILCA Section 1002) that lie nearest to the proposed project site.

Figure 1 illustrates the 1002 Area and Mollie Beattie Wilderness.

2.1 METHODS

By agreement of the lead and cooperating agencies, this visual assessment was prepared primarily by using methods described by the BLM in Manual 8400 Visual Resource Assessment (BLM N.D.), a method used by the USFWS in other instances. It also drew on the Visual Resource Assessment Procedure for the Corps (Smardon et al. 1988). The BLM method was designed largely for lands managed by BLM, so the methodology was modified to account for actual land ownership in the study area and the lack of visual management objectives on lands in the study area, especially the state-owned lands.

The method involved the following steps:

1. Visual Resource Inventory (Section 3 in this document)
    a. Regional Landscape Identification (Section 3.1)

b. Rating of Scenic Quality (alphanumeric ratings based on landform, vegetation, water, color, and other parameters—Section 3.2)
c. Sensitivity Level Analysis (Section 3.3)
d. Distance Zones (mapping—Section 3.4)
e. Visual Resource Classification (assigned a classification based on a combination of management intent and the analysis in previous steps—Section 3.5)

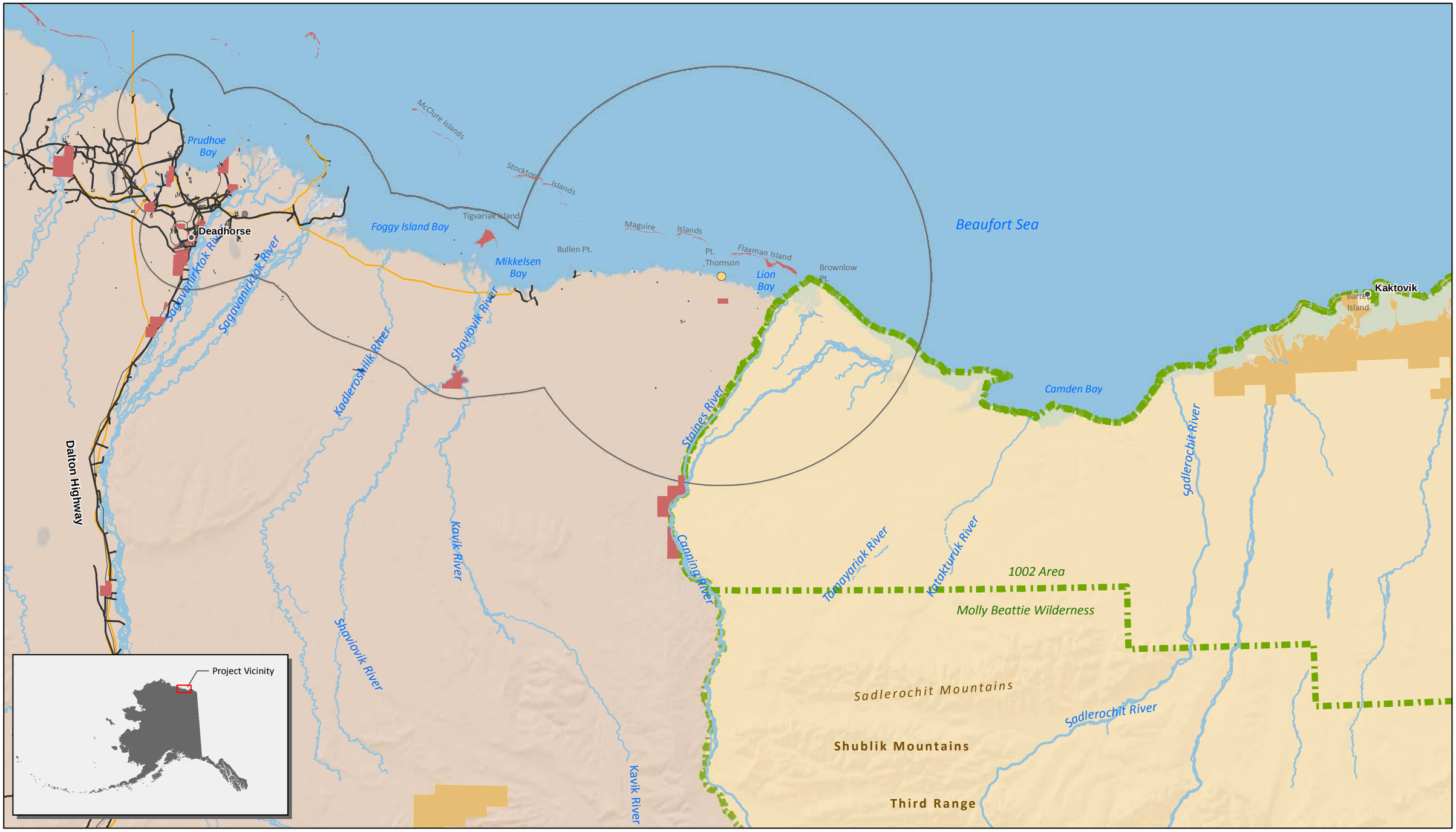
2. Visual Contrast Rating (Section 4 in this document)
   a. Identification of Key Observation Points (KOPs)
   b. Visual Simulation from KOPs
   c. Description of Characteristic (Existing) Landscape from KOPs
   d. Description of Proposed Activity (Project) from KOPs
   e. Contrast Rating (degree of contrast between existing conditions and proposed conditions)

A team of two, including a senior landscape architect with experience managing visual assessments across the nation and an experienced Alaska environmental planner, collaborated on this visual assessment. Site visits were conducted in March 2010 by one person and in July 2010 by both.

2.2 DEFINING THE STUDY AREA

The proposed Point Thomson Project is located on state lands in a flat landscape that offers views to distant horizons. Also, the project is located in a principally undeveloped environment adjacent to Arctic Refuge lands valued for wilderness qualities. The same qualities exist on state land, although the state's management is focused on oil and gas development. Because the presence of human development in a backcountry or nondesignated wilderness environment may be a determinant of a visual impact (see Section 2.3), and because the area's uninterrupted views may allow visibility of the project from inside the refuge and its designated Mollie Beattie Wilderness, the project area for visual assessment purposes is defined based on the concept of "visibility," as further described below.

A common definition of visibility, quoted in a 1999 National Park Service (NPS) paper on the atmospheric effect to visibility, is "the greatest distance at which an observer can just see a black object viewed against the horizon sky" (Malm 1999). This common definition holds that the visibility distance is determined by the "threshold contrast" of an object. An object is usually referred to as at "threshold contrast" when the difference between the brightness of the sky and the brightness of the object is reduced to such a degree that an observer can just barely see the object. However, the NPS paper states that the "threshold contrast for the eye, adapted to daylight, changes very little with background brightness, but it is strongly dependent on the size of the target and the time spent looking for the target." Therefore there are several aspects at work in determining visibility.



POINT THOMSON PROJECT EIS

- Arctic National Wildlife Refuge
- Existing Facilities
- Water Body
- Existing Pipeline
- Existing Road
- Stream
- Primary Study Area Boundary
- Federal Land Arctic National Wildlife Refuge
- State Land
- State Lands Selected by the North Slope Borough
- Kaktovik Inupiat Native Corporation Land

0 5 10 Miles

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Figure 1
Project Vicinity

Date: 27 September 2010
Map Author: HDR Alaska Inc.
Sources:

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While conducting field work for the visual assessment, observers noted it was barely possible to make out the existing Point Thomson drilling rig with the naked eye on clear days with light haze at a distance of 20 miles. The decreasing visibility with distance appeared to be attributed to the reduced brightness of the object (due to haze and light scattering) and the relatively small size of the object in the characteristic landscape at that distance. At 20 miles, observers needed to be keenly aware of the target to be able to see it (that is, it would likely be invisible to a casual observer not otherwise aware it was there). Based on this observation, the primary study area for visual assessment purposes is defined as the area within 20 miles of the proposed project site. In addition to the circle around the project site, the study area extends west in a swath parallel to the coast in which an access road and the export pipeline are proposed to connect with existing facilities at the Badami development (22 miles west) or the greater Prudhoe Bay developments (approximately 50 miles to the west). This swath covers pipeline and road alignments both relatively close to the coast and farther inland and the "foreground-middle ground" area from which they might most readily be seen (five miles farther inland and seaward).

Figure 1 illustrates the primary study area. The western end of the primary study area ends where the pipeline and road routes would intersect existing permanent roads and pipelines near Deadhorse/Prudhoe Bay. ExxonMobil's staging pad in Deadhorse and other facilities there are not included in the visual assessment study area because it was not an area of concern during scoping and is an area already industrialized where visual contrast of new structures would be quite low.

Because there is little to physically obstruct a view besides atmospheric conditions, and because of the sensitivity of the federal lands within the Arctic Refuge, a secondary project area also was considered. It is defined by the theoretical maximum limits of visibility as indicated by a Geographic Information System (GIS) computer modeling exercise that accounted for topography and curvature of the earth.

Figure 2 illustrates all areas from which Point Thomson development might theoretically be visible, and this is the secondary study area.

This maximum distance is assumed to be the area from which unobscured lights from the project might be seen in dim or dark conditions. This secondary area may also be an area from which daytime reflections or exhaust plumes might be seen from beyond the 20 mile primary zone. The form of structures is considered unlikely to be visible with the naked eye under most conditions to most people in the secondary zone. See Section 4.10.1, below, for further detail on this computer modeling exercise.

The focus of this assessment is on closer views and the aesthetic character of the view more than simply the presence or absence of on object within the view. As stated in the NPS report, people typically are more interested in the detail of what they can see and less interested in a tiny black object against the horizon: "visibility is more closely associated with conditions that allow appreciation of the inherent beauty of landscape features. It is important to recognize and appreciate the form, contrast detail, and color of near and distant features…. Visibility includes psychophysical processes and concurrent value judgments of visual impacts, as well as the physical interaction of light with particles in the atmosphere" (Malm 1999). This document explores not only visibility but the quality of a view, with a focus on the primary project area.

2.3 DEFINING THE BASE CONDITION

Although exploratory drilling has been underway since 2009 by the Applicant under state permits, the baseline condition for the visual assessment is the condition prior to 2009—without the exploratory drilling and associated drilling rig tower and other facilities and activities. The current activity has been a preliminary part of the project evaluated in this document. The preliminary activity did not require federal

approvals, and the applicant was able to proceed before completion of the EIS and this visual assessment. The baseline condition in the general area is not static; however, as intermittent industrial activity has occurred occasionally over several decades. At these times, activities have temporarily introduced visually contrasting structures, camps, lights, and motion, and such intermittent activity would likely occur in the future even without the project. While these temporary activities are acknowledged, the focus of this visual assessment is on larger, very long-term, year-round visual changes from the proposed project that would be essentially permanent.

2.4 TYPES OF VISUAL IMPACT

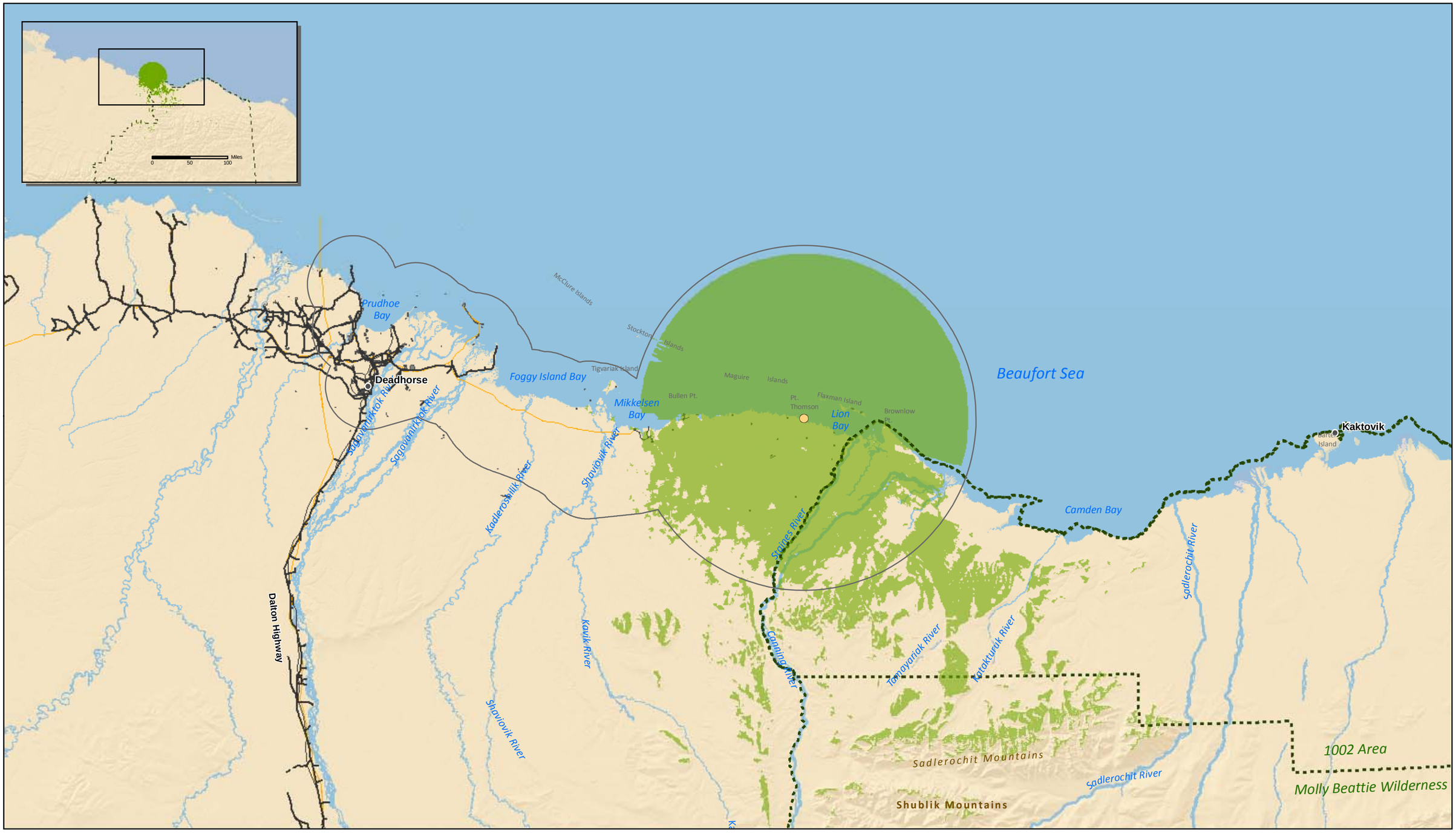
The BLM and Corps methodologies focus on visual assessment measures meant to be as objective as possible—line, form, color, texture—to determine visual contrast or change associated with the implementation of the project. This visual assessment also includes analyses of impacts not typically evaluated as part of BLM or Corps methodologies. At the request of the Corps and cooperating agencies this visual assessment examines visibility of the project from the Arctic Refuge and visual impacts as they might affect wildlife. Each of these is briefly described below. Discussion of these topics in this assessment document is separate from the contrast ratings process. For example, any visual influence on wildlife does not influence the contrast ratings, which are based on human perceptions.

Arctic Refuge: The process of determining visual contrast is effectively independent of land protection status (in this case the designated Mollie Beattie Wilderness and nondesignated refuge land with wilderness qualities); however, the sensitivity and ultimate visual classification of lands are influenced by management decisions and the status of protected lands. The Arctic Refuge as a whole is touted for its wilderness qualities. A refuge brochure states: “The Arctic Refuge is recognized as one of the finest examples of wilderness left on the planet.” A large portion of the refuge was specifically designated as part of the National Wilderness Preservation System by Congress in 1980 with passage of ANILCA. The northwest corner of the Arctic Refuge’s Mollie Beattie Wilderness area lies 30 miles from the proposed Point Thomson Project site.

The nondesignated lands of the 1002 Area are managed in much the same way as the Mollie Beattie Wilderness and are considered by wilderness advocates in Alaska and nationwide to have high wilderness qualities. The nearest portion of the 1002 Area to proposed project facilities is 2 miles.

Because of the sensitivity of the Arctic Refuge this document considers simply where the proposed facilities would and would not be visible—how deeply into the refuge project facilities would be visible and whether or not the project would be visible within the designated Mollie Beattie Wilderness.

Wildlife: The Arctic Coastal Plain is known for its wildlife—herds of thousands of caribou and well-known species of large mammals such polar bears and musk ox that are unique to the far north. Birders appreciate the dozens of migratory species that travel long distances to nest in the arctic. All of these are present in the project area. Project wildlife subject matter experts have indicated that the most likely visual effects to wildlife would be based on motion and reflection or glare. Scoping comments from 2009 and 2002 related to proposed Point Thomson development indicated that, according to observations of local elders, caribou notice and tend to steer clear of reflective pipelines. Because of public concern, this document considers motion and reflection with respect to wildlife.



POINT THOMSON PROJECT EIS

- Arctic National Wildlife Refuge
- Existing Facilities
- Water Body
- Existing Pipeline
- Existing Road
- Stream
- Point Thomson Visibility Areas
- Primary Study Area Boundary

Note: This image illustrates the theoretical areas from which lights, flares, reflections, or exhaust plumes at 150 feet above the ground surface at Point Thomson would be visible by an observer 5 ft above the ground surface, accounting for topographic obstructions and the curvature of the earth. This does not account for reductions in visibility based on atmospheric conditions. The digital elevation model in this area is considered "coarse," with elevation values assigned based on a cellsize of approximately 65m by 65m (i.e. no actual elevation change that may exist within 65m is noted). This is meant as a tool to help determine maximum visibility potential. See text.

0 5 10 Miles

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Figure 2

Primary and Secondary Study Areas and Theoretical Maximum Visibility

Date: 20 October 2010
Map Author: HDR Alaska Inc.
Sources:

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Chapter 3. Visual Resource Inventory

A visual resource inventory is the first step in assessing visual impacts. The inventory provides background information on the region as a whole, to provide context for a more specific inventory of an area—in this case, the Point Thomson area. The specific inventory identifies scenic quality rating units and describes them in terms as objective as possible, based on landform, vegetation, color, and other parameters. Ratings are assigned based on the BLM Manual.

3.1 REGIONAL LANDSCAPE IDENTIFICATION

3.1.1 Physiographic Province

Both the BLM and Corps methods refer to the "physiographic province" as the basis for comparing visual qualities of the subject area to its surroundings. The BLM method does not specifically call for description of the regional landscape, although it is implied. It is included here because the Corps procedure is more specific on the issue. The project site is located in the Arctic Coastal Plain physiographic province and adjacent to the Arctic Foothills physiographic province. The following is verbatim from *Physiographic Divisions of Alaska* (Wahrhaftig 1965):

> **ARCTIC COASTAL PLAIN**
>
> **General topography** The Arctic Coastal Plain is a smooth plain rising imperceptibly from the Arctic Ocean to a maximum altitude of 600 feet at its southern margin. The coastline makes little break in the profile of the coastal plain and shelf, and the shore is generally only 1-10 feet above the ocean; the highest coastal cliffs are only 50 feet high. The Arctic Coastal Plain province is divided into the Teshekpuk and White Hills sections. Scattered groups of low hills rise above the plain in the White Hills section; the Teshekpuk section is flat. Locally, an abrupt scarp 50-200 feet high separates the coastal plain from the Arctic Foothills. Locally pingos are sufficiently abundant to give an undulatory skyline. The part of the coastal plain between the Kuk and Colville Rivers has scattered longitudinal sand dunes 10-20 feet high trending N. 55"-75" E.
>
> **Drainage** The Arctic Coastal Plain is very poorly drained and consequently is very marshy in summer. It is crossed by rivers which head in highlands to the south. Rivers west of the Colville River meander sluggishly in valleys incised 50-300 feet; those east of the Colville cross the plain in braided channels and are building deltas into the Arctic Ocean.
>
> **Lakes** The Teshekpuk Lake section of the Arctic Coastal Plain province is covered by elongated thaw lakes oriented N. 15" W.; these range from a few feet to 9 miles long, are from 2 to 20 feet deep, and are oval or rectangular in shape (pl. 4, fig. 3). The lakes expand about 1 meter per year in places, and several generations of drained lake basins may be seen.
>
> **Glaciers and permafrost** There are no glaciers. The entire land area is underlain by permafrost at least 1,000 feet thick. The permafrost table (base of zone of summer thaw) is (immediately) below the surface. A network of ice-wedge polygons covers the coastal plain. These are oriented parallel and perpendicular to receding shorelines because of stress

differences set up by horizontal temperature gradients. Random polygons form in areas of more uniform stress.

Geology The Teshekpuk Lake section is underlain by 10-150 feet of unconsolidated Quaternary marine sediments resting on nearly flat Cretaceous sedimentary rocks containing coal. The White Hills section contains, in addition, lower Tertiary sedimentary deposits.

The primary, unifying visual characteristics of the landscape of the Arctic Coastal Plain are its essentially flat nature, expansive views, and very low vegetation—all evident year round—as well as the many lakes and ponds (poor drainage), and ground and vegetation patterns influenced by permafrost. It differs from other mostly treeless plains primarily in the preponderance of surface water in summer.

In addition to the physical characteristics noted in the quotation above, it is worth noting that the climate is dry, averaging 2.6 inches of precipitation per year in the Barrow area, according to the Web site of the National Oceanic and Atmospheric Administration (NOAA). There is little natural spatial enclosure; the characteristic landscape is wide open and exposed. Typical viewing distances are not limited by landforms or vegetation. Exceptions are in the river valleys and the ocean shoreline, from which low bluffs may obscure distant views.

