Willow Master Development Plan

Appendix E.4
Soils, Permafrost, and Gravel Resources
Technical Appendix

There is no technical appendix for this resource

January 2023

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Willow Master Development Plan

Appendix E.5
Contaminated Sites Technical Appendix

January 2023

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Table of Contents

List of Tables

List of Acronyms

Project	Willow Master Development Plan Project

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1.0 CONTAMINATED SITES TECHNICAL INFORMATION

1.1 Assessment Criteria and Methodology

The potential for the Willow Master Development Plan Project (Project) to encounter contamination from existing sites was evaluated using records of existing contaminated sites and spills within 0.5 mile of the Project to identify the locations, characteristics, and quantities of existing contamination. The locations of existing contamination were evaluated against the Project activities to assess the likelihood of encountering contamination. The likelihood of encountering contamination during Project construction was assessed using a rating system of very low to high. Ratings are a function of spill status (cleanup complete or active) and distance of the site from the Project footprint. Table E.5.1 presents the assessment criteria for contaminated sites.

Table E.5.1. Contaminated Sites Assessment Criteria

Location	Active Status	Cleanup Complete or Cleanup Complete with Institutional Controls Status
Within 100 feet of Project activity	Moderate	Low
Between 100 and 500 feet of Project activity	Low	Very low
Greater than 500 feet from Project activity	Very low	Very low

1.2 Contaminated Site Details

Table E.5.2 provides a summary of contaminated sites within 0.5 mile of the Project (Figure 3.5.1).

Table E.5.2. Contaminated Sites within 0.5 mile of the Project*

ADEC Hazard ID	Site Name	Event Year	Status	Distance to Project Activity (miles)	Likelihood of Encountering
1446	Kuparuk Construction Service (KCS)	1992	Cleanup complete-institutional controls	0.3	Very low
2923	Lonely AFS Dewline - Diesel Tank SS10	1995	Cleanup complete	0.0	Low
2924	Lonely AFS Dewline - Beach Diesel SS003	1995	Cleanup complete	0.2	Very low
2925	Lonely AFS Dewline - Hangar Pad SS13	1995	Cleanup complete	0.0	Very low
2926	Lonely AFS Dewline - Landfill LF007	1995	Cleanup complete	0.0	Low
2927	Lonely AFS Dewline - Diesel Spills SS05	1995	Cleanup complete	0.0	Moderate
2928	Lonely AFS Dewline - POL Storage SS04	1995	Cleanup complete	0.0	Low
2932	Lonely AFS Dewline - Garage SS09	1995	Cleanup complete	0.0	Very low
2933	Lonely AFS Dewline - Landfill LF011/SS006	1995	Cleanup complete	0.1	Very low
2934	Lonely AFS Dewline - Sewage Disposal SS01	1995	Cleanup complete	0.2	None[a]
2935	Lonely AFS Dewline - Drum Storage SS02	1995	Cleanup complete	0.1	None[b]
2936	Lonely AFS Dewline - Module Train SS012	1995	Cleanup complete	0.0	Low
4223	Lonely AFS Dewline - AOC 1, 2, & 3	2005	Cleanup complete	0.0	Very low

Source: (ADEC 2022a)

Note: ADEC (Alaska Department of Environmental Conservation); AFS (Air Force site); AOC (area of concern); DEW (Distant Early Warning); POL (petroleum, oil, and lubricant).

[a] Site 2934 was noted by the Alaska Department of Environmental Conservation as having eroded into the Beaufort Sea in August 2008.

[b] Site 2935 was noted by the Alaska Department of Environmental Conservation as having eroded into the Beaufort Sea in April 2015.

1.3 Registered Facilities*

Table E.5.3 provides a summary of U.S. Environmental Protection Agency–regulated facilities within 0.5 mile of the Project that may be affected by the release, or threat of release, of hazardous substances, pollutants, or contaminants from Project activities (Figure 3.5.1).

Table E.5.3. U.S. Environmental Protection Agency–Regulated Facilities within 0.5 mile of the Project*

EPA Registry ID	Facility Name	Description	Release of Hazardous Substance, Pollutants, or Contaminant (yes/no)	Number of Releases (size/type)	Distance from Project Activity (miles)
110056899281	Alpine oil field	Crude petroleum and natural gas extraction, drilling oil and gas wells, and support activities for oil and gas operations	Yes	6 (266 gallons/ non-crude oil; 248.5 gallons/hazardous substance)	0.0
110041479030	Alpine airstrip	Airport operations	No	0	0.0
110022527121	Camp Lonely	Airport operations and crude petroleum and natural gas extraction	Yes	3 (10 gallons/ non-crude oil) (3 gallons/hazardous substance)	0.0
110064809916	USAF Dewline Site POW-1: Pt. Lonely	Very small quantity generator	No	0	0.0

Source: (ADEC 2022b; EPA 2022)
Note: EPA (U.S. Environmental Protection Agency).