3.1.2 Cultural Modification of the Landscape

The land has been inhabited for thousands of years by Native people. The entire coastal plain is large (some 650 miles east-west, and varying from 30 to 100 miles or more north-south), and many cultural modifications are swallowed up by the mostly-unmodified natural environment. Seven villages exist in the coastal plain, almost all of them widely scattered along on the coastal edge of the plain. Oil and gas development occurs principally in the center of the coastal plain and effectively encompasses Nuiqsut, one village that is located somewhat inland from the coast. The oil and gas development appears from the air as a large network of narrow roads and pipelines connecting nodes of industrial buildings and structures. On still days, layers of air pollution are visible over these developed areas, and during darkness, the lights are a distinct contrast to the rest of the coastal plain. Modern cultural modifications in villages and industrial complexes are typically functional and mostly do not appear to be designed for visual quality or aesthetics. Because the area is flat and without trees, even low structures are visible over long distances.

From the air, the pattern of roads and pipelines presents an engineered orderliness and attractiveness that creates visual interest and draws the eye. On the ground within developed areas, there is a great deal of industrial storage and buildings (whether homes and offices in communities, or industrial buildings in the oilfields) that appear in aggregate to be mismatched and cluttered. In the less-developed areas across much of the coastal plain there are old gravel pads and airstrips that were created for oil and gas exploration or military or other uses, but most currently are not in use. These may be visible from the air, but without substantial relief or structures built upon them, they usually are not visible when seen from the ground except when immediately upon them. East and west of the greater Prudhoe Bay/ Deadhorse area that is widely developed, the coastal plain is principally undeveloped, with natural elements dominating.

3.2 SCENIC QUALITY EVALUATION: THE ARCTIC LANDSCAPE

3.2.1 Basis for Scenic Quality Evaluation

BLM Manual H-8410-1 states "Scenic quality is a measure of the visual appearance of a tract of land" and provides a method for giving public lands an A, B, or C rating "based on the apparent scenic quality which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications." For a given tract of land, or "scenic quality rating unit," each of these factors is ranked on a comparative basis with similar features elsewhere, especially other parts of the same physiographic province. The rankings are compiled into the overall A, B, or C rating (A indicates better overall scenic quality and C worse).

The physiographic province for the Point Thomson Project site is the "Arctic Coastal Plain," as described in the previous section, with the "Arctic Foothills" province adjacent to the south and the ocean adjacent to the north. The "adjacent scenery" factor considers the adjoining provinces.

The BLM manual provides further background on the application of the scenic quality ratings as follows:

> An important premise of the evaluation is that all public lands have scenic value, but areas with the most variety and most harmonious composition have the greatest scenic value. Another important concept is that the evaluation of scenic quality is done in relationship to the natural landscape. This does not mean that man-made features within a landscape necessarily detract from the scenic value. Man-made features that compliment the natural landscape may enhance the scenic value. Evaluations should avoid any bias against man-made modifications to natural landscape. –BLM Manual 8410

3.2.2 The Scenic Quality Rating

3.2.2.1 Introduction to Scenic Quality Rating Unit and Summary of Rating Results

This section applies the BLM's scenic quality rating system to a specific tract of land, or "Scenic Quality Rating Unit," as a way to measure scenic quality.

BLM Manual H-8410-1 states: "Rating areas are delineated on a basis of: like physiographic characteristics; similar visual patterns, texture, color, variety, etc.; and areas which have similar impacts from man-made modifications." For purposes of this assessment, the portion of the primary study area that is within the 20-mile radius shown in figures is considered to be one single scenic quality rating unit—referred to here as the Point Thomson Scenic Quality Rating Unit. The foothills and mountains would be separate rating units but are sufficiently distant from the study area that they are not described in detail but are considered as adjacent views. The coastal corridor portion of the primary study area was not formally examined for scenic quality. However, based on observations from the air flying between Deadhorse and the Point Thomson area, and based on views on the ground in the Deadhorse area, it appears that the landscape is substantially similar, with the exception of cultural modification in the form of industrial developments. From east to west, these facilities begin at Bullen Point, a coastal radar station and airstrip that began during the Cold War era as a part of the Distant Early Warning Line (DEW Line). Near Bullen Point is the Badami development and its pipeline along the coast from Badami toward Endicott. In the Endicott area, in addition to pipelines, there are permanent roads and the edges of relatively dense network of facilities in the greater Prudhoe Bay/Deadhorse area.

The following subsections rate the Point Thomson Scenic Quality Rating Unit for each category, typically on a 1-5 scale, with high scores indicating high distinctiveness. BLM criteria for the ratings appear in the Appendix.

The subsections provide narrative detail as the basis for scoring the elements of the scenic quality rating unit and for determining an overall scenic quality rating (A, B, or C) for the area. Table 1 summarizes the scores from below to arrive at a total Scenic Quality Score: Based on the following evaluations, and on a sum of the scores presented, a preliminary scenic quality rating of "A" has been assigned for the summer and "B" for the winter for the Point Thomson Scenic Quality Rating Unit. Both ratings indicate relatively high scenic quality, with winter lower than summer based primarily on lack of visible vegetation or water (and therefore less visual variety), and reduced variety of color and textural contrast in the landscape.

Table 1: Summary of Scenic Quality Rating for the Point Thomson Unit

Characteristics	Ratings		Basis for Rating
	Summer	Winter	
Landform	3	3	"Striking" in expansiveness of plain; "detail features interesting though not dominant or exceptional."
Vegetation	4	1	"A variety of vegetative types as expressed in interesting forms, textures, and patterns" but on a scale mostly visible in the close foreground. Vegetation not visible in winter.
Water	5	1	Ocean, large braided river, and extensive ponds create variety and interest in summer. Lack of liquid water in winter.
Color	4	3	Variety of color in combination of vegetation and water in summer. In winter, the changing quality of light as reflected in the snow.
Adjacent scenery	5	4	Adjacent mountain and ocean scenery greatly enhances visual quality. Ocean is less visible in winter when frozen.
Scarcity	3	3	Area is "distinctive, but somewhat similar" to other areas of the coastal plain and quite unusual overall in the U.S.
Cultural modification	0	0	"Modifications add little or no visual variety to the area, and introduce no discordant elements."
Total score	24 (A)	15 (B)	

BLM Manual 8410 indicates ratings as follows: A = 19+ / B = 12-18 / C = 11 or less See guidance from BLM Manual 8410 in the Appendix regarding these ratings.

Detail on the origin of the scores in each category appear in the following paragraphs. BLM guidance on these ratings appears in the Appendix.

3.2.2.2 Landform

The principal landform is the coastal plain, with coastal landforms such as a very low bluff shoreline, low curvilinear barrier islands and spits of land with similar low bluff shorelines, and a major river delta at the mouths of the Staines/Canning River. No large pingos (ice-core hills) exist around the proposed drilling sites and few to the west along proposed pipeline routes. The BLM scenic quality inventory and evaluation chart in the Appendix highlights striking peaks, canyons, and cliffs as the most highly rated landforms. The coastal plain is not striking in this way but is striking in its vast expansiveness, and "detail features which are interesting though not dominant or exceptional," such as the shoreline, spits of land that extend into the ocean, and the complex river delta, which are features common in this area that are

not as common farther west along the coastal plain. A score of 3 has been assigned and applies to both summer and winter.

3.2.2.3 Vegetation and Ground Cover

Vegetation includes a variety of low wetland vegetation types interspersed with substantial open water. There are no trees. Virtually all vegetation is wetland vegetation, but there are variations between "moist tundra" areas (22 percent), "wet tundra" areas (20 percent), complexes of these two types (17 percent), and the open water ponds visible in summer (35 percent). The tundra environments are dominated by sedges and dwarf shrubs, in different proportions depending on "moist" or "wet" conditions and microclimates. Some areas have tussock-forming cotton-grass. Dwarf shrubs, also in different proportions depending on moisture content, include willows and entire-leaf mountain avens. Frost boils occur in some locations, resulting in barren and partially vegetated areas.

The pattern of low-growing vegetation is complex in some areas and visually interesting, including "patterned ground" that is a distinctive arctic feature. Permafrost soils, along with ice wedges or lenses close to the surface, affect vegetation patterns. These arctic soil conditions are visible as irregular, interlocking polygons dozens of feet across defined visually by vegetation and micro-topography. River margins may include some taller willow brush, but typical vegetation throughout the study area is barely ankle-high. River deltas consist of coarse sand and gravel bars that are lightly vegetated, and low ocean bluffs and beaches show similar material, so that dark rock of various small sizes and a variety of colors in shades of black, gray, brown, and red are evident.

The visual variety in vegetation is on a small scale, visible principally in the immediate foreground. Over the entirety of the coastal plain, the vegetation pattern is similar—low plants in irregularly alternating patches over a vast plain, interspersed at intervals by river drainages and gravel bars. From any given location, taken on this larger scale, the vegetation pattern can appear similar. In winter, most vegetation and ponds are snow covered, and the sense of uniformity of the ground cover is greater. Wind sculpted snow, and even the sinuous patterns of blowing snow, provide interest in ground cover in winter but appear quite uniform over vast areas. These patterns of summer vegetation and winter snow cover are similar across the Arctic Coastal Plain physiographic province. A score of 4 has been assigned for summer, reflecting "a variety of vegetative types as expressed in interesting forms, textures, and patterns" but on a scale mostly visible in the close foreground. For winter, during times of snow cover, a score of 1 has been assigned, reflecting "little or no variety or contrast in vegetation," because vegetation is principally not visible.

3.2.2.4 Water

In summer, water is a dominant feature of most of the coastal plain and adjacent ocean (the Beaufort Sea). In the area that is within about four miles of the coast (not the entire Point Thomson Scenic Quality Rating Unit), one-third of the "land" is the open water of multiple ponds. Other parts of the coastal plain may include greater percentages. On a slightly broader scale, the area proposed for drilling and support facilities is somewhat unique on the Arctic Coastal Plain because it is on the lower edge of an old delta of the Canning River, which appears from aerial photographs to have a different drainage pattern than areas farther west. Parts of the study area that are inland farther than about four miles present more continuous vegetation cover, while the lake pattern in most other parts of the coastal plain extends inland 10 to 50 miles or more.

Running water occurs in small rivulets and lake drainages and in the much larger Canning River. The Canning River runs in a broad gravel bed and braided channels, with enough turbulence and waves to disturb the surface and creates a texture of lighter and darker areas and alternating patterns of rougher and still waters. However, there are no dramatic drops or falls.

The coastline in the study area is buffered by barrier islands about two miles offshore. Ocean water can be ice-free in summer but is subject to a dynamic pack of arctic sea ice that floats in and out, often changing the visual seascape very quickly. This is typical of the arctic coastal margin. Ocean water conditions range from calm to stormy, and the ocean is capable of shoreline erosion. For much of the year all water, including ocean water, is completely frozen over, and the ice is covered by usually dense and wind-sculpted snow of shallow depth. Ocean and land in winter may often be barely distinguishable, and most ponds are entirely indistinguishable from the surrounding land. Larger lakes and the active Canning River delta may be partially blown clear, with multicolored ice visible. In breakup in late May and early June, the ponds thaw in a variety of colors (light blue, yellow, green/olive, dark blue), with water and ice apparently colored by soil and vegetation. Water bodies exist in great variety, including ponds of different size and shape, ocean lagoons and the open sea, freshwater rivulets and the much larger braided river, and the river delta. Because of this variety and the preponderance of water, a score of 5 has been assigned for summer. Because of the relative lack of liquid water in winter, a score of 1 has been assigned for the snow season.

3.2.2.5 Color

Color of the landscape varies intensely with the season and the natural lighting. During snow seasons (mid-September through May, with patches of snow remaining through June) the landscape color reflects daylight in shades of blue and white and otherwise reflects the color of sunlight. The high latitude means low-angle sun year round, but particularly in winter, and a substantial period when the sun never rises above the horizon (approximately November 25 through January 16 each winter) so that the full “day” may be shades of sunrise and sunset for several hours. During mostly-clear days, the gold, rose, and orange colors of sunrise and sunset color the snow. On cloudy days, and on days with severe blowing snow (even if otherwise mostly clear), the light can be “flat.” During days of flat lighting, the land, sea, and the sky may all blend together in one uniform color with no shadow and little or no contrasting features, causing visual disorientation. (The uniform color may vary from bright white to gray-blue). In spring, when the snow cover is still virtually 100 percent but the sun has returned (staying above the horizon for 24 hours approximately May 17 through July 27), the surface most of the day can be brilliantly white, and the most reflective highlights as if fluorescent. During sunny days during the snow season, snow drifts create shadows in shades of blue. Because the coastal plain and ocean are flat, the sky is a dominant feature, varying in color itself depending on cloud cover and sun color.

During summer, for a few months, the Arctic Coastal Plain appears much different. The coastal plain presents a rich variety of color. Lakes, ponds, and the ocean may reflect bright sunlight in white or bright gold tones, or may appear black or deep blue, depending on the angle of view and angle of the sun. Vegetation presents in various shades of green and warm colors from yellows, to oranges, to browns. The greenest period is quite short, from mid-July to mid-August. During autumn, yellow, oranges, and some reds predominate until leaves fall or snow covers the landscape. During the latter half of summer, sea ice may drift in and out rapidly, changing the ocean surface to the mottled bright white of reflected snow and ice interspersed with the sharply contrasting dark water. Summer presents the greatest color combinations and the unusual dynamics of a changing ocean surface. Based on these color qualities, a score of 4 has

been assigned for summer. In winter, based principally on the changing quality of light as reflected in the snow, a score of 3 has been assigned.

3.2.2.6 Adjacent Scenery

The scenery adjacent to the Point Thomson Scenic Quality Rating Unit includes two features that add a great deal of variety to the visual environment: the ocean with offshore barrier islands, and the Brooks Range Mountains, which rise to elevations of 3,000-8,000 feet above sea level. From the proposed project site, the mountains are relatively distant, with the nearest about 30 miles inland, and the ocean near—immediately adjacent or within about two miles depending on the project component. At the coast, the ocean influence adds appreciably to the visual environment in summer, providing a striking contrast to the vegetated wetlands on land, and providing interesting low but curvilinear barrier islands about two miles offshore and a variety of similar spits, bars, and points along the mainland itself. The mountains from many parts of the coastal plain are so distant as to be not visible on most days, but in the eastern end of the study area the coastal plain between the mountains and the ocean is narrower than virtually anywhere else (about 30 miles wide), and so it is common to see the mountains from the coast and ocean. The mountains, as adjacent scenery to the south of the study area, are distant but provide important visual contrast to the flat coastal plain. Because adjacent mountain and ocean scenery greatly enhances visual quality, a score of 5 has been assigned for summer. For winter, a score of 4 has been assigned, because the ocean is frozen over much of the snow season and does not provide the same contrast to the inland areas.

3.2.2.7 Scarcity

There is substantial similarity in the natural landscape across the coastal plain, without many visual characteristics that are truly unique or scarce within this physiographic province. However, compared to other parts of the United States, the coastal plain in its entirety is unique. The central and coastal areas of the Arctic Coastal Plain have cultural modifications at villages and in the loosely sprawling oil and gas developments that spread out from Prudhoe Bay. The western and eastern portions of the coastal plain have a high degree of wilderness quality, including large areas without cultural modifications within view. The coastal plain in general provides outstanding opportunities for wildlife viewing, including viewing of large dynamically moving herds of caribou at some times of year, one of the only places in the U.S. where this viewing opportunity exists. The opportunity to view musk ox, polar bears, and other rarely seen species also exists. The eastern portion of the Alaska coastal plain narrows to a band of plain about 30 miles wide—one-fourth the width to the west—resulting in a unique (or scarce) area within the coastal plain where the mountains, the plain itself, and the ocean all are within close proximity and inter-visible, heightening the visual quality of the eastern area. Because this eastern area is “distinctive, but somewhat similar” to other areas of the coastal plain, a score of 3 has been assigned.

3.2.2.8 Cultural Modifications

In the study area there are several preexisting gravel pads, widely scattered, and ExxonMobil has recently made new use of one existing pad for current drilling operations associated with this project. The visual environment baseline for this project is without these existing Point Thomson well drilling operations. There is also evidence of past military and other use of the offshore islands and general human use in isolated pockets (e.g., rusted drums were observed in beach gravel and at Brownlow Point and the USFWS has a research camp within the Canning River Delta). The BLM guidance for cultural modifications presents a numeric rating scale that includes positive and negative numbers (i.e. man-made

objects can complement or detract from scenic quality of the landscape unit)—see the scenic quality inventory and evaluation chart in the Appendix. Considering the physiographic province as a whole, the description from the chart that best fits is the neutral one (score 0): "modifications add little or no visual variety to the area, and introduce no discordant elements."

3.2.2.9 Other Visual Resource Issues

There are several other visual resource issues specific to the Arctic Coastal Plain and study area that are not directly addressed in BLM methods but that help to define the visual environment. These include:

- Atmospheric effects/mirage
- Darkness/light effects
- Arctic haze, ice fog, and blowing snow

Atmospheric Effects/Mirage

A mirage is formed when the atmosphere behaves as a lens. Mirages are normally seen near the horizon and involve image displacements and distortions (American Meteorological Society, no date). An arctic mirage, or hillingar, results from the existence of relatively cold air next to the ground surface. That cold layer exists because a cold snow, ice, or water surface extracts heat from the air just above. In the arctic mirage, a distant object appears normal (i.e. not inverted, as in a desert mirage) but higher than the object's actual location (Davis 1979). This effect can take the form of making objects (ice floes, mountains, etc.) look larger or taller than normal, and can make objects from beyond the horizon appear visible, reportedly (but not usually) at distances of up to 300 miles away (Davis 1979). Fata Morgana is a similar effect that can expand viewed objects vertically in a sort of layer-cake image. These mirage effects add to the sense of a dynamic visual landscape in the study area (moving ice packs on the ocean and the movements and caribou that may make a large portion of the viewed area from a given point appear to be in motion also contribute to this sense of changing views, in addition to movement of clouds and clouds shadows as are common elsewhere). Mirages reportedly are common on the Arctic Coastal Plain, and minor mirage effects were observed both in winter and summer during fieldwork for this study. For example, mirage effects to the Brooks Range made the mountains looks somewhat taller to observers during March 2010 field work, and in July equipment at the C-1 Pad appeared somewhat enlarged when viewed from the coastline.

Darkness and Light

The arctic is known for its extremes of darkness and light, when the sun does not rise above the horizon in mid-winter and does not set below the horizon in mid-summer. This does not mean there is darkness around the clock in winter, but the days are short—approximately five hours of civil twilight on the shortest day of the year, the December 21 Winter Solstice. At night, with little or no artificial light outside of the seven small villages and the oil and gas developments, hundreds of square miles of land are subject to natural darkness. The project site is within these areas of natural darkness. Observers in these areas subject to natural darkness may be particularly sensitive to light in the night sky—the moon, stars, and Aurora Borealis. The artificial light that does exist on the Arctic Coastal Plain may be visible over long distances, because the terrain is flat and without screening vegetation, and because artificial light reflects off of snow on the ground, ice fog crystals in the air, and low cloud layers. Thus, reflected artificial light may be visible in the air even when the curvature of the earth precludes line-of-sight observation of the light source. Vertical projection of individual lamps in ice fog crystals is common in the arctic as well,

giving the appearance of a tube of light projected skyward from each lamp. During travel for this project, unofficial comments from residents of Kaktovik reported a glow in the sky from the current Point Thomson development as seen from their community 60 miles away.

Natural darkness is a feature of wilderness areas that outdoor recreation and wilderness advocates value highly. For example, researchers on the night sky topic state, "the present-day effort to save night skies is not merely analogous to, but an integral part of the wilderness ethic" (Duriscone 2001). The NPS maintains a Night Sky Team and a Natural Lightscapes program to address this issue, and its Web site states, "dark night skies are not only a resource unto themselves, but are an integral component of countless park experiences." In the Point Thomson area, Arctic Refuge lands on the coastal plain in the study area (the 1002 Area) are managed in part to maintain wilderness values or, farther away, are actually designated as part of the National Wilderness Preservation System. Artificial light visible from these areas could be a management issue for the Arctic Refuge, although the refuge does not currently have any management objectives specifically associated with the night sky.

Haze, Fog, and Blowing Snow

Haze: According the U.S. Environmental Protection Agency's "Visibility" web site (www.epa.-gov/visibility/what.html), haze occurs when sunlight encounters tiny particles in the air. These particles absorb some of the light, and the rest is scattered. More pollutants mean more absorption and scattering of light, which reduce the clarity and color of what the human eye sees. "Arctic Haze" is a term for haze visible at high latitudes. It is a haze of air pollution that has been tracked to industrial uses, usually hundreds or thousands of miles away.

Fog/Ice Fog*:* Fog and ice fog are common on the Arctic Coastal Plain and can both obscure a view and can be lit from within and cause artificial light to be projected in the sky, making the light visible over long distances. These effects were observed in the field and have been reported by local residents.

"According to international definition, fog reduces visibility below 1 km (0.62 mile) and differs from cloud only in that the base of fog is at the earth's surface while clouds are above the surface. Visibility reduction in fog depends on concentration of cloud condensation nuclei and the resulting distribution of droplet sizes" (American Meteorological Society, n.d.).

Ice fog is composed of suspended particles of ice. It occurs at very low temperatures, and usually in clear, calm weather in the arctic. In daytime, the sun usually is visible through the ice fog and may cause halo phenomena. Ice fog is rare at temperatures warmer than -22 F and increases in frequency with decreasing temperature until it is almost always present at air temperatures of -49 F in the vicinity of a source of water vapor, such as open water, herds of animals, volcanoes, and products of combustion for heating or propulsion (American Meteorological Society, n.d.). As an element of a viewed landscape, ice fog, like normal fog, can obscure views. But it also can make artificial lights more visible by projecting the light vertically and can add interest in halo and rainbow type effects.

Blowing Snow: With flat terrain, frequent wind, and cold, dry conditions much of the year, the Arctic Coastal Plain is subject to blowing snow and ground blizzards that can dramatically reduce visibility, even on otherwise clear days. Snow particles blow across the surface, and finer particles lift into the air to heights of 100 feet or more above the ground. From the ground on a clear day, the sun may be visible in the sky but horizontal visibility through blowing snow may be very low—measured in tens of feet. On overcast winter days, or at times when blowing snow may be mixed with falling snow or fog, the entire view in all directions may appear as a uniform white or blue-gray-white color with no shadows and no

depth perception—sometimes called a whiteout. Less extreme conditions may simply result in a pattern of sinuous threads of blowing snow visible on the surface, and visible on a broad scale from the air.

3.3 SENSITIVITY LEVEL ANALYSIS

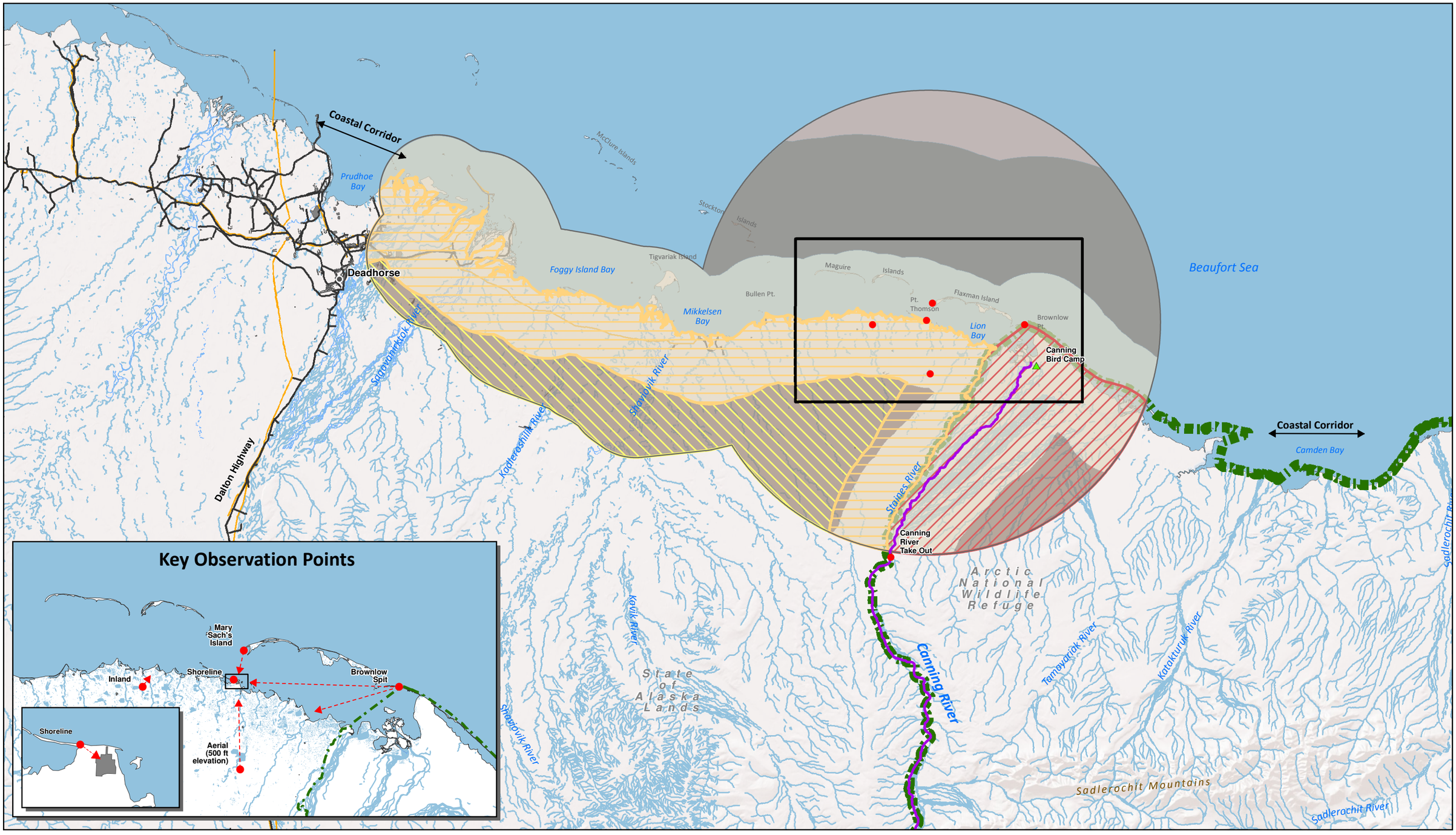
The BLM Visual Resource Inventory Manual states "sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern." BLM specifies five "factors to consider:" type of users, amount of use, public interest, adjacent land uses, and special areas. The paragraphs below explain each of these. The conclusion of the following discussion is that the high profile of the Arctic Refuge among the public and its management for maintenance of high wilderness qualities and values places it in the "high" sensitivity category. It is an "adjacent use" for the state land on which the project is proposed. The state land is rated "medium" sensitivity. Figure 3 shows the study area with several overlays, including sensitivity levels. The same "medium" sensitivity is applied to areas along the coast, because the coast is a travel corridor and use area for subsistence hunting and camping by residents of the North Slope Borough, for recreation, and for general transportation by boat and snowmachine. Other state lands farther inland are rated "low" sensitivity because of low human use and because it is not managed for visual values. Detail on these sensitivity levels is described in the remainder of Section 3.3.

3.3.1 Type of Users

There are three basic categories of user in the study area: local residents of the North Slope Borough camping in, hunting and fishing in, or transiting the area on the ground or transiting the area in the air; recreational or tourism visitors on the surface or in the air; and industrial workers on the surface or in the air. Figure 3 shows the surface travel corridors commonly used in the study area:

- A coastal corridor paralleling the shoreline but encompassing an area from a mile or two offshore to a mile or two inland. This corridor would be used by boat, by snowmachine on sea ice or inland, and on foot.
- A Canning River corridor following the main stem of the river but encompassing land areas on both sides in which river travelers would be most likely to camp, hunt, and hike.

Air travel routes (not shown on the figure) are generally north-south and east-west. North-south traffic typically is aircraft flying over the Brooks Range on standard routes between Fairbanks and Kaktovik and charter flights to pick up people from the Canning River. East-west traffic includes overflights on standard routes between Deadhorse and Kaktovik.



POINT THOMSON PROJECT EIS

- Existing Facilities
- Arctic National Wildlife Refuge
- Water Body
- Stream
- Existing Road
- Existing Pipeline
- Primary Study Area Boundary
- Canning River Corridor
- Key Observation Point

Visual Sensitivity Level

- High
- Medium
- Low

Distance Zones

- Foreground-Middleground - 5 miles from Travel Corridors
- Background Seen- 5-15 miles from Travel Corridors
- Seldom Seen Zone - Remainder of Lands and Waters in Primary Study Area

Scenic Quality Rating Unit: The Point Thomson Scenic Quality Rating Unit is the all the land areas within the primary study area circle

Visual Resource Classification: Arctic Refuge lands in the primary project area are Class I, and all other lands in the primary study area are class III (see text)

N

0 5 10 Miles

Figure 3

Scenic Quality Inventory Mapping and Key Observation Points

Date: 7 June 2011
Map Author: HDR Alaska Inc.
Sources: ExxonMobil 2009; PND Engineering 2009; USFWS 2009 BP Exploration 2008, 2009; Alaska DNR 2009; ESRI 2009; NHD 2009; HDR 2009

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3.3.1.1 Local Residents

Based on project scoping and a general level of concern expressed about changes in their area, local residents of the North Slope Borough are thought to have moderate to high sensitivity to changes in the visual environment. Typically, they visit the study area for subsistence hunting, fishing, or gathering. Some areas, particularly along the coast, have a long cultural history among some local residents, and local people are emotionally attached to the land, including its visual environment. Although the Iñupiat people do not typically think of their subsistence lifestyle as recreation, and specifically have addressed recreation as something visitors do, there is, in western cultural terms, a recreational element to subsistence activity—camping, getting away from one's usual daily routine, reconnecting with family, and enjoying the natural quiet and scenery. Access to and from Kaktovik may be by boat along the coast in summer, by snowmachine parallel to the coast in winter, and by scheduled flights over the study area. The coastline, in general terms, may be considered a broad travel corridor, although no specific route is defined. Low numbers of local residents transit the industrial western edge of the primary study area near Prudhoe Bay and Deadhorse. Some Nuiqsut residents travel the roads by private car with permits. Others transit the coastal corridor via snowmobile and boat. Because of the industrial development, relatively little hunting and camping is likely to occur in this portion of the study area.

3.3.1.2 Recreation and Tourism Users

Recreation and tourism users include river floaters on the Canning River, private pilots flying over or landing, backpackers, ocean kayakers, and hunters on the coastal plain, in the coastal corridor, and adjacent to the primary study area in the Sadlerochit Mountains. Offshore, there are occasional arctic cruise ships that transit the area. Most people recreating on the ground (rather than flying over, paddling, or touring on a cruise ship) come to visit the Arctic Refuge, but some venture onto neighboring state land. None of these user types occurs in large numbers, but their sensitivity generally is thought to be high. The Arctic Refuge logs just over 100 recreationists on the Canning River in the average summer.

The Canning River, a common float trip in the Arctic Refuge, can be considered a recreational travel corridor, along with an area alongside it used for camping and short walks. The coast may also be considered a recreational travel corridor by a few; the coastal corridor likely gets more use by local residents than visitors from outside the area.

The Arctic Refuge Comprehensive Conservation Plan (1988), coupled with other documents regarding users of designated or nondesignated wilderness areas, indicate that recreationists come for wilderness qualities of the area. Many of those who visit are likely to be highly sensitive to seeing other parties, litter, or footprints in the immediate foreground or human development or artificial light at any distance during their visit for the following reasons (among others):

- Most users specifically come for a wilderness experience (Christensen 2009).
- The area is remote and requires considerable investment of money and time to visit. The average stay is nine days according to the Arctic Refuge (Reed 2010 pers. comm.).
- The rhetoric and polarized views expressed in the national media and in public opinion campaigns about wilderness values vs. hydrocarbon development values on the Arctic Coastal Plain portion of the Arctic Refuge heightens sensitivity.

Because most visitors on the ground access the area via small aircraft, they will see the area from the air as well as from the surface.

At the western edge of the primary study area near Prudhoe Bay and Deadhorse are larger numbers of tourists and recreationists who drive the Dalton Highway for pleasure and adventure. Others arrive by air. Some of them take organized bus tours through the industrial facilities to see the facilities and the Arctic Ocean (private cars are not allowed; there is no public access to the ocean except by bus). This group of recreationists is likely to be less sensitive overall to the visual environment because they are coming to see or expect to see industrial facilities.

3.3.1.3 Industrial Workers

Industrial workers are likely to be the least sensitive category of the area's users. Occasional oil and gas exploration activity has occurred in the study area, outside of the current drilling operation at Point Thomson. Cleanup of old contaminated sites has been on-going in 2009-2010 at Bullen Point radar station (a federal facility west of Point Thomson) and at old oil and gas drilling locations, and activities like these could continue in the future with or without the Point Thomson Project. The largest influx of workers, however, is likely to occur if the project is approved and operates for many years. Workers typically are not allowed to go off the developed areas except for specific work purposes, and such work is relatively rare. Most work is indoors. Presumably workers might enjoy the view when outdoors or when flying in and out, but because they expect to be staying at an industrial facility, their overall sensitivity level is considered low. Large numbers of industrial workers occur at the western edge of the primary study area near Prudhoe Bay and Deadhorse.

3.3.2 Amount of Use

The level of use in the study area is low compared to designated public recreation land areas across much of the United States. Because the area of the Arctic Refuge adjacent to the Point Thomson Project is managed for its wilderness qualities, including low encounters with other groups, low use levels meet the expectations of users, including visual expectations. Management for maintenance of wilderness qualities implies use is not likely ever to be high on Refuge lands as it is at highly accessible and much more developed areas in national parks like Denali National Park and Preserve (in excess of 335,000 visitors annually, according to the Denali National Park Web site). As an example of the main use in the area, the Arctic Refuge reports an average of 147 people per year using the Canning River corridor (range 99-204), and a little more than 1,000 visiting the entire Arctic Refuge annually. Because the Arctic Refuge does not have a way to count all visitors, these numbers are considered the minimum. There are no counts of users of the coastal corridor. Kaktovik residents are reportedly the most common users of the coastal corridor in the study area, and Kaktovik's entire population in 2009 was 286, according to the Alaska Division of Community & Regional Affairs Web site. One or two cruise ships per summer appear to transit the area offshore, and each ship likely contains more people than see the study area from the Canning River or coastal plain each year. Overflights include Canning River users, virtually all of whom fly in and out in small aircraft, near daily flights to and from Kaktovik that traverse the study area at relatively high altitudes (likely at or above 1,000 feet), and current and projected future project-oriented flights that would land and take off at the project site daily. The western end of the study area is the Prudhoe Bay/Deadhorse area, which has high use by industrial workers and some tourists terminating their highway trips or wishing to see the industrial facilities.

3.3.3 Public Interest

Concern on the part of the public for visual quality of the area, particularly the Arctic Refuge lands, is evident in the years of public controversy about opening the 1002 Area to oil and gas development, or

designating it as part of the National Wilderness Preservation System. The Arctic Refuge is also the subject of many books published over several decades celebrating its wilderness qualities, responding to the perceived threat of oil and gas development to wilderness qualities and wildlife, or examining the interplay of these issues.[1] These books, and similar articles and films, are indicative of and contribute to public interest in the area.

3.3.4 Adjacent Land Uses

See Special Areas, below. The Arctic Refuge's overlap with the study area heightens the visual sensitivity rating of the area, based on public concern for such areas.

3.3.5 Special Areas

BLM Manual 8410 describes "special areas" in part by example, including "Natural Areas, Wilderness or Wilderness Study Areas, Wild and Scenic Rivers,[2]" and several others. Manual 8410 also emphasizes management objectives, stating that designation as one of the example types "does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting." The 1002 Area of the Arctic Refuge is a "minimal management" area that has a high profile among the public nationally, among the land managers, and among elected officials. It is managed in part to maintain the existing natural landscape setting and visual values, which include seeing little or no human development. The 1002 Area is not one of the named examples of "special areas" in the BLM manual, which is focused on BLM categories, but its "minimal management" status under the USFWS and its high profile make it similar to a "special area" as defined and, in any case, more sensitive than the adjacent state land on which the project is proposed. The state land is not included in any special area of this kind. Rather, the proposed project site is managed as an oil and gas lease sale area by the Alaska Division of Oil and Gas.

3.3.6 Delineation of Sensitivity Level Rating Units

Refuge lands within the primary study area are rated "high" sensitivity, because they are equivalent to a "special area" as described in the preceding subsection. State lands adjacent to the refuge boundary and state lands with the coastal corridor are rated "medium." Although the appearance of the land itself is virtually identical on each side of the state-federal boundary, and although the study area overall has high wilderness values and natural scenic qualities, the sensitivity of the refuge is higher because of its management, the types of users attracted to it, and the public interest in the area. The immediately adjacent state land is rated "medium" rather than "low" because it is adjacent to and within view of the Arctic Refuge and because it physically has the same qualities as the Arctic Refuge land. Public interest is lower, and the state manages the area for oil and gas development, although until this project there has been no long-term industrial development. Similarly, state lands along the coastal corridor are rated "medium" because of the use of the corridor by local residents and by recreationists likely to be seeking a mostly natural experience. Other state lands farther inland and at the developed areas of Prudhoe Bay (far

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1 An Internet search of Amazon.com books on Arctic National Wildlife Refuge returned 2,401 results, compared to other random but known examples, as follows: Everglades National Park (480), Denali National Park (353), and Kenai National Wildlife Refuge (185).

2 At this printing, an Arctic Refuge planning process may evaluate the Canning River for recommended designation under the Wild and Scenic River Act. At this time, it is not designated.

western end of the project area) are rated "low" sensitivity. The bands of sensitivity zones along the Arctic Refuge boundary and the coastal corridor are five miles wide, corresponding with the "foreground-middle ground" distance zone explained in the next section. See Figure 3.

3.4 DISTANCE ZONES

BLM Manual 8410 states:

> Landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. The three zones are: foreground-middle ground, background, and seldom seen. The foreground-middle ground zone includes areas seen from highways, rivers, or other viewing locations which are less than 3 to 5 miles away. Seen areas beyond the foreground-middle ground zone but usually less than 15 miles away are in the background zone. Areas not seen in the foreground-middle ground or background (i.e., hidden from view) are in the seldom seen zone.
>
> The distance zones provide valuable information that can be very useful in the sensitivity analysis. For example, the foreground-middle ground zones are more visible to the public and changes are more noticeable and are more likely to trigger public concern.

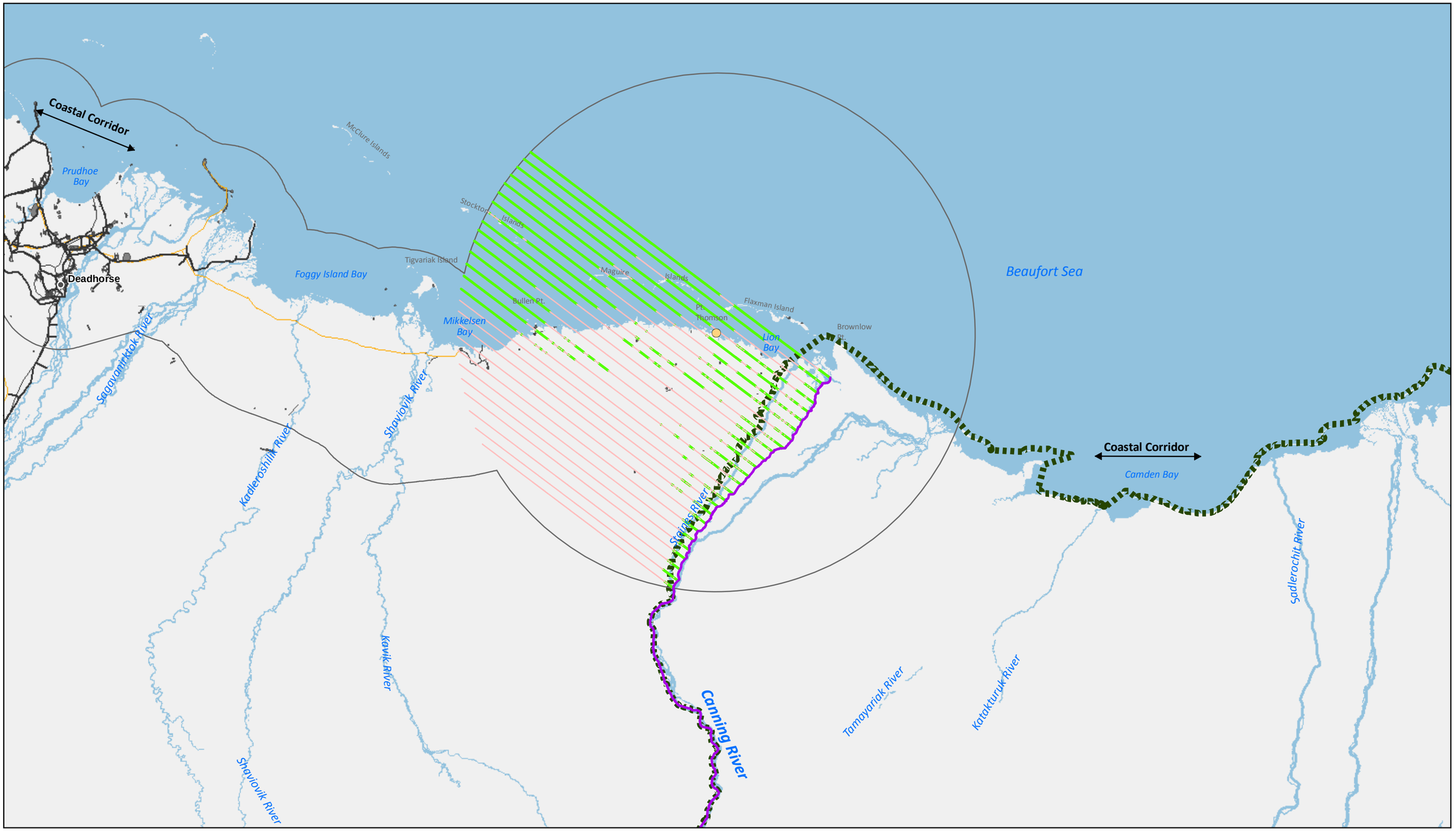
For this project, two general travel corridors were defined—a Canning River corridor, based on recreational floating of the river and associated camping and hiking in the river area, and a coastal corridor, based on summer boat travel along the coast and winter snowmachine travel in this same general alignment on snow-covered sea ice or land.