2.0 REFERENCES

ADEC. 2022a. Contaminated Sites Program Databases. Accessed January 5, 2022. https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/Search.

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EPA. 2022. FRS Facility Detail Report Database. Accessed January 4, 2022. https://www.epa.gov/frs/frs-query.

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Willow Master Development Plan

Appendix E.6
Noise Technical Appendix

There is no technical appendix for this resource

January 2023

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Willow Master Development Plan

Appendix E.7
Visual Resources Technical Appendix

January 2023

Appendix E.7A
Visual Resources Technical Appendix

Appendix E.7B
Visual Contrast Ratings Worksheets

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Willow Master Development Plan

Appendix E.7A
Visual Resources Technical Appendix

January 2023

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Table of Contents

List of Tables

List of Acronyms

BLM	Bureau of Land Management
NPR-A	National Petroleum Reserve in Alaska
Project	Willow Master Development Plan Project
VCRW	Visual contrast rating worksheets
VRI	Visual Resource Inventory
VRM	Visual Resources Management

Glossary Terms

Background zone: Areas visible within 5 to 15 miles from viewer locations.

Distance zones: The level of visibility and distances from important viewer locations, including travel routes, human use areas, and observation points. Distance zones consist of foreground-middleground (0 miles to 5 miles), background (5 to 15 miles), and seldom-seen (not visible or beyond 15 miles). The Willow Master Development Plan Project's (Project's) estimated nighttime lighting conditions are determined by the heights of drill rigs and communications towers. The Project would be visible out to 30 miles, based on the direct line-of-sight limits due to the curvature of the earth and regional atmospheric conditions.

Foreground-middleground distance zone: Areas visible within less than 5 miles from key observation points.

Scenic quality: The relative worth of a landscape from a visual perception point of view expressed as a quantitative measure of qualitative criteria associated with landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications (BLM 2020).

Seldom seen areas: Areas within the foreground-middleground and background zones that are not visible, or areas that are visible but are beyond the background zone (more than 15 miles from key observation points).

Sensitivity level: The measure of public concern for scenic quality (as determined through the Visual Resource Inventory process).

Viewshed: The total landscape seen from a point, or from all or a logical part of a travel route, use area, or waterbody.

Visual resources: Visible physical features on a landscape, including land, water, vegetation, animals, structures, and other features.

Visual Resource Inventory: The process of determining the visual value of BLM-managed lands through the assessment of the scenic quality rating, sensitivity level, and distance zones of visual resources within those lands.

Visual Resource Inventory classes: Four visual resource inventory classes into which all BLM-managed lands are placed based on scenic quality, sensitivity levels, and distance zones, as determined through the Visual Resource Inventory process.

Visual Resources Management classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones with consideration for multiple-use management objectives. There are four classes; each class has an objective that prescribes the amount of change allowed in the characteristic landscape. Visual resource management classes are assigned through BLM Resource Management Plans (in this case, the IAP for the NPR-A).

Visual Resources Management: The system used by BLM to manage visual resources (including in the NPR-A). It includes inventory and planning actions to identify visual values and to establish objectives for managing those values.

1.0 VISUAL RESOURCES

1.1 Visual Resources Management in the National Petroleum Reserve in Alaska

The following descriptions, worksheets, and tables support the analysis in the Willow Master Development Plan Environmental Impact Statement Section 3.7, *Visual Resources*, and tier to previous Bureau of Land Management (BLM) studies. Section 3.7 discusses existing conditions in Section 3.7.1, *Affected Environment*, and discloses impacts to scenery and people, and conformance with **BLM Visual Resources Management** (VRM) objectives (BLM 2022) in Section 3.7.2, *Environmental Consequences*. The BLM **Visual Resource Inventory** (VRI) (BLM 2012) provides the visual baseline conditions using the indicators of scenic quality, sensitivity, and distance zones. The BLM scenic quality rating is the basis for determining impacts to scenery in the analysis area. The BLM sensitivity levels and distance zones are the basis for determining impacts to people (human environment) in the analysis area.