Because there is little in the natural environment to restrict visibility, this document uses the outer limit of BLM's guidance for the foreground-middle ground zone (five miles rather than three miles). The background zone is the area between five miles and fifteen miles from the corridor. The seldom seen zone is that area beyond 15 miles from the corridor. For purposes of impact assessment, several KOPs were selected at various distances from the project site and generally in association with the two surface travel corridors, but these are not necessarily exact locations known to attract viewers.

Figure 3 illustrates the distance zones. A north-south line reflects the Canning River corridor, and the coastline itself reflects an east-west coastal corridor. For each line, a five-mile offset illustrates the foreground-middle ground zone. Similarly, a zone offset from 5 to 15 miles illustrates the background distance zone. Areas beyond 15 miles comprise the seldom-seen zone. All of the primary study area except for a small portion of the ocean falls within the background or foreground-middle ground zones from these corridors.

In landscapes with greater topographic relief and forests to frame views, it would be possible to more clearly define areas within the foreground-middle ground zone or background zone that would actually be visible from a corridor.

Figure 4 illustrates a GIS modeling exercise for the Canning River corridor that helps define areas that might or might not be visible from the corridor. For this exercise, the Canning River corridor viewing area was defined by a line set on the main channel of the river (based on information from the USFWS about the most common float route).



POINT THOMSON PROJECT EIS

- Arctic National Wildlife Refuge
- Existing Facilities
- Water Body
- Existing Pipeline
- Existing Road
- Stream Line - Small Scale

Line-of-Sight from Canning River

- Visible from Observer on Canning River
- Not Visible from Observer on Canning River
- Primary Study Area Boundary
- Canning River Corridor

Note: This image illustrates the line-of-sight to the northwest from points at 1,000-foot intervals along the Canning River corridor. This model is meant to help illustrate how much of the study area might be visible to a recreationist seated on a raft in the river. The observer height is modeled at 3 feet above the surface elevation. The "target" for modeling purposes is the ground or water surface at the boundary of the study area circle (20-mile radius around Point Thomson). The parallel lines indicate surface areas that would be visible without intervening topography. Curvature of the earth is not accounted for in this model, and this model does not account for reductions in visibility based on atmospheric conditions. The digital elevation model in this area is considered "coarse," with elevation values assigned based on a cell size of approximately 65m by 65m (i.e. no actual elevation change that may exist within 65m is noted). This is meant as a tool to help understand how much of each distance zone and area of sensitivity (see Fig. 3) might actually be visible. Note that increases in target height or observer height would be expected to rapidly increase the surface area that would be visible (compare Fig. 2).

N

0 2.5 5 Miles

Figure 4

Areas Visible West of the Canning River Corridor

Date: 18 October 2010
Map Author: HDR Alaska Inc.
Sources:

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Using points at 1,000-foot intervals along the line and at three feet above the surface elevation (to approximate eye-level of someone sitting in a raft), the model examined surface-to-surface visibility (areas that should be visible without intervening topography). The model is limited by the coarse digital elevation model available in this remote area (grid size 65 meters, or 213 feet), but it helps to illustrate that large parts of the foreground-middle ground zone would likely not be blocked by bluffs and would be visible, especially at the lower end of the river. It also shows that some parts of the standard five-mile off-set foreground-middle ground zone likely would not be visible. Field work by helicopter near the Canning River Take-Out, where some rafters end their trips, indicated that low river bluffs in that area were enough to limit the view principally to the river area between the bluffs.

For mapping the coastal corridor, cartographers used the mapped shoreline itself to approximate the travel corridor. The corridor is not specific and is meant to capture travel sometimes on the water and sometimes on land, a corridor that might be used for near-shore boat traffic and onshore snowmachine or foot traffic, and for potential shoreline camps. The shoreline was given five-mile and 15-mile buffers to illustrate the distance zones, as shown on Figure 3. No GIS modeling of the potential view was completed for this corridor, because it is a less specific travel corridor than the Canning River corridor. Most of the inland portion of the study area is assumed to be visible from the coastal area, because the land is gently rising at a fairly uniform rate.

Beyond the background distance zone, the BLM method describes a seldom seen zone. Taking into account the two corridors and the flat, open terrain, virtually all of the study area falls within the background or foreground-middle ground zones. Therefore, project features are likely to be readily visible from many points in the primary study area. It is worth noting that use of these two corridors is low; by most standards, even the foreground is not often viewed, not because of low visibility but because of limited use. Nonetheless, mapping distance zones is a tool to use in conjunction with sensitivity, public use, and type of users to better understand project effects for those who do use the study area.

3.5 VISUAL RESOURCE CLASSES AND OBJECTIVES

3.5.1 Visual Resource Classification

BLM Manual 8410 states:

> Visual resource classes are categories assigned to public lands which serve two purposes: (1) an inventory tool that portrays the relative value of the visual resources, and (2) a management tool that portrays the visual management objectives (of the land managing agency).

The guidance is aimed in part at creating land-management objectives within the context of a BLM management plan for BLM lands. Such use for visual resource classification does not apply here. Instead, this visual assessment seeks to illustrate any existing visual resource management objectives of the USFWS (Arctic Refuge) and the State of Alaska for their lands and to be an inventory tool.

Neither the BLM nor the Corps methods is perfectly suited to state-owned and refuge land in the study area. However, both methods include similar classification systems. The classification system for this assessment draws on both but was developed for this specific document. The classification levels are defined as follows:

- **Class I**: Areas where visual values are strong and where management decisions have been made to preserve visual values.
- **Class II**: Areas where visual values are strong, distinctive for the region, but not protected by management action.
- **Class III**: Areas where visual values are strong, but not necessarily distinctive for the region.
- **Class IV**: Areas where visual values are neither distinctive nor poor. Average visual environment for the region.
- **Class V**: Area where visual values are poor, usually as a result of human activity or physical damage to a landscape, highly contrasting structures or forms, and the visual environment is not harmonious, could be improved, or is in need of rehabilitation.

The Arctic Refuge is assigned as Visual Resource Inventory Class I, because the USFWS manages the area under "minimal management" to maintain the natural landscape. State lands are assigned Class III, based on a scenic quality rating of "A" in summer when virtually all of the highest sensitivity visitation occurs. Because the rating is relatively high and breaks solely on land management/land ownership boundaries, it is not necessary to map the area in detail as might normally be done for a BLM visual resource assessment. Figure 3 shows the Staines River boundary between Arctic Refuge lands (Class I) and state lands (Class III); this corresponds to the area noted as "high" sensitivity.

3.5.2 Objectives for Visual Resource Classes

The BLM method specifies management objectives for different classifications (I, II, etc. as indicated above) for management of BLM lands. In this case, the Arctic Refuge does not have specific visual management objectives spelled out in its management plan or in any resource specific plan (Voss 2010, Reed 2010). Refuge managers have indicated that their visual management guidelines are those generally laid out in the Arctic Refuge's founding purposes and ANILCA purposes, in the Wilderness Act, in ANILCA, and in other legislation and policy. These documents indicate the Arctic Refuge places high value on scenic resources and manages its lands for preservation of visual resources generally, but the Arctic Refuge does not enumerate specific management objectives for visual resources. The state and borough do not substantially address management for visual resources at all. The following sections provide additional detail regarding visual resource management for these agencies.

3.5.2.1 Arctic Refuge Visual Management

The Arctic Refuge plan indicates the USFWS:

> …will identify and maintain the scenic values of the refuge and minimize the visual impact of developments consistent with the constraints imposed by (the management plan as a whole). Refuge facilities and commercial use support facilities will be designed to blend into the landscape. The (U.S. Fish and Wildlife) Service will cooperate with state agencies to prevent any significant deterioration of visual resources. -Arctic National Wildlife Refuge Comprehensive Conservation Plan, USFWS 1988

Arctic Refuge personnel were unaware of any specific or formal cooperation effort with the State of Alaska regarding visual resources (Reed 2010 pers. comm.).

Congress in ANILCA required the Arctic Refuge to identify "special values of the Arctic Refuge;" this was accomplished through the Arctic Refuge's Comprehensive Conservation Plan (CCP; USFWS 1988) which includes "wilderness values" and "scenic and recreational values" as special values. The closest specific area called out as an area of "special value" (both "scenic" and "wilderness") is the subset of the Brooks Range called the Sadlerochit Mountains, the closest mountains to the Beaufort Sea and to the Point Thomson study area. Under "wilderness values," the CCP quotes from Congressional reports associated with the debate over ANILCA before the legislation passed:

> The Arctic National Wildlife Range is spectacularly scenic. Unlike elsewhere in the Alaska Arctic, the transition zone from mountains to coast is compressed into a relatively compact area. Within 150 miles there is a complete wilderness transect from the forested Brooks Range South Slope to the Beaufort Sea. (96th Congress, 1st Session, House Report No. 96-97, Part I, quoted in the CCP, USFWS 1988)

Besides this indication, most of the specific areas associated with "scenic values" in the CCP are in the mountains and visually remote from the study area. Nonetheless, scenic values in general are highlighted as among the Arctic Refuge's most important values.

3.5.2.2 State and Borough Visual Management

The State of Alaska Administrative Code addresses scenic values principally in the context of state park management. No state parks exist in the area. State regulations for the Department of Natural Resources (ADNR) include stipulations for designation of special use areas, and include a North Slope Special Use Area, which applies to state lands in the study area. The Administrative Code introduces special uses as follows: "The department has determined that these sites and areas of land have special scenic, historic, archeological, scientific, biological, recreational, or other special resource values warranting additional protections or other special requirements" (11 AAC 96.014). Although scenery is listed, the code does not state whether scenery or any of these other factors were the primary reasons for designation of the North Slope Special Use Area. The code merely requires a permit for overland motorized transportation, unless such use is for subsistence uses.

The North Slope Borough's Municipal Code at Title 19 defines a Conservation District for all undeveloped parts of the borough, including much of the general project area, and a Resource Development District for specific areas where development occurs or is proposed. The Point Thomson area is part of the RD District. While Title 19 indicates the Conservation District is "intended to conserve the natural ecosystem for all the various plants and animals upon which Borough residents depend for subsistence," there is no mention of scenic values. The RD District similarly contains no mention of scenic values.

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Chapter 4. Visual Resource Contrast Rating

4.1 INTRODUCTION TO VISUAL RESOURCE CONTRAST RATING

The BLM methods in Manual 8431 define the visual contrast rating system:

> The contrast rating system is a systematic process used by the BLM to analyze potential visual impact of proposed projects and activities…. The basic philosophy underlying the system is: The degree to which a management activity affects the visual quality of a landscape depends on the visual contrast created between a project and the existing landscape."

The manual specifies the following steps to develop a contrast rating for a project that might alter the visual environment:

- **Obtain Project Description.** A detailed project description was provided by ExxonMobil (ExxonMobil 2009); it is not repeated here. ExxonMobil provided a detailed three-dimensional model of the proposed action components that visually describes the project in photo simulations presented in this section.
- **Identify Visual Resource Management Objectives.** As stated in subsection 3.5.2, above, the state and borough have no visual resource management objectives. The Arctic Refuge, on adjacent land, manages generally for preservation of the natural visual environment.
- **Select Key Observation Points.** Observation points were selected for summer and winter field work and visual simulations, as shown on Figure 3. Subsection 4.1.1, below, further describes the selection of observation points.
- **Prepare Visual Simulations**. Based on project field work at the KOPS, visual simulations have been prepared illustrating preexisting conditions and conditions for the applicant's proposed action, and they appear below (Figure 8 through 23) in subsections 4.2 through 4.7. Note that in illustrations of "preexisting conditions" at the Central Pad, the existing exploratory drilling equipment and camp were removed from site photographs to simulate the baseline condition.
- **Complete Contrast Rating.** Based on the visual simulations and field visits, contrast ratings have been prepared and are described below in subsections 4.2 through 4.7.

4.1.1 Selection of Key Observation Points

The study area—remote, principally undeveloped, treeless, and mostly flat—presents an environment in which views are not framed by terrain or vegetation. Typically, KOPs would be associated with places frequented by viewers (designated scenic overlooks along highways, camp sites, etc.), and this assessment attempts to follow this protocol even though the corridors are lightly used and have vaguely defined edges. The KOPs have been selected based in part on the Canning and coastal corridors shown in Figure 3, but also based on a selection of sites at graduated distances from the proposed project features. Table 2 describes and provides rationale for selection of the KOPs. Figure 3 illustrates their locations.

Table 2: Key Observation Points for Visual Assessment of the Point Thomson Project			
Key Observation Point	Key Element Viewed (distance to KOP)	Rationale for Selection	Notes
West end Mary Sachs Island (State land)	Central Pad (1.8 mi.) Others: East Pad 4.25 mi West Pad 5.25 mi	Local communities use coastal corridor for transportation by snowmachine and small boat and may use barrier islands and mainland coast at the foreground distance for camps. There is also some recreation use.	Site represents a distance that boaters or snowmachiners would see if passing between the mainland and barrier islands, and possible view from any camp at this distance. Also generally represents views from an inland transportation route south of the project at a distance of about 2 mi. The distance is also similar to the closest point between the Arctic Refuge boundary and the project.
Brownlow Spit (State land near Arctic Refuge boundary)	East Pad (5 mi.) Central Pad (8.2 mi)	Brownlow Point is a destination for Kaktovik residents by boat and snowmachine; site of Native allotments; near Arctic Refuge boundary, used by Arctic Refuge visitors.	Similar distance as other points on the Canning River delta used by river rafters and inhabitants of the Arctic Refuge's bird research camp. Also represents views at the limits of the foreground-middle ground and background distance zones.
Shoreline West of Central Pad (State land)	Central Pad (0.16 mi) Others: West Pad (4 mi) Pipeline (1 mi)	Local communities use coastal corridor for transportation by snowmachine and small boat and use coastal locations in the study area for camps.	A close view of the Central Pad also generally represents close views of all the pads at an immediate foreground distance
Canning River Bluff (Arctic Refuge land)	Project Site (20 mi.)	Common destination for recreational floaters on Canning River in summer only.	Representative of other sites at the outer limits of the study area inside and outside the Arctic Refuge. Camp site from which the project site is at "seldom-seen" distance.
Aerial, at 500 feet above ground level at a point due south of Central Pad.	Central Pad (4.7 mi.) Others: East Pad 5 mi West Pad 7 mi	Commercial and private aircraft traverse the area carrying Kaktovik travelers and Arctic Refuge travelers. Elevation is minimum cruising altitude.	Meant to represent general flights to and from Kaktovik or points in the Arctic Refuge. Elevation and location is compromise between higher elevation overflights and those landing and taking off at Canning River or Point Thomson itself. Also, location is meant to help represent middle ground and background views from the south looking north.
Pipeline/Inland SW of W. Pad	Pipeline (225 feet) West Pad (0.8 mi)	Proposed pipeline would run west from the drilling area for 22-50 mi. and would be visible to subsistence hunters and others.	Represents foreground view from the south with an ocean backdrop. Represents the stand-alone pipeline and the pipeline with facilities behind it.

4.1.2 The Nature of the Project

The project is a substantial industrial development. It includes the necessary facilities to drill for, produce, process, and export (via pipeline) hydrocarbons from beneath the Arctic Coastal Plain and beneath the Beaufort Sea (via directional drilling). The project proposes development along the coast on three gravel pads separated by about three to four miles. There are also airport and water supply facilities proposed farther inland, along with gravel roads and aboveground pipelines connecting the three pads, and an aboveground export pipeline extending to the Badami development area. The views of the project differ based on the KOP and which pad is closest to that observation point. On Central Pad, the project would construct substantial industrial facilities where previously there was only a gravel pad. The gravel pad would be expanded and built upon for drilling and hydrocarbon production and reinjection of non-exportable hydrocarbons back into the natural underground reservoir. Associated worker housing, maintenance facilities, fuel and water storage, a helicopter pad, and vehicles all would be part of the development. East Pad and West Pad would have more limited facilities focused on drilling for and production of hydrocarbons but would not have the processing, maintenance, and housing functions of Central Pad, so they would be smaller and more compact.

Figure 5 illustrates developments proposed for the three pads side by side at the same scale. West Pad development is anticipated to be similar in scale to that shown for East Pad. The visual simulations that appear later in this section focus on developments on the pads and less on connecting pipelines, roads, and the airport. Specifically, Figures 8-10 (Mary Sachs Island) include data for Central Pad and the connecting pipelines only; Figures 14-16 (Brownlow Spit) include data for the Central Pad and East Pad only; Figures 19-20 (Shoreline) include data for Central Pad only; Figure 24 (Aerial) includes data for the Central Pad, connecting pipelines, roads, and the airport gravel pad but not airport buildings or towers, an excavated lake, or other facilities or features; Figure 25 (West Pad and Pipeline) includes data for the West Pad and export pipeline only; and Figure 26 (Pipeline) includes data for the export pipeline only.

4.1.3 Guide to Contrast Rating Tables

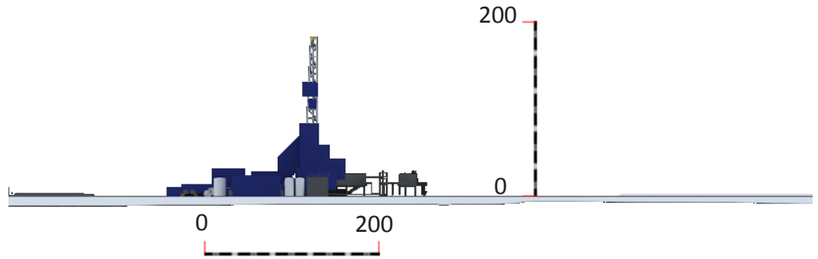
The following subsections generally each present two tables. One of the tables is a “Landscape Characteristics and Project Characteristics” table, which lays out as simply as possible the basic elements of the visual landscape prior to 2009 Point. Thomson drilling activity using headings for landform/water, vegetation/snow cover, and structures and row headings for form, line, color, and texture. The same headings repeat in the lower half of each table but are specific to the project itself. The table format comes from the BLM Manual 8400 and is designed for a wide range of projects or activity types in a wide range of environments. Projects or activities can include timber harvests or open pit mines, where the project itself alters the line and form of vegetation or earth. It is important in reviewing the tables to understand that the lower half is focused on the proposed activity (the project) and not on the broader visual environment. This two-part first table summarizes narrative information presented for each KOP.

The second table in the subsections below is a “Contrast Rating” table. This second table summarizes the first table in the form of a strong-moderate-weak rating of visual contrast. It rates the contrast between the project’s visual characteristics and the broader landscape’s visual characteristics.

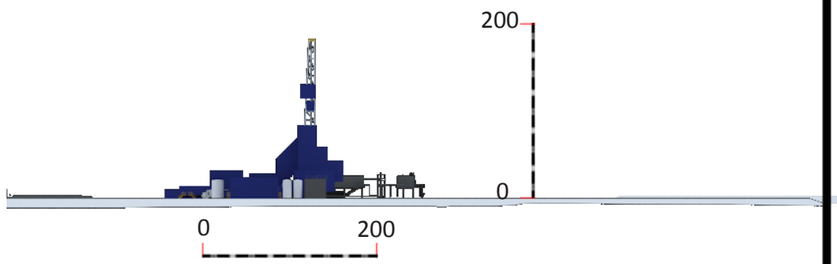
When actually completing the contrast rating, the BLM guidance indicates the following definitions:

None:	The element contrast is not visible or perceived.
Weak:	The element contrast can be seen but does not attract attention.
Moderate:	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong:	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

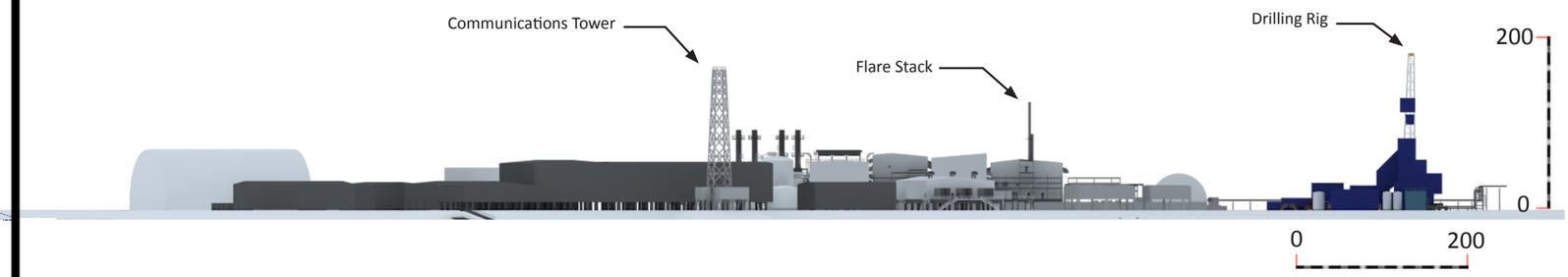
The rating is done without regard to the number of people who would see the view. The numbers of viewers is acknowledged to be low. The rating also is done without regard to Arctic atmospheric effects/mirages in the study area (see sub-section 3.2.2.9). Mirages have the potential to make project components appear larger/taller than they normally would or they have the potential to visually lift objects from below the horizon to above the horizon. Low cloud, fog, and ice fog have the potential to obscure project components or to highlight project light sources or project them skyward. Blowing snow also limits views. The contrast ratings assume unobscured views, generally a worst-case scenario for impact assessment.



West Pad Development
(Viewing from Northeast)



East Pad Development
(Viewing from Northeast)



Central Pad Development
(Viewing from East)

Note: Drilling rig is shown at each site but is unlikely to be located on two sites at once.

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Figure 5

Proposed Point Thomson Facilities

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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4.2 WEST END MARY SACHS ISLAND (VIEWING CENTRAL PAD)

4.2.1 Basic Information

Visual Resource Inventory Class: III-A (summer), III-B (winter).

Location: T10N R23 E Umiat Meridian. Figure 3 illustrates the locations of all KOPs.

Distance from Central Pad: 1.8 mi

4.2.2 Characteristic Landscape Description—Mary Sachs Observation Point

4.2.2.1 Characteristic Landscape, Summer—Daylight

Figure 6 illustrates a characteristic view in summer, showing the gravel island and surrounding ocean.

Figure 6: View to the West from Mary Sachs Island (Summer, Daylight)

Land/Water

The immediate foreground is occupied by gravel of the island, unvegetated at the observation point, and by the nearby water of the Beaufort Sea and the enclosed marine waters between the island and the mainland. Multiple small pans of ice are collected against the shoreline, mostly white, some of them speckled with gray-brown mud or sand. The various shapes and sizes of the ice blocks add interest to the foreground view. The larger arctic ice pack is visible offshore as a bright white line. The mainland is visible as a thin yellow-ochre line. The color of the shoreline is tan to grey. The texture of the sand cobble is fine. Some woody debris along the shoreline adds a little more texture and color to the foreground view. The Brooks Range mountains are visible as a blue backdrop in the background distance zone.

Vegetation/Snow

No vegetation is visible in the immediate foreground. The yellow-ochre color of the mainland is the color of vegetation that has principally not yet greened up for the season. The vegetation edge is a horizontal line.

Structures

The baseline condition for this site is without structures and development. However, at HDR's site visit, the Central Pad is in use for authorized exploratory drilling and is covered with a compact cluster of structures. The PTU-1 Pad also is occupied by buildings which are visible in Figure 6 as low boxy silhouettes distorted by heat waves.

4.2.2.2 Characteristic Landscape, Winter—Daylight

Land/Water

Figure 7: View to the South from Mary Sachs Island (Winter, Daylight)

The foreground-middle ground primarily is the snow-covered coastal plain. Mountains are visible in the far background. Land and water are virtually indistinguishable. During the March 2010 field visit, a sharp horizontal line is evident between the plain, which is darker (blue) and fog (bright white, somewhat backlit by sunlight). The mountains are a bluish uniform color, without texture. There are some areas of shiny reflective snow on lower mountain slopes—a gold color through a thin mist of fog. In the very immediate foreground is partially exposed gray dirt of the island, with very small tufts of grass about one inch tall. The relief of this low island above the ocean is not evident at this time of year, but snow is thin in some spots on the island, with sand visible (this would be called coarse sand but is not coarse visual texture). Figure 7 illustrates a representative view to the south (inland).

Vegetation/Snow

At this time of year, no vegetation is visible except for the wind-exposed tufts of grass in the immediate foreground. In the foreground is coarsely textured wind-sculpted snow drifts (sustrugi), fading to fine texture with distance. Snow depth is variable. Relief of drifts is variable at around one to two feet. The texture is evident as an irregular pattern of dark blue shadows and light blue sun-exposed snow with a bit of a pink-gold warm tone.

Structures

The baseline condition for this site is without structures and development. However, at HDR's site visit, the Central Pad is in use for authorized exploratory drilling and is covered with a compact cluster of structures. The PTU-1 Pad also is occupied by buildings which are visible as low, boxy, dark silhouettes on the horizon.

4.2.2.3 Characteristic Landscape, Winter—Darkness

HDR's winter field visit fell at the end of civil twilight, with the sky relatively bright in the west and dark in the south. The baseline condition, without human influences, includes vaguely distinguishable differences in shadow on the snow surface. A waxing moon high in the sky to the south casts a shadow, but with some light still coming from the sunset, the shadow is not strong. Strong, dark, deep orange sunset colors are visible in the west-northwest sky even at 9:45 p.m. Overall, the environment is all a very dark blue-gray (Payne's gray) with some variation in shades based on remaining light in the sky. Overhead, besides the moon, the brightest stars are visible but not a full array of stars. Under project baseline conditions, no point source of artificial light is visible, with the possible exception of a light visible at what was likely the Bullen Point radar station. Distant lights visible on the horizon to the west, both fixed and in motion, may have been located at Bullen Point, but it was not possible to verify the location or whether these were temporary lights associated with a soil clean-up effort (which had been

seen from the air) or permanent lights associated with the radar equipment. In any case, the Bullen Point facility is slated to be demolished, and there will be no permanent lights there in the future.

4.2.3 Proposed Activity Description—Mary Sachs Observation Point

Figure 8 through Figure 10 simulate the view from Mary Sachs Island with the project in place. East Pad and West Pad would be visible also to the right and left of this view, but at much greater distance (similar distance to the views of East Pad from Brownlow Spit, see below).

4.2.3.1 Proposed Activity, Summer—Daylight

Land/Water

Figure 8 simulates the summer view. In summer, the flat line that is the edge of the mainland is altered and the low hills and distant, hazy mountains behind are partially blocked from view with insertion of project facilities.

Vegetation

The yellow-ochre line of tundra vegetation that is visible as the edge of the mainland is removed at the location of facilities and is not visible.

Structures

Facilities include vertical elements of the drill rig, a communications tower, and a narrow flare stack spaced at about equal distances across the view. Buildings and tanks form a blocky, undulating line lower than the towers. All facilities appear mostly silhouetted, but it is possible to make out some depth between facilities, and light and dark colored facilities appear different. A pipe system emerges strongly on the right-hand side of the facilities. Pipelines at greater distances behind the Central Pad facilities are visible running east and west, and disappearing in the distance to the west.

4.2.3.2 Proposed Activity, Winter—Daylight

Land/Water

Figure 9 simulates the winter daylight view. In winter, the crisp line of the horizon or demarcation between a layer of fog and the ground is broken by the dark silhouette of the industrial complex. The complex sprawls across a limited portion of the horizon and is cleanly separated from the rest of the natural backdrop.

Vegetation/Snow

Except for the silhouetted structures, the expanse of snow and its texture is as described above. Only on the pad is there elimination of snow, as further described below.

Structures

With snow cover, the environment is bright with reflected daylight, and the color of the structures is mostly not perceptible—the silhouette mostly appears to be a uniform dark blue or blue gray against the bright snow, and the silhouetted structures stand out boldly. A few colors, such as the blue of the drill rig, are barely visible. Three towers are slender vertical lines in the principally horizontal view. The structures otherwise appear as boxy and cylindrical forms that run together into a mostly horizontal arrangement.

Texture within the silhouette is vague, but the collection of structures taken together gives a sort of coarse texture.

4.2.3.3 Proposed Activity, Winter—Darkness

Figure 10 simulates the Central Pad at night. The base photo was taken at about 9:30 p.m. March 24, 2010, after sunset (8:25 p.m.) but before full darkness.

Land/Water

The daytime crisp horizon that define the coastal plain generally is not visible in these dark conditions; land and sky nearly blend together in a dark blue wash. The facilities define a horizon that otherwise nearly has disappeared.

Vegetation/Snow

The dim blue snow cover is subtly lighted with silver-blue and pink highlights from the sky in the west-northwest and from a quarter moon high in the sky to the south. The proposed facilities are brightly lit in contrast with the surrounding dimly-lit snow cover.

Structures

The lights mounted on and around the structures, taken together, create a mostly horizontal line across the surface; the three towers are not as prominent as they are in the daytime, although they are visible. The pipelines are barely visible as shadowy lines east and west of the Central Pad.

Pre Existing Conditions

Proposed Conditions

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Figure 8

View of Central Pad from Mary Sachs Island (Summer, Daylight)

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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Pre Existing Conditions

Proposed Conditions

Figure 9

View of Central Pad from Mary Sachs Island (Winter, Daylight)

POINT THOMSON PROJECT EIS

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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Pre Existing Conditions—Simulated Condition Prior to 2009

Conditions, March 2010

Proposed Conditions

POINT THOMSON PROJECT EIS

Figure 10

View of Central Pad from Mary Sachs Island (Winter, Dark)

Date: 10/07/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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4.2.4 Contrast Rating—Mary Sachs Observation Point

Figure 8 through Figure 10 are photo simulations of the Central Pad area as seen from Mary Sachs Island in winter and summer. The contrast rating was completed from the daylight simulations, as shown in Table 3 and Table 4. Refer back to subsection 4.1.3 for explanation of these tables. Nighttime conditions provide the strong contrast of relatively bright lights in a dark (but not totally black) environment but are not addressed in the contrast ratings tables because mostly light and dark are visible, not form, line, other color not associated with lights, or texture.

Table 3: Landscape Characteristics and Project Characteristics—Mary Sachs Island

	Land / Water	Vegetation / Snow	Structures
Characteristic Landscape Description (Preexisting Condition)			
Form	Very flat overall. Mountains in background	Summer: Poorly visible thin line of mainland vegetation. Winter: No vegetation visible. Snow surface flat with small wind-carved drift pattern	None
Line	Horizontal. Mountains form a jagged line against sky in background	Summer: Vegetation visible as a line above the water. Winter: No vegetation line visible	None
Color	Summer: Light tan/gray island beaches. Blue sky, water, mountains. Winter: Whites and blues of snow and mountains. No water.	Summer: Yellowish/straw color Winter: White/blue snow	None
Texture	Fine (some coarser wind-carved snow in immediate foreground)	Summer: Fine vegetative texture. Winter: Fine snowdrift texture	None
Proposed Activity Description (Landscape with Proposed Project)			
Form	Flat, elevated gravel pad (barely distinguishable). Appears as snow in winter.	Summer: Vegetation partly displaced by development Winter: Project does not affect form associated with snow.	Combination of boxy, cylindrical, open-web tower structures. 'Fence' appearance of pipes on vertical supports.
Line	Horizontal	Summer: Line of visible vegetation broken by development. Winter: Project does not affect lines associated with snow.	Horizontal overall, with three tall vertical lines in towers.
Color	Summer: Gray/tan Winter: White/blue	Partly displaced by development of different colors.	Whites, dark blue, tan, gray. Many structures mostly silhouetted (dark).
Texture	Fine	Summer: Fine veg. texture partly displaced by development Winter: Fine snowdrift texture partly displaced by development	Some coarse texture in blockiness of forms. Individual surfaces appear smooth.

Table 4: Rating of Visual Contrast Between the Existing Characteristic Landscape and the Proposed Activity—Mary Sachs Island

DEGREE OF CONTRAST		FEATURES											
		Land/Water Body				Vegetation/Snow				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form			W/S		W		S		W/S			
	Line			W/S			W/S			W/S			
	Color			W/S		W	S			W/S			
	Texture			W/S			W/S			W/S			

Legend: winter (W), summer (S), winter and summer (W/S)

4.2.5 Conclusion

Although close to two miles in the distance, when seen from Mary Sachs Island, the Central Pad development is large enough and different enough (particularly in form and color) that it effectively "fills the view." Without similar forms and colors in the same proximity, the facilities dominate and draw the eye, so that the focus is on the facilities more than on the surrounding landscape. The contrast overall is strong.

This view is one that may be seen by users of the coastal corridor, such as local residents in small boats using the protected waters inside the barrier islands, or perhaps camping on the islands. This is a closer view of Central Pad development than any view from within the Arctic Refuge boundaries but is a similar distance and scale as the views of East Pad developments from the refuge boundary, although the Central Pad development includes more facilities and takes up more land than the proposed East Pad development.

4.3 BROWNLOW SPIT (VIEWING EAST PAD AND CENTRAL PAD)

4.3.1 Basic Information

Visual Resource Inventory Class: III-A (summer), III-B (winter).

Location: T9N R25E Umiat Meridian. Figure 3 illustrates the locations of all KOPs.

Distance from East Pad: 5 mi.

Distance from Central Pad: 8.2 mi.

Figure 11: View West along Brownlow Spit, with Caribou and Flaxman Island Bluff Visible in Distance (Summer, Daylight)

4.3.2 Characteristic Landscape Description—Brownlow Spit Observation Point

4.3.2.1 Characteristic Landscape, Summer—Daylight

Figure 11 shows a characteristic view in summer.

Land/Water

The basic landform at this location is Brownlow Spit, which is a narrow gravel bar extending westward into the sea paralleling the mainland coastline. The topography is very flat. A dark bluff that forms the eastern end of Flaxman Island is visible to the west. Mountains associated with the Brooks Range are visible in the distant background and form a jagged line against the sky. The coastline and the spit form a distinct line between land and water in the foreground view. The texture is very fine with the smoothness of the water and the fine cobble beach making up Brownlow Spit views in the foreground. Logs and woody debris scattered along the shore of the spit add some interest and textural contrast to the immediate foreground. The water is deep blue; the cloudless sky may contribute to the blueness of the water on this particular day. The floating / melting ice pieces north of the spit add some color and texture contrast to the blue water in the foreground view.

Vegetation and Structures

There is no vegetation on the spit. No structures are visible. Mainland vegetation is not visible on the day of the summer visit, apparently lost in a minor mirage effect that makes the protected marine water south of the spit appear continuous to the sky or background mountains. Views during the winter visit indicated the mainland coastline might normally be visible, and like the summer view from Mary Sachs Island, the vegetation color of the mainland often may be visible.

4.3.2.2 Characteristic Landscape, Autumn—Darkness

The project field team visited during summer and during winter darkness (July and March) but not in autumn. However, the Corps and cooperating agencies were interested in addressing autumn conditions, especially related to refuge visitors. The summer snow-free experience and winter darkness experience are combined for this KOP with general knowledge of daylight at high latitudes, because this KOP best represents Arctic Refuge views.

The summer "midnight sun" sets for the first time (briefly) about July 27 each year. There is still 24 hours of twilight for the rest of the summer. Approaching the September 21 equinox, daylight disappears quickly, but until the equinox there is more daylight in each 24-hour period in the arctic than there is at any point farther south. By mid-August, nighttimes are twilight, and growing periods of actual darkness soon follow. This timing coincides with reported reduction in visitation by recreationists. Marine waters remain unfrozen well into October, which means remaining opportunities for travel by boat, especially for local residents. The landscape from this KOP in autumn would appear much the same as the summer description, except that at night land and water features would be dim, or invisible at a distance. At night, natural light likely would be the only light visible—the glow of the sun below the northern horizon, moonlight, stars, aurora borealis, and reflections of these natural lights in the water. Reflections of natural light may distinguish water from land. In rare circumstances of patchy fog or low clouds, it may be possible to make out a reflected glow from Kaktovik to the east or oil developments to the west. No structures would be visible, and no artificial lights would be visible in any direction.

Figure 12: View West along Brownlow Spit from the Air (Winter, Daylight)

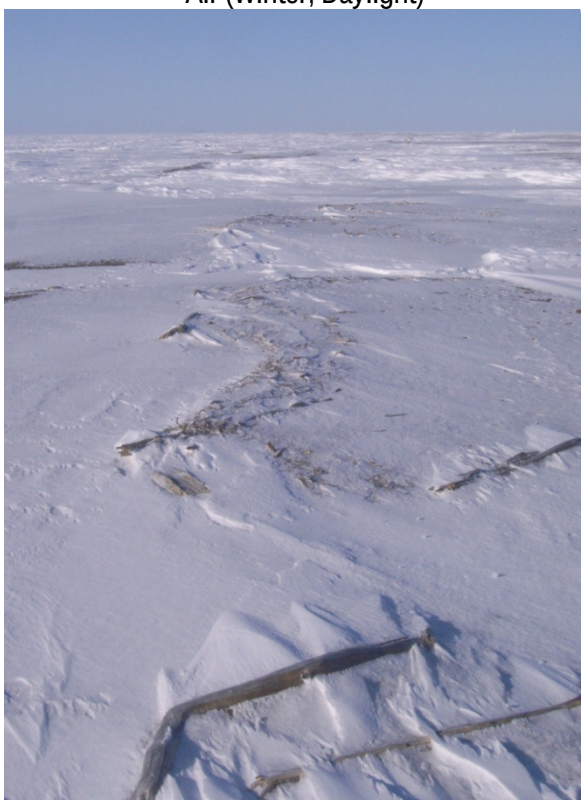

Figure 13: View West along Brownlow Spit from the Ground (Winter, Daylight)

4.3.2.3 Characteristic Landscape, Winter—Daylight

Figure 12 and Figure 13 show characteristic views in winter.

Land/Water Body

This site is located on a long, narrow, low, gravel strip in the ocean (a spit), running generally east-west. The low bluff along the spit creates a visual line separating the spit from the lower ocean surface. Except for the spit, the foreground-middle ground is dominated by the snow-covered coastal plain and frozen ocean surface, which largely run together. There is a hint of the coastal bluff to the left of the Figure 13 view, across the frozen "bay." A higher bluff is visible out the spit to the right (appears to be the eastern end of Flaxman Island). Mountains are visible in the distance to the south (to

the left). The mountain color is mostly a uniform light blue-gray with a couple of areas of shiny reflective gold highlights off snow crust.

The horizon to the west is a sharp horizontal line, as shown in Figure 12 and Figure 13. The land at the horizon is very bright white. The sky is dusky blue-gray above. The color of the land at the horizon to the left fades to bluish and is darker than the sky. A distance out the spit to the west, and standing vertically, is a form that may be an ice chunk, but is too far away to identify.

Relief above the "bay" surface on the south side of spit is estimated at four to six feet. The beach is slightly stair-stepped from different water levels. The relief is greater on the ocean side—perhaps 10 feet or more.

The line of the spit and line of the horizon (roughly perpendicular) lead the eye somewhat to their intersection.

Vegetation/Snow

No vegetation is visible. In the immediate foreground, there is gravel visible where the wind has swept the snow off portions of the land surface. Where gravel is visible, it has a semi-coarse texture. These are black-red-brown stones generally less than 3 inches in diameter, some angular, some rounded, interspersed with firm snow. The foreground also includes driftwood and one large stump (these reportedly drift from the MacKenzie River Delta in Canada), which add considerable foreground interest.

The site is located on the south (inside) edge of the spit. The snow texture to left of spit on the "bay" surface is very coarse, with etched "canyons" about two feet deep. A hump probably caused by ice pressure is visible to the northeast, apparently on the frozen ocean surface.

The snow color is gray-brown where it is very thin over gravel and very bright white-gold on highlighted south-facing edges. Shadows are gray-blue, at different intensities.

Structures

There are no structures visible.

4.3.2.4 Characteristic Landscape, Winter—Darkness

The field visit is on a partly cloudy evening at about 11:00 p.m. with some layers of low cloud or fog to the west of Brownlow Spit. The sky directly overhead is mostly clear, with a very light haze that appears to be shifting during the observation. A near-three-quarter moon and a few of the brightest stars are visible, but the moonlight appears somewhat diffused by mist and some snow particles in the air (whether this is precipitation or windblown snow is not clear) and does not appear to cast a lot of light or sharp shadow. The baseline condition (without visible human influence) includes thin layers of low cloud vaguely visible to the south and west and lit somewhat by the moon. Dim light from the sun, long since set, remains in the sky to distant west-northwest, but is mostly faded and/or obscured by clouds.

Land/Water Body

The flat landform and frozen ocean surface generally is apparent but depth perception is difficult.

Vegetation/Snow

Vague dark shadows and slightly lighter areas are visible in the drifted snow around the site. The general aura is quite dark, with filtered moonlight making snow and cloud features partially visible, but the snow and sky visually run together as one.

Structures

In the baseline (pre-2009) condition, no structures or lights on structures are visible in any direction.

4.3.3 Proposed Activity Description—Brownlow Spit Observation Point

4.3.3.1 Proposed Activity, Summer-Daylight

Figure 14 simulates the view from Brownlow Spit in summer daylight.

4.3.3.2 Proposed Activity, Winter Daylight

Figure 15 simulates the view from Brownlow Spit in winter.

Land/Water Body and Vegetation/Snow

Land and (frozen) water appear much the same as under preexisting conditions, except where structures break the flat coastal plain horizon.

Structures

Project development is visible but small to the west/west-southwest. East Pad development is closer and therefore more sharply contrasted with the bright snow and sky (less obscured by mist and scattering of light by moisture or ice crystals in the atmosphere). Central Pad development is farther away and somewhat less distinct but is a larger development, spread somewhat farther along the horizon. It too is a dark feature on a bright horizon. Both developments appear almost entirely as silhouette. No particular color or texture is visible. The vertical towers and cranes on both sites create dark vertical lines, perpendicular to the strong horizontal line of the horizon. Although small in context of the vast plain and frozen ocean, the sites present unusual low blocky forms and spires. The distance is such that the developments appear small in a vast environment, but they are not lost because they are the only dark, blocky, and vertical visual elements on the horizon.

Pre Existing Conditions

Notes
Figures 13-15 show different apparent size and distance between facilities based on different camera location and different lens settings.