The referenced figures and tables in this appendix contain quantitative and qualitative information for:

1. **Scenic quality** is the relative worth of a landscape from a visual perception point of view expressed as a quantitative measure of qualitative criteria associated with landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.
2. **Sensitivity level** is the measure of public concern for scenic quality (as determined through the VRI process).
3. **Distance zones** are the level of visibility and distances from important viewer locations, including travel routes, human use areas, and observation points. Distance zones consist of the foreground-middleground (0 miles to 5 miles), background (5 to 15 miles), and seldom-seen (not visible or beyond 15 miles) zones. The Willow Master Development Plan Project's (Project's) estimated nighttime lighting conditions are determined by the heights of drill rigs and communications towers which would be visible out to 30 miles, based on the direct line-of-sight limits due to the curvature of the earth and regional atmospheric conditions.
4. **VRI classes** are four visual resource inventory classes which all BLM-administered lands are placed into based on scenic quality, sensitivity levels, and distance zones, as determined through the VRI process.
5. **VRM classes** are categories assigned to public lands based on scenic quality, sensitivity level, and distance zones with consideration for multiple-use management objectives. There are four classes. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape. VRM classes are assigned through BLM Resource Management Plans, which for the National Petroleum Reserve in Alaska (NPR-A) is the Integrated Activity Plan (BLM 2022).

The BLM's VRM class objectives are defined in Table E.7.1.

Visual contrast rating worksheets (VCRW), located in Appendix E.7B, *Visual Contrast Rating Worksheets*, document:

1. The forms, lines, colors, and textures of landforms/water, vegetation, and structures in the characteristic landscape.
2. The forms, lines, colors, and textures of landforms/water, vegetation, and structures of the project.
3. The visual contrasts in the categories are strong, moderate, weak, and none; conformance with VRM objectives; and recommended mitigations, if any.

Table E.7.1. Bureau of Land Management Visual Resources Management Class Objectives

Class	Management Objective
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic (design) elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture.

Source: BLM 1986

The Project's VCRWs are included in Appendix E.7B and include:

- VCRW-1: Contrast Ratings and Conformance for Foreground-Middleground Viewing Situations in VRM Class IV Areas
- VCRW-2: Contrast Ratings and Conformance for Background and Seldom-Seen Viewing Situations in VRM Class IV Areas
- VCRW-3: Contrast Ratings and Conformance in VRM Class II Areas
- VCRW-4: Contrast Ratings and Conformance for Foreground-Middleground Viewing Situations in VRM Class III Areas (Option 3)
- VCRW-5: Contrast Ratings for Foreground-Middleground Viewing Situations (Non-BLM lands)
- VCRW-6: Contrast Ratings for Background and Seldom-Seen Viewing Situations (Non-BLM lands)

1.2 The Willow Project and Visual Resources Analysis Area

The analysis area for visual resources is the area within line-of-sight from ground-eye-level to the tallest components of the Project (drill rig and communications tower lighting). For this Project, that area (also known as the **viewshed**) is 30 miles, with the exception of the diesel and seawater pipelines from near Nuiqsut to Kuparuk, which would be colocated with existing pipeline infrastructure and has a viewshed of 15 miles (Figure 3.7.1).The Project viewshed includes all areas from which the proposed facilities would be visible based on topographical obstruction and viewer distance from the Project (0- to 5-miles **foreground-middleground zone** and the 5- to 15-miles **background zone**.

1.2.1 State Lands

State lands that occur within the analysis area are not subject to known visual management standards. The BLM visual contrast rating process has been applied to non-BLM lands to provide a qualitative analysis of the potential degree of contrast of Project facilities when viewed from 0- to 5-miles foreground-middleground zone and the 5- to 15-miles background zone.

1.3 Bureau of Land Management Scenic Quality in the Project Viewshed

The BLM scenic quality classes are the basis for determining impacts to scenery in the analysis area. Due to the natural character of existing conditions in the viewshed, the Project would be strongly contrasting with scenery due to the broad, panoramic landscape where few human-made or built features occur. The Project's impacts to scenery are determined by comparing the view characteristics of the action alternatives with views of the characteristic landscape. The relative scenic quality (Class A, B, or C) is assigned to a landscape by applying the VRI scenic quality evaluation factors with scenic quality A having the highest rating and scenic quality C having the lowest. The Project would result in substantial changes in the visual landscape for public land users and viewers in the foreground-middleground and background distance zones and the level of change and scenic quality would reduce the inventoried scenery class designations in the viewshed based on the introduction of Project components that are not common in the landscape. Table E.7.2 shows the acreages and percentages of scenic quality classes where viewers would have visibility toward the Project. The scenic quality classes are shown in Figure 3.7.2, and the Project's viewshed is shown in Figure 3.7.1.

Table E.7.2. Scenic Quality Classes in the Analysis Area and Viewshed

Area	Class A Acres (%)	Class B Acres (%)	Class C Acres (%)	No Data Acres (%)	Unclassified, Not in NPR-A Acres (%)	Total Acres (%)
In analysis area	180,538.9 (3.0%)	28,979.4 (0.5%)	2,399,945.0 (39.9%)	1,777.6 (less than 0.1%)	3,411,329.1 (56.7%)	**6,020,792.4 (100%)**
In Project viewshed	161,764.8 (3.3%)	20,508.4 (0.4%)	1,720,473.0 (35.4 %)	1,481.2 (less than 0.1%)	2,954,376.6 (60.8%)	**4,857,122.8 (100%)**

Note: NPR-A (National Petroleum Reserve in Alaska). Areas outside of NPR-A are not managed by the Bureau of Land Management and thus do not have scenic quality classifications.

1.4 Bureau of Land Management Sensitivity Levels and Distance Zones in the Project Viewshed

The BLM sensitivity level and distance zones are the basis for determining impacts to people/viewers in the analysis area. Higher user concern for scenery would be more susceptible to visual impacts than lower concern and near distance zones would be more susceptible to visual impacts than far distance zones. Visual contrasts for viewers are determined by comparison of the view characteristics of the Project with views of the characteristic landscape. The Project would result in strong visual contrasts and viewer impacts that are strong in comparison with existing conditions, including visually dominant forms, lines, colors, and textures of landforms, water, vegetation, and structures. The Project would result in strong contrasts to scenic quality for viewers in the foreground-middleground, and background distance zones, and the level of contrast likely would reduce the inventoried sensitivity level designations in the analysis area. Table E.7.3 shows the acreages and percentages of BLM sensitivity classes where viewers would have visibility toward the Project. Table E.7.4 summarizes BLM distance zones where viewers would have visibility toward the Project. The Project's viewshed is shown in Figure 3.7.1, BLM sensitivity levels are shown in Figure 3.7.3, and the distance zones are shown in Figure 3.7.4.

Table E.7.3. Sensitivity Classes in the Analysis Area and Viewshed

Area	High Acres (%)	Medium Acres (%)	Low Acres (%)	No Data Acres (%)	Unclassified, Not in NPR-A Acres (%)	Total Acres (%)
In analysis area	2,611,241.0 (43.4%)	0.0 (0.0%)	0.0 (0.0%)	0.9 (less than 0.1%)	3,409,551.4 (56.6%)	**6,020,792.4 (100%)**
In Project viewshed	1,904,227.5 (42.4%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	2,952,894.9 (60.8%)	**4,857,122.4 (100%)**

Note: NPR-A (National Petroleum Reserve in Alaska). Areas outside of NPR-A are not managed by the Bureau of Land Management and thus do not have sensitivity classifications.

Table E.7.4. Distance Zones in the Analysis Area and Viewshed

Area	Foreground-Middleground Acres (%)	Background Acres (%)	Seldom Seen Acres (%)	Unclassified, Not in NPR-A Acres (%)	Total Acres (%)
In analysis area	2,169,481.5 (36.0%)	441,759.4 (7.3%)	0.0 (0.0%)	3,409,551.4 (56.6%)	**6,020,792.4 (100%)**
In Project viewshed	1,560,104.2 (32.1%)	344,123.3 (7.1%)	0.0 (0.0%)	2,952,894.9 (60.8%)	**4,857,122.4 (100%)**

Note: NPR-A (National Petroleum Reserve in Alaska). Areas outside of NPR-A are not managed by the Bureau of Land Management and thus do not have distance zone classifications.

1.4.1 State Lands

Similar to BLM lands, Project facilities and lighting would affect scenery and people by impacting the undisturbed characteristic landscape (including night skies). State lands in the area of Project activity for the action alternatives would be in areas of existing activity (e.g., Oliktok Dock, Alpine Annual Resupply ice road), while state lands along the Module Delivery Option 3 ice road route from Kuparuk DS2P to the Colville River ice bridge would follow a route without permanent infrastructure, though there are other temporary winter activities that occur in the area (e.g., North Slope Borough's Community Winter Access Trail).