Only one drilling rig is expected to be in use for the Point Thomson Project. It would move from pad to pad. In this figure, the drilling rig is shown on East Pad to illustrate the greatest visual contrast likely from this observation point.

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Figure 14
View of East and Central Pads from Brownlow Spit (Summer, Daylight)

Date: 11/02/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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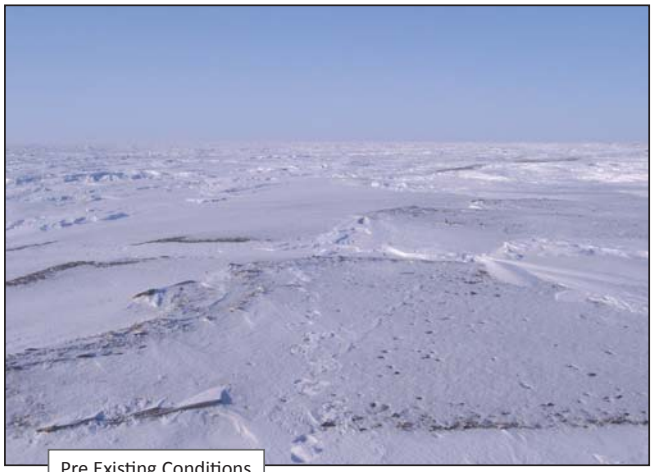
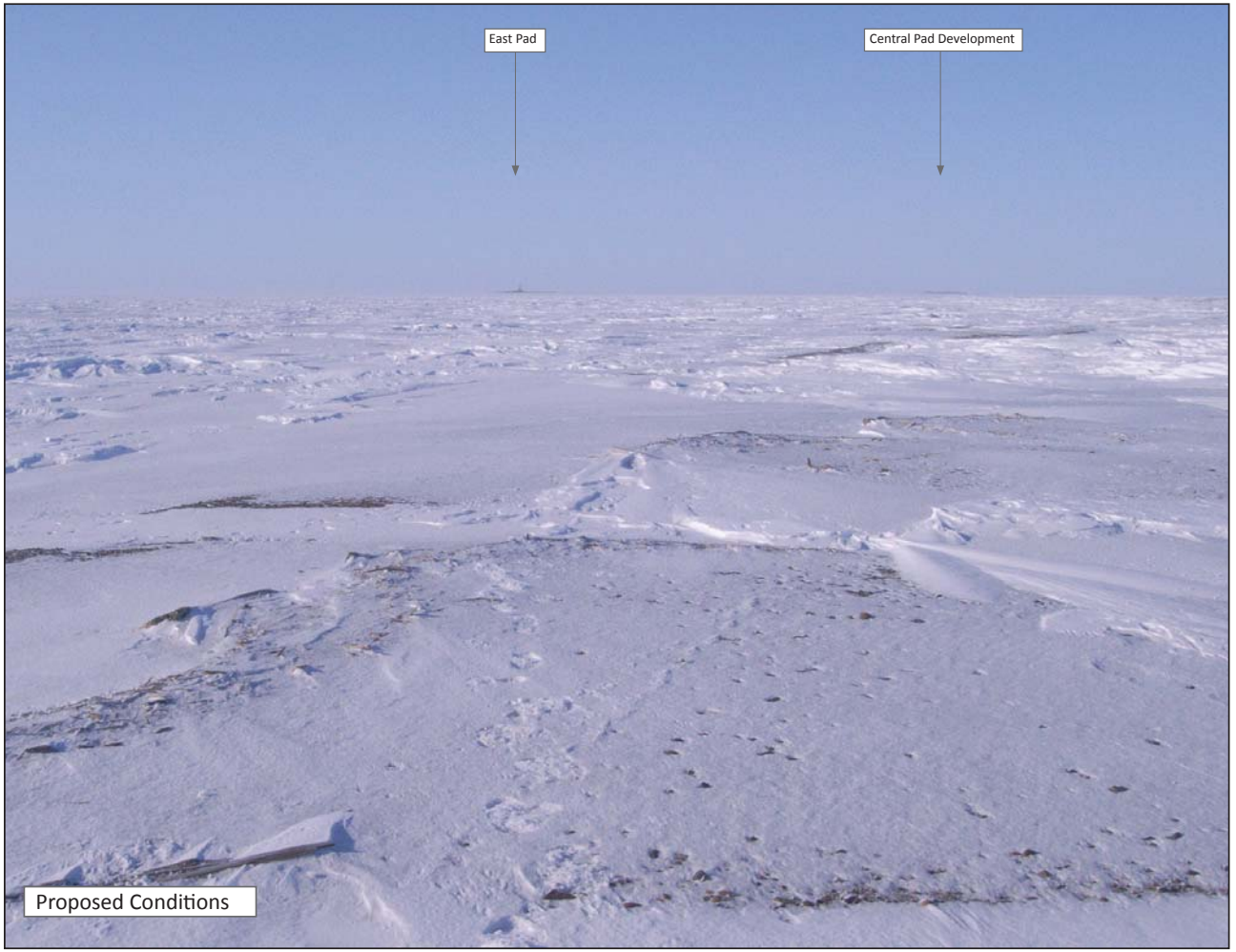


Pre Existing Conditions

Note: Figures 13-15 show different apparent size and distance between facilities based on different camera location and different lens settings.

Note: Only one drilling rig is expected to be in use for the Point Thomson Project. It would move from pad to pad. In this figure, the drilling rig is shown on East Pad to illustrate the greatest visual contrast likely from this observation point.



POINT THOMSON PROJECT EIS

Figure 15
View of East and Central Pads from Brownlow Spit (Winter, Daylight)

Date: 10/07/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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4.3.3.3 Proposed Activity, Winter Darkness

Figure 16 simulates the view from Brownlow Spit during winter darkness.

Land/Water Body and Vegetation/Snow

Structures

The lights of the project, principally East Pad and Central Pad lights, are the only lights visible in any direction and therefore are quite prominent in the darkness, although they are located several miles away and appear small. The simulation captures the apparent size of the lighted facilities but does not capture the sense of dominance experienced by field personnel. Central Pad, at 8.2 miles away, is perhaps more prominent at night than East Pad (5 miles away), because the development is much larger and contains more lights. The East Pad drill rig lights at the midpoint and the top of the tower indicate the vertical structure is present. There are diffuse lights at the base of the tower creating a horizontal glow. With low-hanging layers of fog and Figure 14 simulates the view from Brownlow Spit in summer. East Pad development is closest (about 5 miles across Lion Bay). Central Pad development, which is more extensive, also is visible but is more distant (about 8 miles). For purposes of the simulation, the drilling rig is located on East Pad and not on Central Pad. In reality the drilling rig could be placed on either pad but would not appear on both simultaneously.

Land/Water Body

Both development areas break the horizon with a silhouetted new form, dark against the sky. East Pad appears much like an island across the water, and Central Pad looks as if it could be at the far end of the spit.

Vegetation

The edge of the coastal plain landform that creates the coast is barely visible. Vegetation is not visible at this distance, so is effectively unaltered in this view.

Structures

Although the structures are distant, they are clearly nonnatural, industrial developments. Vertical elements and the dark shading contrast sharply with the bright and horizontal water-sky horizon and draw the eye. Some vague internal texture and depth may be visible within each development, but except for towers, individual components are not distinct.

4.3.3.4 Proposed Activity, Winter Daylight

Figure 15 simulates the view from Brownlow Spit in winter.

Land/Water Body and Vegetation/Snow

Land and (frozen) water appear much the same as under preexisting conditions, except where structures break the flat coastal plain horizon.

Structures

Project development is visible but small to the west/west-southwest. East Pad development is closer and therefore more sharply contrasted with the bright snow and sky (less obscured by mist and scattering of

light by moisture or ice crystals in the atmosphere). Central Pad development is farther away and somewhat less distinct but is a larger development, spread somewhat farther along the horizon. It too is a dark feature on a bright horizon. Both developments appear almost entirely as silhouette. No particular color or texture is visible. The vertical towers and cranes on both sites create dark vertical lines, perpendicular to the strong horizontal line of the horizon. Although small in context of the vast plain and frozen ocean, the sites present unusual low blocky forms and spires. The distance is such that the developments appear small in a vast environment, but they are not lost because they are the only dark, blocky, and vertical visual elements on the horizon.

4.3.3.5 Proposed Activity, Winter Darkness

Figure 16 simulates the view from Brownlow Spit during winter darkness.

Land/Water Body and Vegetation/Snow

Structures

The lights of the project, principally East Pad and Central Pad lights, are the only lights visible in any direction and therefore are quite prominent in the darkness, although they are located several miles away and appear small. The simulation captures the apparent size of the lighted facilities but does not capture the sense of dominance experienced by field personnel. Central Pad, at 8.2 miles away, is perhaps more prominent at night than East Pad (5 miles away), because the development is much larger and contains more lights. The East Pad drill rig lights at the midpoint and the top of the tower indicate the vertical structure is present. There are diffuse lights at the base of the tower creating a horizontal glow. With low-hanging layers of fog and wispy cloud, lights from the facilities reflect off the clouds over each site dimly as a sort of green-white glow.

4.3.4 Contrast Rating—Brownlow Spit Observation Point

4.3.4.1 Proposed Activity, Winter Daylight

Figure 15 simulates the view from Brownlow Spit in winter.

Land/Water Body and Vegetation/Snow

Land and (frozen) water appear much the same as under preexisting conditions, except where structures break the flat coastal plain horizon.

Structures

Project development is visible but small to the west/west-southwest. East Pad development is closer and therefore more sharply contrasted with the bright snow and sky (less obscured by mist and scattering of light by moisture or ice crystals in the atmosphere). Central Pad development is farther away and somewhat less distinct but is a larger development, spread somewhat farther along the horizon. It too is a dark feature on a bright horizon. Both developments appear almost entirely as silhouette. No particular color or texture is visible. The vertical towers and cranes on both sites create dark vertical lines, perpendicular to the strong horizontal line of the horizon. Although small in context of the vast plain and frozen ocean, the sites present unusual low blocky forms and spires. The distance is such that the developments appear small in a vast environment, but they are not lost because they are the only dark, blocky, and vertical visual elements on the horizon.

Pre Exisiting Conditions

Note: Prior to 2009, no light would have been visible under typical nighttime conditions. No simulation of this condition is necessary.

Conditions, March 2010

Notes
Figures 13-15 show different apparent size and distance between facilities based on different camera location and different lens settings.

Only one drilling rig is expected to be in use for the Point Thomson Project. It would move from pad to pad. In this figure, the drilling rig and associated lights are shown on East Pad to illustrate the greatest visual contrast likely from this observation point.

The Proposed Condition simulates lights from the East and Central Pads only. Airport lighting and other minor scattered project lighting data are not available.

Proposed Conditions

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Figure 16
View of East and Central Pads from Brownlow Spit (Winter, Dark)

Date: 11/02/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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4.3.4.2 Proposed Activity, Winter Darkness

Figure 16 simulates the view from Brownlow Spit during winter darkness.

Land/Water Body and Vegetation/Snow

Structures

The lights of the project, principally East Pad and Central Pad lights, are the only lights visible in any direction and therefore are quite prominent in the darkness, although they are located several miles away and appear small. The simulation captures the apparent size of the lighted facilities but does not capture the sense of dominance experienced by field personnel. Central Pad, at 8.2 miles away, is perhaps more prominent at night than East Pad (5 miles away), because the development is much larger and contains more lights. The East Pad drill rig lights at the midpoint and the top of the tower indicate the vertical structure is present. There are diffuse lights at the base of the tower creating a horizontal glow. With low-hanging layers of fog and Figure 14 through Figure 16 are photo simulations of the East Pad and Central Pad areas as seen from Brownlow Spit in summer and winter daylight, and in winter darkness. From the daylight simulations, the contrast rating was completed, as shown in Table 5 and Table 6. Refer back to subsection 4.1.3 for explanation of these tables. The contrast rating in Table 6 is for daylight conditions only. The facilities during winter darkness, as the only lights in a completely dark environment, create strong contrast despite the distance. The contrast created by form and line is essentially the same in both seasons, as indicated in Table 5. The difference is primarily in the "color" contrast—in this case the strength of the silhouette against the background.

Table 5: Landscape Characteristics and Project Characteristics—Brownlow Spit			
Characteristic Landscape Description (Preexisting Condition)			
	Land / Water	Vegetation / Snow	Structures
Form	Very flat overall. Mountains in background	Summer: No vegetation visible. Winter: Snow as a flat plain across ocean and land.	None
Line	Horizontal. Mountains in background form a jagged line against sky.	Summer: No vegetation visible. Winter: Snow horizon flat, horizontal.	None
Color	Summer: Light tan/gray island beaches. Blue sky, water, mountains. Winter: Whites and blues of snow & mountains. No water.	Summer: No vegetation visible. Winter: White/blue snow.	None
Texture	Fine	Summer: No vegetation visible. Winter: Fine (some coarser wind-carved snow in immediate foreground)	None
Proposed Activity Description (Landscape with Proposed Project)			
Form	Gravel pads not distinguishable from other structures.	Summer: No vegetation visible. Winter: Snow is locally displaced by development	East Pad appears as a sort of triangular form with apex forming a tower. Central Pad appears as low boxy forms with two vertical towers.
Line	NA-project does not affect lines associated with land/water	NA-project does not affect lines associated with vegetation/snow	East Pad appears as horizontal base, vertical center line (inverted T). Central Pad generally horizontal line along horizon with two vertical towers.
Color	NA- project does not affect color associated with land/water	NA- project does not affect color associated with vegetation/snow	Mostly silhouetted (dark blue, black, gray). Structures hazy with distance, especially Central Pad and especially in winter.
Texture	NA-project does not affect texture associated with land/water	NA-project does not affect texture associated with vegetation/snow	Texture not discernable.

Legend: Not applicable (NA)

Table 6: Rating of Visual Contrast Between the Existing Characteristic Landscape and the Proposed Activity—Brownlow Spit

DEGREE OF CONTRAST		FEATURES											
		Land/Water Body				Vegetation/Snow				Structures*			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				W/S				W/S		W/S		
	Line				W/S				W/S		W/S		
	Color				W/S				W/S		S	W	
	Texture				W/S				W/S				W/S

Legend: winter (W), summer (S), winter and summer (W/S).

*Structures appear small and are not necessarily prominent at these distances; however they are the only structures visible on the horizon and the only dark and vertical elements in the view.

4.3.5 Conclusion

This view is one that may be seen by local residents staying at hunting camps or visiting Native allotment lands nearby, by those travelling along the sea ice or coast by snowmachine, and by occasional recreational boaters or kayakers in coastal waters. It also approximates views at similar distances (5.5. mi.) from within the Arctic Refuge at the bird research camp/informal airstrip area and on the lower part of the Canning River corridor. Although the facilities appear small and distant and contrast is not as strong as the view from Mary Sachs Island, the contrast remains, and structures attract attention. At this distance, the facilities do not dominate the view as they do from closer observation points, but without similar forms and colors in the same proximity, the facilities draw the eye. It is possible that some viewers who did not know the facilities were present would not notice them, but once noticed, the facilities tend to be the focus of the viewer because they are the unusual element in the view. Nighttime lights and reflection of those lights off of fog and low cloud layers clearly would dominate the night view.

4.4 SHORELINE WEST OF CENTRAL PAD (VIEWING CENTRAL PAD)

4.4.1 Basic Information

Visual Resource Inventory Class: III-A (summer), III-B (winter).

Location: T10N R23E Umiat Meridian. Figure 3 illustrates the locations of all KOPs.

Distance from Central Pad: 0.16 mi. or 845 feet

Figure 17: View South Inland from the "Shoreline" Site Toward the Coastal Plain and Brooks Range (Summer, Daylight)

4.4.2 Characteristic Landscape Description—Shoreline Observation Point

4.4.2.1 Characteristic Landscape, Summer—Daylight

Figure 17 illustrates a characteristic view from the "Shoreline" observation point in summer, showing a small impoundment of marine water, the coastal plain, and the distant Brooks Range.

Land/Water

The basic landforms at this location are the coastal plain and the Beaufort Sea shoreline. The viewpoint is adjacent to the Beaufort Sea. Inland ponds are visible as well. The water appears mostly blue, reflecting the sky (likely more silvery on an overcast day). The topography is very flat. There is a very slight undulation in the tundra vegetation visible only in the foreground view. No rock outcrops or geologic formations are visible. Bare gravel is visible in the immediate foreground beach gravel.

Vegetation

Vegetation consists of arctic tundra. The vegetative texture is fine as there are no coarse plants and no trees or shrubs. The color ranges from a tan associated with the previous years' dead plant material to green where new plant growth is emerging.

Structures

An old gravel pad exists and is the baseline condition for this study. Because ExxonMobil had already begun authorized exploratory drilling activity on this existing pad, it was not possible to see exactly what the pad would look like without development. Based on other old pads in the area seen principally from the air, it likely would appear from this viewpoint as a distinctly man-made feature. It would be only perhaps two feet above the surrounding tundra. Its northern edge, visible from this location, would appear continuous with the adjacent beach gravel. Its top surface and edges would be weathered and might show signs of variable subsidence (no longer a perfectly engineered structure). Cylindrical fuel tanks likely would be located on a portion of the pad and would be readily visible.

4.4.2.2 Characteristic Landscape, Winter—Daylight

Land/Water

The foreground-middle ground primarily is the snow-covered coastal plain and the frozen and snow-covered ocean surface to the north, which mostly run together visually as a single plain. The site is located on a narrow spit, which is a linear feature (a hump of sand/gravel) raised about three feet above the wind-sculpted snow of the surrounding "ocean." (Figure 18).

Mountains are visible to the south in the distant background and form a backdrop line against the sky. The mountains have a layer of haze along their lower flanks. Some variety in color and texture of the mountain faces is apparent. There is dark blue contrast that may be rock or simply deep shadows. In general, the powder blue shadow of the mountains is darker than the closer snow of the plain.

Vegetation/Snow

No vegetation is visible. Patchy dark gravel is visible on the spit, intermixed with wind-thinned snow. With as little as about 10 feet of distance, pebbles in this gravel appear as black contrast to the relatively bright snow. Up close, various shades of gray, brown, and black pebbles are visible.

Figure 18: View West from Shoreline Site, Ocean to the Right; Small Bay and Land to the Left (Winter, Daylight)

The snow surface is sculpted by the wind into a chaotically regular series of drifts with a relief of perhaps 6-12 inches. The light on the snow, at the time of the field visit (just before sunset), on the inland plain and on the ocean, is a rosy gold color on highlights with multishade blue shadows, creating a complex texture that fades to fine texture with distance. In the immediate foreground, a weather-bleached log sticking out of snow contrasts with snow in color and linear form.

To the east, haze in the lower portion of the sky has a blue-gray cast at this visit and does not contrast sharply with the snow surface as does the view to the west. The horizon is very flat and crisp to the west, toward the evening light. The snow has a blue-purple cast when looking toward the sun (the observer sees mostly shadow on the snow), with a few shiny highlights on crusted snowdrift surfaces that reflect "warm" red-orange and dark pink evening sunlight colors.

To the west, the gravel spit is an irregular line of higher (but still low) topography leading toward the horizon. Nothing breaks the crisp horizon in a 180 degree view in this direction.

Structures

The preexisting landscape includes a low gravel pad. In winter it is not visible as a distinctly engineered structure.

4.4.3 Proposed Activity Description—Shoreline Observation Point

4.4.3.1 Proposed Activity, Summer

Figure 19 simulates the view from the Shoreline observation point in summer.

Landform/Water The expansion of the gravel pad and installation of drilling equipment, production facilities, and associated housing and maintenance facilities are located on the coastal plain immediately adjacent to but not in the ocean. The new pad is in the same location as the existing gravel pad but is larger and higher, a more prominent form in itself.. A bulkhead built up with gravel behind driven sheet pile walls is located in the edge of the ocean to provide barge access and is outside the left edge of the Figure 19 image. Gravel road embankments would be visible on the tundra as a raised landform principally to the right of the image.

Vegetation

The expanded pad and structures cover some tundra vegetation and replace the visibly "soft" organic surface with an engineered gravel structure and other facilities.

Structures

Structures are new elements in the view and their bulk completely dominates the view at this proximity. The Central Pad elements include several colors: blue and white are the most dominant colors with lesser amounts of yellow, red, turquoise, and black (detail colors based on current development). The texture of the feature surfaces is mostly smooth. The colors of the main elements on the pad blend fairly well with the blueness of the water but less well with summer vegetation colors (yellow/brown/green). Roads, pipelines elevated on pilings, and various markers and stakes would be visible across the tundra slightly to the right of this view. West Pad development also would be visible at the ocean edge of the coastal plain about 4 miles away. East Pad development would not be visible from this viewpoint; it would be screened by Central Pad development in the immediate foreground.

4.4.3.2 Proposed Activity, Winter

Figure 20 simulates the view from the Shoreline observation point during the day in winter.

Landform/Water

The forms of boxy buildings and tall towers visually break the flat form of the Arctic Coastal Plain and adjacent ocean. Structural forms partially replace the natural form. Where the Brooks Range offers a distant counterpoint to the plain, the structures partially block the mountains in this view.

Vegetation/Snow

The medium textures of winter snow are replaced in part by the smooth textures of individual building panels. Light and shadow on the combination of pipelines, building surfaces, open tower ironwork, railings, cranes, vehicles, and storage containers, and—in winter—piles of plowed snow) give an overall coarse texture with angular break points.

Pre Existing Conditions

Proposed Conditions

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Figure 19

View of Shoreline West of Central Pad (Summer, Daylight)

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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Pre Existing Conditions

Proposed Conditions

POINT THOMSON PROJECT EIS

Figure 20

View of Shoreline West of Central Pad (Winter, Daylight)

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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Structures

A substantial, compact industrial facility dominates the view to the southeast at close range with large boxy blue structural forms and with two principal towers adding a distinct vertical element in an otherwise horizontal landscape. An elevated system of pipelines on regularly-spaced pilings surrounds the sides of the structure that are visible from this observation point. The pipeline system appears from this angle somewhat like a large fence. Low boxy structures are visible behind the pipe system.

The blue and white colors of many of the structural components are similar to blue shadows on snow in winter. Project lights stand out in dim and dark conditions.

To the west, in the nearly the opposite direction, West Pad development also is visible. East Pad development is mostly screened by the foreground development. The pipeline system is visible stretching across the plain toward West Pad as a continuous elevated line on regularly spaced pilings.

4.4.4 Contrast Rating—Shoreline Observation Point

Figure 19 and Figure 20 are photo simulations of the Central Pad area as seen from the Shoreline observation point in summer and winter. From these simulations, the contrast rating was completed, as shown in Table 7 and Table 8. Refer back to Section 4.1.3 for explanation of these tables.

Table 7: Landscape Characteristics and Project Characteristics—Shoreline			
Characteristic Landscape Description (Preexisting Condition)			
	Land / Water	Vegetation / Snow	Structures
Form	Very flat overall/beach/spit/coastal plain with mountains in background to SE. Ponds visible inland. Summer: Ocean water to north. Winter: Continuous snow cover to north	Summer: Very low arctic tundra, patchy in foreground, continuous in background. Winter: No vegetation visible	Summer: Low, flat, weathered gravel pad (not highly engineered in appearance). Winter: Pad not expected to be distinguishable as a structure; snow obscures it.
Line	Horizontal. Mountains form a jagged line against sky in background.	Summer: Vegetation visible as a line above the water. Winter: No veg. visible	Horizontal pad. Vertical lines in boxy equipment on pad.
Color	Summer: Light tan/gray beaches. Blue sky, water, mountains. Winter: Blue snow & mountains. Pink & white highlights.	Summer: Yellowish / straw color Winter: Bluish snow	Summer: Gray/tan gravel pad.
Texture	Fine (some coarser wind-carved snow in immediate foreground in winter)	Summer: Fine veg. texture. Winter: Fine snowdrift texture	Fine texture gravel pad.
Proposed Activity Description (Landscape with Proposed Project)			
Form	Summer: Flat, elevated gravel pad. Winter: Same; appears as snow.	Summer: Patches of vegetation partly displaced by development. Winter: Vegetation not visible	Large boxy, cylindrical, and open-web-tower structures. Linear 'fence' appearance of pipes on vertical supports.
Line	Horizontal gravel pad, but elevated above natural ground surface and above old pad elevation.	Irregular lines of patchy foreground veg. displaced by expansion of pad.	Strong vertical in towers and pipeline supports, and building walls. Horizontal roofs and pipelines. Some horizontal lines in embankment sides and shadows.
Color	Summer: Gray/tan gravel Winter: Blue with white (snow covered)	Summer: Partly displaced by development	Blue, white with blue-gray shadow, silver. Some tan, gray, red, green. Gray-tan gravel embankment. Strong shadows.
Texture	Fine texture of gravel.	Summer: Partly displaced by development Winter: Fine snowdrift texture	Some coarse texture in blockiness of forms. Individual surfaces appear smooth. Side of gravel embankment is fine texture.

Table 8: Rating of Visual Contrast Between the Existing Characteristic Landscape and the Proposed Activity—Shoreline Observation Point

DEGREE OF CONTRAST		FEATURES											
		Land/Water Body*				Vegetation/Snow				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form		W/S					W/S		W/S			
	Line			W/S				W/S		W/S			
	Color			W/S				W/S		W/S			
	Texture			W/S				W/S		W/S			

Legend: winter (W), summer (S), winter and summer (W/S).

*These columns compare existing structure (pad) with new.

4.4.5 Conclusion

From this observation point, the visual contrast is especially strong. The project creates a dominating new element in the view. This view represents only the closest views—those of a passing boat or snowmachine proceeding very close to the shoreline, or the view from a camp or person walking or hunting along the near-shore area.

4.5 BLUFF ABOVE CANNING RIVER TAKEOUT (VIEWING PROJECT AREA IN GENERAL)

4.5.1 Basic Information

Visual Resource Inventory Class: I-A (summer), I-B (winter).

Location: T6N R23 E Umiat Meridian. Figure 3 illustrates the locations of all KOPs.

Distance from project site: approximately 20 mi.

Figure 21: View from Canning River Takeout Area Bluff Downstream and Northward Toward Proposed Project Site and Beaufort Sea (white sea ice visible on horizon) (Summer, Daylight)

4.5.2 Characteristic Landscape Description—Canning River Observation Point

Landform/Water

The Canning River takeout, where some rafters floating down from the Brooks Range and upper Canning River pull their boats out of the water and await pickup by aircraft on "tundra tires," was located during a summer field visit. This observation point is adjacent to the east side of the Canning River within the Arctic Refuge. The basic landforms at this location are a Canning River floodplain terrace, and bluffs that run approximately north-south forming the eastern and western edges of the Canning River floodplain. Figure 21 through Figure 23 presents characteristic views from the bluff top and river terrace. In the foreground distance zone, the eastern bluff rises gently at a consistent slope above the floodplain terrace. The soils of the terrace at the base of the bluff slope are saturated, and form small hummocky mounds. The color of the bluff ranges from brown, where snow has recently melted, to green, where more plants have emerged since snowmelt. The Canning River is a dominant feature in the foreground view at this location. The river (water) ranges in width from approximately 100 feet to 200 feet, with flows carrying substantial silt and looking visually muddy. The channel is braided with varying sizes of gravel bars interspersed throughout the river profile. The water color is a light tan, like light-colored chocolate milk. The rocky bars add to the textural contrasts with the flowing water. The sandy gravels are brownish-gray color that blends well at this time of year with the muddy river flows. After the high runoff period presumably the water clears up some and likely appears green to blue in color. No rock outcrops or geologic formations are visible other than the bluff. The Brooks Range Mountains are visible in the background distance zone to the south. Away from the river and on the bluff top is a vista or rolling terrain leading gently south uphill toward the mountains and north toward the ocean; partially visible in the distance, mostly as a bright white line of sea ice between the darker land and sky.

Figure 22: View from Canning River Takeout Area, South from Bluff Top (Summer, Daylight)

Vegetation

Vegetation on the floodplain consists of arctic dwarf willows, short grass, and wildflowers. The vegetative texture is fine as there are no coarse plants and no trees or shrubs. Some color is added by many blooming wildflowers which included purple, white, and yellow flowers. These flowers are small and only distinguishable at close range. Bluff top vegetation forms a continuous carpet of tundra with tiny flowers.

Structures

A metal USGS monitoring station is present on the edge of the river. It is a piece of technical equipment, approximately human-sized, with metal legs and an antenna. No other structures are visible.

Figure 23: View from Canning River Takeout Area Terrace Looking Upstream to the Southwest (Summer, Daylight)

4.5.3 Proposed Activity Description—Canning River Observation Point

No simulation of the proposed facilities was undertaken. The field visit determined that the construction and operation activity at the coast near Point Thomson would be invisible from the river, because of the opposite river bluff, and it would be effectively invisible from higher ground nearby, because of the distance (about 20 miles). The following explains the field effort undertaken to arrive at this conclusion.

A summer field visit in July followed a winter field visit in March. In winter, a field observer went to the coordinates indicated by the Arctic Refuge as the common raft take-out, camp site, and aircraft landing area and determined that low river bluffs across a bend in the Canning River obscured long-distance views toward the coast. A winter attempt to find a location nearby with a long-distance view resulted in an observation on higher ground west of the river, where it was determined that the existing Point Thomson development was all but invisible at that distance (about 20 miles). That is, with effort, the development was visible with the naked eye, but it was not visible in photographs. Later research and consultation with the Arctic Refuge determined the original location for the take-out had not been accurate; the actual location was downstream less than a half mile and around a bend where visibility could be different.

During summer, observers were able to locate the Canning River takeout location on the east side of the river with confidence. The existing Point Thomson development was not visible from this location along the river, because a low bluff on the west side of the stream obscured views of the coast. A short walk up the low bluff on the east side of the river, similar to where people likely would go from a camp near the river, indicated that the existing development was nearly invisible even to those looking for it. The drilling rig showed up as a thin dark vertical line against distant white pack ice. The visibility was similar to that experienced during the winter from a similar distance. The development would not be noticed by the casual observer, and if pointed out, would not be identifiable as an industrial development. The development was not clearer when observed through binoculars. As in winter, the point was so distant that it did not appear in photographs taken.

Although the proposed activity would include a larger Central Pad development and separate developments at West Pad and East Pad, the scale of each would be similar to that observed. For example, the vertical line of the tower was the visible feature, and it is the same height and form as is proposed for future development. It was concluded by field observation that future development would not be visible from the river and would be effectively invisible from the eastern bluff or other points at similar distance. They would not show up in visual simulations. For these reasons, no simulation was attempted for this KOP.

4.5.4 Contrast Rating—Canning River Bluff Observation Point

Although no simulation was created for the Canning River Bluff KOP, contrast rating information was prepared from the bluff top, based on the site visit and field notes, and is provided in Table 9 and Table 10. Refer back to subsection 4.1.3 for explanation of these tables.

Table 9: Landscape Characteristics and Project Characteristics—Bluff Above Canning River Takeout

	Land / Water	Vegetation	Structures
Characteristic Landscape Description (Preexisting Condition)			
Form	Coastal plain with mild rounded hills and low river bluffs. River floodplain. Mountains to south. Ocean to north.	Very low arctic tundra.	None.
Line	Horizontal ocean/icepack. Low-angle diagonal bluff. Curving river edges and bluff lines.	Vegetation cover follows contour of land.	None
Color	River bars light gray/tan. River water light milky color and white reflections. Icepack bright white.	Yellowish / straw colored older vegetation.; green new vegetation Scattered white, yellow, purple tiny flowers	Minor point of metallic reflection from distant USGS station.
Texture	Fine.	Fine	None
Proposed Activity Description (Landscape with Proposed Project)			
Form	No project earth forms visible at all.	No project-related vegetation changes visible at all.	No form distinguishable.
Line	NA-project does not affect lines associated with land/water.	NA-project does not affect lines associated with vegetation.	Very small, faint, vertical line—virtually indistinguishable from background.
Color	NA- project does not affect land/water color.	NA- project does not affect color associated with vegetation.	Dark silhouette, but virtually indistinguishable from background.
Texture	NA-project does not affect land/water texture.	NA- project does not affect texture associated with vegetation.	None distinguishable.

This table represents summer only. Site not visited in winter. NA=not applicable

Table 10: Rating of Visual Contrast Between the Existing Characteristic Landscape and the Proposed Activity—Bluff Above Canning River Takeout

DEGREE OF CONTRAST		FEATURES											
		Land/Water Body				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				S				S				S
	Line				S				S			S	
	Color				S				S			S	
	Texture				S				S				S

Legend: winter (W), summer (S), winter and summer (W/S).

Note: contrast shown as 'weak' is very weak.

4.5.5 Conclusion

For the Bluff Above Canning River Takeout, visual contrast is very weak to nonexistent in daylight. The contrast may be strong in dim and dark conditions, and the project likely would appear as a single point of light for each developed pad area, but actual nighttime conditions were not directly observed. It is anticipated that most people would visit the area in summer when there were no dim and dark periods. The relatively few who might visit late in the season would most likely be in tents near the river and not on the bluff during the darkest conditions in the middle of the night. Local residents hunting in the area during winter and spring could camp in areas with a similar view and, based on observations made from this site and on GIS modeling of visibility (Figure 2), would be able to see lights at night.

4.6 AERIAL OBSERVATION POINT

4.6.1 Basic Information

Visual Resource Inventory Class: III A (summer), III B (winter).

Location: T9N R22 E Umiat Meridian. Figure 3 illustrates the locations of all KOPs.

Distance from Central Pad: 4.7 mi. and 500 vertical feet.

4.6.2 Characteristic Landscape Description—Aerial Observation Point

Landform/Water

This viewpoint represents an aerial view for air travelers crossing over the arctic coastline. The main elements in the view are ponds of water, the coastal plain and patterned ground, and the Beaufort Sea coastline with marine waters and offshore ice pack. At the time of field work in early July, large herds of caribou were visible from the air moving across the view. The basic landforms at this location are the coastal plain and the Beaufort Sea shoreline. Pond colors range from shiny light blue to deep dark blue. The distant ocean water appears almost black and contrasts sharply with white sea ice. The topography is very flat. There is a very slight undulation in the tundra vegetation visible only in the foreground view and not particularly discernable from the air. The patterned ground provides visual interest.

Vegetation

At the time of the field visit, the tundra is the color of straw, yellowish tan, with very fine texture. Wetter areas and drainage channels are greener. Vegetation is interspersed with many ponds and small winding drainages. The wet and relatively dry conditions and the patterned ground provide visually interesting vegetation patterns not readily apparent from the ground.

Structures

Under baseline conditions, there are essentially unaltered views from the air in all directions traveling over this location. Small old gravel pads are visible from the air in the general area.

4.6.3 Proposed Activity Description—Aerial Observation Point

Figure 21 is a photo simulation of the project area as seen from the aerial observation point in summer.

Landform/Water

The proposed airstrip, connection roads, and gravel staging area/water supply are visible in the foreground zone (approximately 1.75 miles away). These are mostly low, flat, linear structures placed on the coastal plain and do not stand out. The Central Pad development is at the far edge of the foreground-middle ground zone (4.7 miles away) and includes taller and bulkier facilities that interrupt the shoreline in color and somewhat in form. No rock outcrops or dominating geologic formations beyond the plain itself are visible. The dark ocean and bright white summer ice pack are visible beyond the shoreline.

Vegetation

Bare gravel of the constructed facilities replaces the yellow-browns and greens of the vegetation with lighter grays and tans of the surface, but from this distance the texture is not different, and color is only mildly different, depending on lighting.

Structures

The structures are mostly new in this view. The gravel mine pit is used as a water supply, so it appears as another pond (the mine pit/lake was not modeled in Figure 21). Although it is a pond with an engineered rectangular shape, it is not readily evident from this vantage point. Roads, the airstrip, and the pipelines have tidy engineered shapes that are symmetrical and visually pleasing but dissimilar from the surrounding natural conditions. Because of distance, the relative size of facilities appears small. The airstrip is the most visible, because it is relatively close and also relatively wide. The background structures and towers of Central Pad are visible as vertical lines and bulky forms against the brighter ocean waters. At this distance, the coastal vegetation also is somewhat dark. The structures from this distance appear as a compact cluster of blocky forms and towers that is readily evident. The simulation suggests the network of roads and pipelines, while visible, would be less visible than the larger pads and the development on Central Pad. Any view of new structures from an aerial vantage point would be relatively brief as the aircraft passed by.

4.6.4 Contrast Rating—Aerial Observation Point

Figure 24 is a photo simulation of the Central Pad and other facilities as viewed from the Aerial observation point. From this simulation, the contrast rating was completed, as shown in Table 11 and Table 12. Refer back to subsection 4.1.3 for explanation of these tables.

Table 11: Landscape Characteristics and Project Characteristics—Aerial

Characteristic Landscape Description (Preexisting Condition)			
	Land / Water	Vegetation / Snow	Structures
Form	Very flat overall, both coastal plain and ocean/icepack.	Low, flat, with patterns following drainage.	None
Line	Horizontal coastline and horizon. Oval/curving pond edges. Angular patterned ground in some places.	Curvilinear vegetation edge along waterways and pond edges.	None
Color	Blue water with white reflections and bright white ice. No bare earth visible.	Summer: Yellowish/straw color with some darker brown and some greener areas.	None
Texture	Fine.	Fine vegetation texture.	None

Table 11: Landscape Characteristics and Project Characteristics—Aerial			
Proposed Activity Description (Landscape with Proposed Project)			
Form	NA-project does not visibly alter land/water except for addition of a pond (not readily evident).	Flat vegetation surface partly overlain by development with minor vertical relief (pads) or strong relief (buildings/towers) at a distance.	Combination of boxy, cylindrical, open-web tower structures. 'Fence' appearance of pipes on vertical supports.
Line	NA-project does not visibly alter land/water	Vegetation partly replaced by arcs or roads, straight pipeline in distance, strong horizontal edges of airport	Faint arcs of road alignments. Strong vertical of towers.
Color	NA-project does not visibly alter land/water	Vegetation partly replaced by development of gray-tan color of gravel.	Some structures/towers silhouetted. Others appear with distance as light neutral tan colors.
Texture	NA-project does not visibly alter land/water	Vegetation partly replaced by development with fine texture.	Some coarse texture in blockiness of forms. Most texture of Central Pad not visible. Road and airport texture is fine.

Legend: Not applicable (NA)

Table 12: Rating of Visual Contrast Between the Existing Characteristic Landscape and the Proposed Activity—Aerial Observation Point													
DEGREE OF CONTRAST		FEATURES											
		Land/Water Body				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				S			S		S			
	Line				S		S			S			
	Color				S			S			S		
	Texture				S			S				S	

Legend: This table addresses summer (S) conditions only. Not visited in winter.

4.6.5 Conclusion

The Central Pad developments would contrast fairly strongly despite the distance because of unusual massing and form for the area, combined with vertical lines and contrast against the bright ocean water. Roads and pipelines at this distance contrast weakly. Any view from the air would take in a broad area, of which the project site would be a limited part. Different angles of view based on different aircraft route, elevation, or distance would alter the view simulated here. Different lighting could cause greater reflectivity off the pipelines and lighter colored gravel road and runway surfaces. Any view from aircraft would be of relatively short duration as the aircraft passed by but at distances similar to those simulated would attract attention because of contrast compared to the surrounding environment.

Pre Existing Conditions

Proposed Conditions

Figure 24

View of Central Pad from Aerial Viewpoint (Summer, Daylight)

POINT THOMSON PROJECT EIS

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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4.7 INLAND SOUTHWEST OF WEST PAD (WEST PAD AND PIPELINE)

4.7.1 Basic Information

Visual Resource Inventory Class: III A (summer), III B (winter).

Location: T6N R23 E Umiat Meridian. Figure 3 illustrates the locations of all KOPs.

Distance from West Pad: 0.8 mi. or

Distance from Export Pipeline (closest point): 225 feet.

4.7.2 Characteristic Landscape Description—Inland Observation Point

Landforms/Water

The basic landform at this location is the coastal plain. The topography is very flat. There is a slight undulation in the ground visible only in the foreground view. In places where there is patterned ground, it provides micro topographic relief. No rock outcrops or dominating geologic formations are visible. Ponds are visible and, in the distance, the white offshore icepack is visible.

Vegetation

Vegetation consists of arctic tundra. The tundra vegetative texture is fine as there are no coarse plants and no trees or shrubs. The color ranges from light tan to green where new growth is emerging, generally in wetter areas in and around standing water.

Structures

In the baseline condition, no structures are readily apparent from this location. A dark vertical line on the western horizon, apparent mostly with binoculars, is thought to be the top of a tower at the Badami development.

Other

At the time of the field visit, large numbers of caribou crossed from the western horizon to the northern horizon and eastward.

4.7.3 Proposed Activity Description—Inland Observation Point

Figure 25 and Figure 26 are visual simulations of West Pad facilities and the export pipeline from the Inland observation point.

Landform/Water

The proposed addition of the West Pad drilling rig, other facilities, and export pipeline are new elements in the northeastward view. The pipe itself is slightly above eye level and nearly blocks the horizon, but it is possible to see under it to the horizon. The project does not visibly alter landforms or water.

Vegetation

The vegetation itself is visually unaltered, except for pilings emerging from the tundra to support the pipeline and shadows cast on the vegetation.

Structures

The West Pad development is a new development and is partly obscured by the foreground pipeline, but the drilling rig presents a strong vertical line and tower form about 0.8 mile away. The export pipeline and its vertical support members are new structures and pass 225 feet from this observation point. The pipe is somewhat shiny silver and reflects colors from the sky and the ground. Against the bright horizon sky, the pipeline appears dark, and the shadowed portions of the vertical supports are darker than the backdrop vegetation. The pipeline is a long, linear element in the view and parallels the line of the horizon, the coast, and the distant ice pack. The pipeline supports add a vertical element to the view, but because they are capped by the long-running horizontal pipe, the visual contrast is reduced and the horizontal line dominates. The overall impression of the pipeline is that of a long horizontal element disappearing into the distance to the west. In the view to the northeast, with West Pad development visible behind the pipeline, the vertical tower dominates. The pipeline can be seen running eastward into the distance.