Along the Option 3 ice road route, visual contrast from Project facilities and activity (including light sources during operations) would cause the greatest visual impacts in foreground-middleground views due to the broad, panoramic landscape and lack of intervening land features. Overall contrasts would diminish based on viewer location and proximity to existing oil and gas infrastructure in the Kuparuk area. In viewing areas distant from the developed Kuparuk area, moderate to weak construction-related contrasts in the background and **seldom seen areas** (5-15 and greater miles) would occur.

1.5 Bureau of Land Management Visual Resource Inventory Classes in the Project Viewshed

The BLM VRI classes indicate the overall value of landscape on BLM lands. Views to the action alternatives from more valued landscapes have greater potential for impacts than do views from less valued landscapes. Table E.7.5 shows the acreages and percentages of existing BLM VRI classes in the analysis area and the Project's viewshed. Construction, operations, and reclamation activities would result in overall landscape values that strongly contrast with existing conditions. The Project would result in strong contrasts to the landscape for viewers in the foreground, middleground, and background distance zones, and the level of impact would likely reduce the inventoried BLM VRI class designations in the analysis area. The VRI classes are shown in Figure 3.7.5, and the Project's viewshed is shown in Figure 3.7.1.

Table E.7.5. Visual Resource Inventory Classes in the Analysis Area and Viewshed

Area	Class I Acres (%)	Class II Acres (%)	Class III Acres (%)	Class IV Acres (%)	Unclassified, Not in NPR-A Acres (%)	Total Acres (%)
In analysis area	0.0 (0.0%)	209,518.3 (3.5%)	1,959,963.2 (32.6%)	441,759.4 (7.3%)	3,409,551.5 (56.6%)	**6,020,792.4 (100%)**
In Project viewshed	0.0 (0.0%)	182,273.1 (4.1%)	1,377,831.0 (30.7%)	344,123.3 (7.7%)	2,952,894.9 (60.8%)	**4,857,122.3 (100%)**

Note: NPR-A (National Petroleum Reserve in Alaska). Areas outside of NPR-A are not managed by the Bureau of Land Management and thus do not have Visual Resource Inventory classifications.

1.6 Bureau of Land Management Visual Resources Management Classes Within the Analysis Area*

Conformance with VRM management classes is based on the characteristics of Project facilities that are physically located within the VRM classified lands. The VRM classes were assigned to these lands by the NPR-A IAP/EIS Record of Decision (BLM 2022). The VRM Class objectives for each alternative (BLM 2022) takes into consideration VRI information and overall BLM land management objectives for each resource managed within the NPR-A.

VRM Class objectives (BLM 2022) identify 1,179,885.4 acres of VRM Class II within the analysis area (19.6% of the analysis area) and 1,335,405.2 acres of VRM Class IV (22.2% of the analysis area). There are no VRM Class I or III objectives identified within the analysis area (Figure 3.7.6). The acres of each VRM class within the Project viewshed provides a summary of the amount of those areas from which a viewer could see the Project facilities (Table E.7.6).

Table E.7.6. Visual Resources Management Classes in the Analysis Area and Viewshed Objectives*

Area	Class I Acres (%)	Class II Acres (%)	Class III Acres (%)	Class IV Acres (%)	In NPR-A, No BLM Surface Authority Acres (%)	Unclassified, Not in NPR-A Acres (%)	Total Acres (%)
In analysis area	0.0 (0.0%)	1,179,572.5 (19.6%)	0.0 (0.0%)	1,335,404.1 (22.2%)	96,264.3 (1.6%)	3,409,551.4 (56.6%)	**6,020,792.3 (100.0%)**
In Project viewshed	0.0 (0.0%)	907,300.4 (29.8%)	0.0 (0.0%)	905,215.8 (18.6%)	89,130.4 (1.8%)	2,995,476.1 (61.7%)	**4,857,122.4 (100.0%)**

Note: NPR-A (National Petroleum Reserve in Alaska). Areas outside of NPR-A are not managed by the Bureau of Land Management and thus do not have Visual Resources Management classifications.

Conformance with the VRM objectives is determined by comparison of the forms, lines, colors, and textures of view characteristics of the Project with forms, lines, colors, and textures of views of the existing characteristic landscape where they are physically located. Within the analysis area, the Project would not conform with VRM Class II objectives but would conform with VRM Class III and IV objectives as allocated for each VRM Class Alternative described above.