Pre Existing Conditions

Proposed Conditions

POINT THOMSON PROJECT EIS

Figure 25

View of West Pad and Pipeline from Inland Viewpoint (Summer, Daylight)

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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Pre Existing Conditions

Proposed Conditions

POINT THOMSON PROJECT EIS

Figure 26
View of Export Pipeline (Summer)

Date: 09/29/2010
Photosimulation Author: HDR Boise Inc.
Sources: ExxonMobil, USGS, AK DNR, URS

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4.7.4 Contrast Rating—Inland Observation Point

Figure 25 is a visual simulation of the proposed West Pad development, with the export pipeline in the foreground; Figure 26 is a visual simulation of the pipeline alone. While the photos in Figure 26 were taken from the same inland location as those in Figure 25, those in Figure 26 were taken looking directly north instead of northeast. Figure 26 illustrates what the export pipeline might look like at most locations between Point Thomson and Badami. Table 13 presents the preexisting landscape characteristics and the projected project characteristics for comparison. Table 14 presents the contrast rating. Refer back to subsection 4.1.3 for explanation of these tables.

Table 13: Landscape Characteristics and Project Characteristics—Inland Observation Point

	Land / Water	Vegetation / Snow	Structures
Characteristic Landscape Description (Preexisting Condition)			
Form	Very flat overall, both coastal plain and ocean/ice pack.	Very low arctic tundra.	None
Line	Horizontal.	Horizontal edge of vegetation against ocean waters at coastline or of ponds.	None
Color	No bare earth visible. Pond reflections blue and white. Ocean ice pack white.	Yellowish / straw colored older vegetation with patches of new green vegetation.	None
Texture	Fine	Fine texture of tundra cover.	None
Proposed Activity Description (Landscape with Proposed Project)			
Form	No visible earth or water changes.	Vegetation partly replaced by development	Long, thin, cylindrical pipeline and supports visible from foreground to distant background. Combination of boxy, large, and open-web tower structures behind foreground pipeline.
Line	NA-project does not affect lines associated with land/water.	Line of tundra horizon broken by development.	Strong vertical line of tower. Strong horizontal line of pipeline.
Color	NA- project does not affect color associated with land/water.	Minor shadow locally darkens tundra.	Dark blue, tan, gray. Pipeline reflects bright sky and darker ground-cover colors.
Texture	NA-project does not affect texture associated with land/water.	No change to vegetation.	Individual surfaces appear smooth.

This site visited in summer only.
NA=not applicable

Table 14: Rating of Visual Contrast Between the Existing Characteristic Landscape and the Proposed Activity—Inland Observation Point

DEGREE OF CONTRAST		FEATURES											
		Land/Water Body				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				S			S		S			
	Line				S			S		S	*		
	Color				S				S		S		
	Texture				S				S		S		

Site visited in summer only. *The horizontal line of the pipeline along would have only moderate contrast, while the "line" rating for the pipeline with West Pad would be "strong."

4.7.5 Conclusion

This view point is representative of all of the pads as they might be seen from about a mile inland, with a tundra foreground. The stand-alone pipeline view is representative of the pipeline at close range at most points over its 22 mile-length, as it would be seen from inland locations (but very similar to what it would look like from the opposite side as well). This vantage point would be most likely to be seen by hunters ranging inland from the coast and by those traveling the coastal corridor by snowmobile in winter. Although visually "light" because the pipe and supports are narrow, the structure runs from horizon to horizon, contrasting moderately or greater with the natural landscape, and therefore dominating the view at close range and likely continuously visible at distances two to three miles away. With West Pad and the export pipeline combined, the strong right-angle meeting of the vertical tower and horizontal pipeline create strong contrast of line and form.

4.8 SKY GLOW VISIBILITY FROM KAKTOVIK

Informal reports at the time of project scoping indicated that Kaktovik residents sometimes were able to see a glow in the sky from the lights of the Point Thomson exploratory drilling rig. Visualization experts for the project modeled the potential for the project to cast a reflection in the sky that might be seen from Kaktovik, 60 miles from the project site. Curvature of the earth would hide any direct view of project lighting from Kaktovik. Night sky reflections would be entirely dependent on atmospheric conditions. Clear night conditions would reveal no effect as seen from Katovik. The visualization team modeled atmospheric conditions with cloud cover at altitudes of approximately 3,000-6,000 feet above ground level at the project site, and with limited low-elevation haze or fog. Conditions between Kaktovik and the project site were assumed to have no significant low cloud cover or fog that would obscure the view of clouds at the project site. Project lighting was modeled, including lighting intensity for all three proposed pad developments (but not the airstrip, for which data were not available). Based on observed reflection off low cloud layers during the March 2010 field visit at Brownlow Point, the visualization team prepared a simulation of the reflection as it might be seen from 60 miles away.

In the simulated image, a very low intensity glow was visible in a dark black image, but the light contrast was such that the glow was not visible on a computer screen at typical image sizes and was not visible at all when the image was printed. Therefore, the simulation was not published as part of this document. Nonetheless, the model agreed with informal reports from Kaktovik residents that Point Thomson reflected light may sometimes be visible from the Kaktovik area and other locations approximately 60 miles away. Such reflected light would occur only under certain atmospheric conditions. When it did appear, the reflected light would likely appear quite dim but in very dark conditions would be visible. The glow might not be visible within the community of Kaktovik because of community lights and reflections surrounding the viewer. The glow might be visible only on the outskirts of the community where the surroundings would be darker. It is likely that, at certain times, reflected light from the Prudhoe Bay area similarly may be visible from Pt. Thomson or from the western edge of the Arctic Refuge, which are about 60 miles from the Prudhoe Bay development. No reports of seeing reflected light from Prudhoe Bay at Kaktovik (120 miles) are known.

4.9 VIEW FROM WILDERNESS BOUNDARY

The Mollie Beattie Wilderness boundary within the Arctic Refuge lies 30 miles inland from the coast, measured from Point Thomson. The visual assessment team had anticipated completing a simulation based entirely on GIS analysis and not on photography. However, based on the relative invisibility of current drilling operations at Point Thomson from a distance of 20 miles, it was determined to be unwarranted to complete a simulation at 30 miles. It is likely that areas within the Mollie Beattie Wilderness boundary that have unobstructed views to the coast at Point Thomson would be affected by a direct view of lights from the project in dim and dark conditions. Compare Figure 1 and Figure 2; the areas affected are principally the north face of the Sadlerochit Mountains, some low-angle north-facing slopes at the base of these mountains, and the ridge tops of the Shublik Mountains. With minor “spot” exceptions, those parts of the coastal plain designated as wilderness within 5-10 miles of the Canning River, where most use would be expected, would not be within sight of the facilities, according to the model. No visibility during daylight is expected anywhere within the Mollie Beattie Wilderness boundary, unless there were perfect sun angles to cause a bright reflection or unless there was a large

plume of dark smoke from an unusual flare event that called attention to the site. See also discussion below in Section 4.10.1.

4.10 OTHER ELEMENTS OF VISUAL IMPACT

4.10.1 Visibility Distances

As indicated in Sections 2.2 and 2.3, limits on visibility on the Arctic Coastal Plain are principally atmospheric, not topographic. Most vistas are not framed by vegetation or topography but are wide open and can include very long views. Because mere presence of human activity or structures in a nondesignated or designated wilderness environment can indicate adverse impact to wilderness recreationists (see Section 2.3), and at the request of resource agencies, this analysis examined the concepts of maximum visibility—how far one might see in good conditions—especially as pertains to the Arctic Refuge and its management for wilderness qualities.

A GIS exercise modeled an observer at five feet above the surface elevation and an observed point at Point Thomson 150 feet above the surface elevation (based on ExxonMobil statement of the expected height of a flare on a tower at the proposed production facility; ExxonMobil 2009). The digital elevation model for the Arctic Coastal Plain is coarse, but the mapped conclusions (Figure 2) are meant as a tool to help define roughly how far a person might be able to see a light or reflection or possibly the structures themselves if inhibited only by topography and curvature of the earth. Including ridge tops and peaks in the Brooks Range, the model indicates that the theoretical maximum is well in excess of 100 miles.

Detailed visibility studies are not available for the North Slope in Alaska. In the Lower 48 states, in the western U.S. under natural conditions (i.e., without air pollution), visibility is 110 to 115 miles. In the eastern U.S., where the climate is more humid, visibility typically is 60 to 80 miles (Malm, 1999). It is therefore likely that the theoretical maximums shown in the model for the project site could be achieved (60-120 miles). This is consistent with actual experience, which showed that far mountain ridges of the Brooks Range were readily visible from the coast. The primary question regarding views *from* those distances *to* project facilities is the relative size of the project facilities. As noted in Sections 2 and 4.5, field experience in March and July 2010 indicated that the forms of existing Point Thomson structures and the drilling rig tower were barely visible with the naked eye during daylight at 20 miles to observers who knew where the facilities were located and were specifically looking for them. However, as soon as a helicopter left the ground at night near the Arctic Refuge boundary at the coast, lights of the greater Prudhoe Bay area were visible about 60 miles away. Therefore, it is assumed that the more distant views would pertain mostly for light at night or reflection during the day, or possibly for larger plumes of exhaust or flare smoke.

The most distant areas in Figure 2 where people might be expected to camp are bluffs west of the Canning River or around the base of the Sadlerochit Mountains, some 35-40 miles from the proposed project site. These locations could apply to recreational visitors and to North Slope Borough residents at hunting camps. It seems likely that under good conditions lights at night or reflection or exhaust plumes in daylight at the project site could be visible from these distances and that people would become aware of man-made structures and development.

The more distant areas indicated in Figure 2 are unlikely to be viewpoints for seeing nighttime lights from the project for a combination of the following reasons:

- Summer in the arctic includes 24-hour daylight, and most project lights would not be on or would not be visible under the influence of the "midnight sun."
- Summer is the time when the vast majority of the most sensitive users are likely to visit the Arctic Refuge; few visitors would be expected in the snow season when longer periods of darkness occur, although local residents are likely in hunting camps during these periods
- Even autumn visitors experience only a moderate period of darkness at night.
- During nighttime hours when dim and dark conditions might occur, most Arctic Refuge visitors or local residents in hunting camps are unlikely to be on the high ridges and mountaintops and are more likely to be in a camp at lower elevations, where views to the coast would more likely be obscured by topography.

Overall visitation to the Arctic Refuge and the eastern portion of the Arctic Coastal Plain is low (for example, the Arctic Refuge reports about 1,000 recorded visitors per year in the entire refuge), and only a small fraction of the visitors ever would be in the area shown in Figure 2 as visible to Point Thomson.

This analysis indicates that people on the Arctic Coastal Plain, in the Mollie Beattie Wilderness, and on mountain slopes outside the 20 mile primary study area radius may be able to see lights, reflections, or plumes and become aware that the visual environment includes man-made features. However, 24 hour daylight, atmospheric moisture, and fog or clouds all are likely on most occasions to keep the project from being visible except for visitors closest to the project. Also, when conditions did allow views of project lights from mountain slopes, the observer likely would be at sufficient elevation that he or she also would be seeing lights of the Prudhoe Bay complex on the horizon or would see lights of Kaktovik. That is, project lights likely would not be the only lights visible but would be part of a cumulative reduction in natural dark conditions when combined with lights that already exist.

4.10.2 Motion and Visual Effects to Wildlife

Resource agencies requested that this visual assessment provide information that might be useful to wildlife biologists. A brief treatment of motion associated with the project is presented below. Wildlife sections of the EIS provide further information on effects to wildlife.

Because of predator-prey relationships between species, detection of and response to visual motion may be keys to wildlife survival. Motion in the study area under baseline conditions typically is related to wind or wildlife movements. Motion based on wind includes clouds moving on the wind, low shrubs and grasses waving or vibrating in the wind, or substantial snaking streams of loose snow blowing in the wind. Summer pack ice also moves in and out under the influence of wind and tide, and ocean or river waters sometimes carry sticks, logs, boats, and rafts. Wildlife movement includes large numbers of birds and herds of caribou that migrate to and through the area, as well as individual animals. Occasional snowmachines, motorized boats, people walking, and overflying or landing aircraft are the other typical, if relatively rare, movements of humans.

During construction and operation of the project, human-caused motion would increase, with greater aircraft operations; frequent vehicle traffic on infield roads between drilling pads and access ice roads in winter; exhaust plumes from structures, large snowplow plumes from higher-speed plowing on roads as observed during winter fieldwork, and dust plumes behind vehicles; flares and lights that would vary in intensity or turn on and off; and large barges in motion on near-shore waters. The project would include bright and reflective surfaces, including intentional reflectors marking roads or equipment; and buildings, pipelines, and other structures that may have shiny stainless steel, aluminum, or light-colored exteriors.

These may catch the attention of an animal or person that crosses the path of reflected sunlight and bring attention to facilities that might otherwise not readily be visible. Small reflective road markers waving in the wind, for example, were observed causing blinking reflections over long distances (likely a mile or more) during winter field work conducted for this visual assessment.

4.11 VISUAL CONTRAST AND IMPACT CONCLUSIONS

The visual simulations and contrast ratings indicate strong visual contrast between views of the project site under preexisting conditions and views under proposed project conditions. This general statement must be balanced by the low number of viewers likely to be in the study area in any given year (see section 3.3.2, above) and the relatively high sensitivity of recreationists and local users who would be in the study area.

The contrast is strong from most KOPs, particularly from the coastal corridor, decreasing with distance. The contrast remains strong in the foreground-middle ground views (up to about five miles). Views beyond five miles are less affected, and it is likely that people unaware of the project location would not immediately notice the facilities unless conditions were dark and project lights caught their attention, or reflection, dust, exhaust plume, aircraft activity, or possibly noise caught their attention and drew their eye. Virtually the entire Canning River corridor normally used by recreationists is at, or beyond, this five-mile range.

The distances of the various KOPs indicate that all facilities in the Applicant's proposed action would be readily visible from the coastal corridor. The East Pad location would create strong contrast and would be readily visible from the western edge of the Staines River/Canning River delta at the Arctic Refuge boundary (two miles in the distance—use Figure 5 for an indication of East Pad's general form and massing, and use Figure 8 through Figure 10 for a sense of similar distance). However, East Pad development would be less visible at the USFWS bird research camp on the delta (6 mi.) where some recreational users fly in and out, and on the lower few miles of the Canning River corridor (Figure 13 through Figure 15 from Brownlow Spit illustrate a similar distance of 5 mi.). Central Pad and West Pad are far enough away that their contrast is substantially diminished from all but the very edge of the Arctic Refuge, but contrast is such that they would be visible during the day, and lights would strongly stand out during dim and dark periods. West Pad may be not visible except as a light during dark periods.

The other common Arctic Refuge fly-out point from the Canning River is just outside the primary study area, at 20 miles from the coast and about 17 miles from the nearest proposed project component (airstrip). The project from this KOP (the bluff immediately above the river) would be in the "seldom seen" zone from this location, if mapping were from this location only, and it is unlikely that project components would be noticed at all under most daylight conditions by most people. However, lights would be readily visible during dim and dark conditions (beginning in late August).

From the coastal corridor, the proposed facilities would be immediately visible with strong contrast over a stretch of about 10 miles of coastline. With Bullen Point development within five miles of West Pad and Badami development another six miles west, the visual effect along the coast would be altered so that the entire coastal corridor from Prudhoe Bay to the Canning River delta (Arctic Refuge) would be within view of industrial development; as one industrial feature was beginning to fade from view, another would be growing more visible.

Boaters passing by the three pads would experience visual impacts between those indicated in the Shoreline simulations (Figure 18 and Figure 19) and the Mary Sachs Island simulations (Figure 8 through

Figure 10), depending on how far the boat was from shore and its location between development nodes. For snowmachiners or hunters, the same would be true inland, with a view of the opposite sides of the facilities.

The BLM Manual 8431 visual contrast rating worksheet poses two final questions, as follows:

- Does the project design meet visual resource management objectives?
- Are additional mitigating measures recommended?

The only agency with visual resource management objectives is the USFWS/Arctic Refuge. Because the project is located outside the refuge on state land, the project is not within the direct management purview of the USFWS. However, the project is within view of the Arctic Refuge, with a moderate to strong degree of contrast from the northwest corner of the refuge. Even though there are few recreationists overall on the Canning River corridor, and even though few of them would be likely to notice the facilities immediately, the presence of industrial facilities where previously there were none is likely to be of management concern for the Arctic Refuge and its visitors.

Official mitigation measures to reduce visual impact along the coastal corridor and from the Arctic Refuge/Canning River corridor will be addressed in the EIS. Examples of the types of mitigation that could reduce visual impact include:

- Creating greater distance between corridors or view points and industrial facilities, particularly permanent towers (communications tower, flare stack). Possibly provide for flaring inside a low-level containment rather than on a tower.
- Reducing the potential of the project to call attention to itself by moving the airstrip and/or aircraft operations farther from corridors and view points, and by minimizing flares, exhaust plumes, and dust.
- Reducing light emissions by turning off lights when not needed, aiming lights westward and inland (away from corridors) and downward.
- Minimizing use of smooth reflective surfaces.

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Appendix A

BLM Manual 8410 - Visual Resource Inventory

Please see Instructions at bottom of page on how to rate the visual quality of scenic resources.

Illustration 1 - Scenic Quality - Explanation of Rating Criteria

1 - Scenic Quality - Explanation of Rating Criteria
Landform
Topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, as the Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangell Mountain Range in Alaska, or they may be exceedingly artistic and subtle as certain badlands, pinnacles, arches, and other extraordinary formations.
Vegetation
Give primary consideration to the variety of patterns, forms, and textures created by plant life. Consider short-lived displays when they are known to be recurring or spectacular. Consider also smaller scale vegetational features which add striking and intriguing detail elements to the landscape (e.g., gnarled or windbeaten trees, and Joshua trees).
Water
That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.
Color
Consider the overall color(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) as they appear during seasons or periods of high use. Key factors to use when rating "color" are variety, contrast, and harmony.

Adjacent Scenery
Degree to which scenery outside the scenery unit being rated enhances the overall impression of the scenery within the rating unit. The distance which adjacent scenery will influence scenery within the rating unit will normally range from 0-5 miles, depending on the characteristics of the topography, the vegetative cover, and other such factors. This factor is generally applied to units which would normally rate very low in score, but he influence of the adjacent unit would enhance the visual quality and raise the score.
Scarcity
This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery - the scarcity factor can be used to recognize this type of area and give it the added emphasis it needs.
Cultural Modifications
Cultural modifications in the landform/water, vegetation, and addition of structures should be considered and may detract from the scenery in the form of a negative intrusion or complement or improve the scenic quality of a unit. Rate accordingly.

Illustration 2 - Scenic Quality Inventory and Evaluation Chart

Key factors	Rating Criteria and Score	.	.
Landform	High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. 5	Steep canyons, mesas, buttes, cinder cones, and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features which are interesting though not dominant or exceptional. 3	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. 1

Key factors	Rating Criteria and Score	.	.
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. 5	Some variety of vegetation, but only one or two major types. 3	Little or no variety or contrast in vegetation. 1
Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. 5	Flowing, or still, but not dominant in the landscape. 3	Absent, or present, but not noticeable. 0
Color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. 5	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element. 3	Subtle color variations, contrast, or interest; generally mute tones. 1
Influence of adjacent scenery	Adjacent scenery greatly enhances visual quality. 5	Adjacent scenery moderately enhances overall visual quality. 3	Adjacent scenery has little or no influence on overall visual quality. 0
Scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. * 5+	Distinctive, though somewhat similar to others within the region. 3	Interesting within its setting, but fairly common within the region. 1
Cultural	Modifications add favorably to	Modifications add little or	Modifications add

Key factors	Rating Criteria and Score	.	.
modifications	visual variety while promoting visual harmony. 2	no visual variety to the area, and introduce no discordant elements. 0	variety but are very discordant and promote strong disharmony. -4

* A rating of greater than 5 can be given but must be supported by written justification.

INSTRUCTIONS

Purpose: To rate the visual quality of the scenic resource on all BLM managed lands.
How to Identify Scenic Value: All Bureau lands have scenic value.
How to Determine Minimum Suitability: All BLM lands are rated for scenic values. Also rate adjacent or intermingling nonBLM lands within the planning unit.
When to Evaluate Scenic Quality: Rate for scenery under the most critical conditions (i.e., highest user period or season of use, sidelight, proper atmospheric conditions, etc.).
How to Delineate Rating Areas: Consider the following factors when delineating rating areas.

1 Like physiographic characteristics (i.e., land form, vegetation, etc.).

2 Similar visual patterns, texture, color, variety, etc.

3 Areas which have a similar impact from cultural modifications (i.e., roads, historical and other structures, mining operations, or other surface disturbances).

Explanation of Criteria: (See Illustration 1)
NOTE: Values for each rating criteria are maximum and minimum scores only. It is also possible to assign scores within these ranges.

SCENIC QUALITY
A = 19 or more
B = 12-18
C = 11 or less

8410 Visual Resource Inventory

Illustration 11 - Determining Visual Resource Inventory Classes

1. Basis for Determining Visual Resource Inventory Classes

1. Class I. Class I is assigned to all special areas where the current management situations requires maintaining a natural environment essentially unaltered by man.

2. Classes II, III, and IV. These classes are assigned based on combinations of scenic quality, sensitivity levels, and distance zones as shown in the following matrix:

Visual Sensitivity Levels

		High			Medium			Low
Special Areas		I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II
	B	II	III	III* IV*	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
		f/m	b	s/s	f/m	b	s/s	s/s
		DISTANCE ZONES						

* If adjacent areas is Class III or lower assign Class III, if higher assign Class IV

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