2.0 REFERENCES

BLM. 1986. *BLM Manual H-8410-1: Visual Resource Inventory*. Washington, D.C.

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Willow Master Development Plan

Appendix E.7B
Visual Contrast Rating Worksheets

January 2023

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Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/08/2019
District Office: Arctic
Field Office:
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Willow	Varies	See 2020 FEIS - Appendix A: Figure 3.7.6 Visual Resource Management Classes
2. Key Observation Point (KOP) Name: Foreground-MiddlegroundViews		
3. VRM Class at Project Location: Class IV	(Lat. Long) Varies	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Planar horizontal land, lakes and ponds.	Planar horizontal surface of grasses in summer turning to snow cover for 9-10 months..	None
LINE	Strongly horizontal land, lakes, and ponds..	Horizontal surface of grasses in summer turning to snow cover for 9-10 months.	None
COLOR	Very light to medium tan earth. Water reflecting colors of sky in summer turning to snow cover for 9-10 mo	Light to medium green turning to tan to brown grasses in summer and uniform snow cover for 9-10 months	None
TEX-TURE	Smooth land, lakes, and ponds	Smooth grasses and snow cover	None

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, planar pads and roads	Geometric patterns of present and absent grasses.	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Horizontal pads and curvilinear roads	Horizontal and angular lines at edges of geometric shapes.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Tans and greys	Greens, tans, and greys.	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth.	Smooth to coarse at a distance.	Moderate to coarse.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM		✓				✓			✓			
	LINE		✓				✓			✓			
	COLOR		✓				✓			✓			
	TEXTURE			✓				✓			✓		

2. Does project design meet visual resource management objectives? ✓Yes ___No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: Chris Bockey
Date: 12/31/2019

(Continued on Page 2)

Comments from item 2.

Strong construction-related contrasts in the foreground and middleground seen areas (0-5 miles) would occur for the 10-11-year time period specified (Chapter 2.4.6.10.2) for drilling and from the presence of drill rigs and construction equipment. Strong contrasts would be caused by the structural forms, lines, and colors and colors of lighting for facilities, equipment, and vehicles. These contrasts would conform with Visual Resource Management Class IV management objectives (see following table). These noticeable forms and lines are required for function and the highly contrasting colors are needed for safety in the region's extreme weather conditions. Thus, they would cause strong contrasts in the characteristic landscape and mitigations of color would not be feasible.
Dark Sky BMP Re: down-shielded lighting – This BMP would limit direct (line-of-sight) visibility of the standard Osha-mandated lighting at facilities. However, down-shielding in snow cover conditions is known to increase reflectiveness toward the sky and the resultant sky glow and light dome would cause problematic navigation issues for humans and fauna.
Strong contrasts would be reduced to moderate and then weak during the operations, maintenance, and reclamation phases of the project. These phases would be portrayed by pads, roads, pipelines, and vehicles, and, eventually, less-noticeable forms, lines, and colors in the landscape.

BLM Visual Resource Management Class Objectives
Class I Objective The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic (design) elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III Objective The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective The objective Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture.
Source: BLM 1986, 2008b.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/08/2019
District Office: Arctic
Field Office:
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Willow	Varies	See 2020 FEIS - Appendix A: Figure 3.7.6 Visual Resource Management Classes
2. Key Observation Point (KOP) Name Background-Seldom Seen Views		
3. VRM Class at Project Location Class IV	(Lat. Long) Varies	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Planar horizontal land, lakes and ponds.	Planar horizontal surface of grasses in summer turning to snow cover for 9-10 months..	None
LINE	Strongly horizontal land, lakes, and ponds..	Horizontal surface of grasses in summer turning to snow cover for 9-10 months.	None
COLOR	Very light to medium tan earth. Water reflecting colors of sky in summer turning to snow cover for 9-10 mo	Light to medium green turning to tan to brown grasses in summer and uniform snow cover for 9-10 months	None
TEX-TURE	Smooth land, lakes, and ponds	Smooth grasses and snow cover	None

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, planar pads and roads	Geometric patterns of present and absent grasses.	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Horizontal pads and curvilinear roads	Horizontal and angular lines at edges of geometric shapes.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Tans and greys	Greens, tans, and greys.	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth.	Smooth to coarse at a distance.	Moderate to coarse.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓			✓		
	LINE			✓				✓			✓		
	COLOR			✓				✓			✓		
	TEXTURE			✓				✓				✓	

2. Does project design meet visual resource management objectives? ✓Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
✓Yes ___No (Explain on reverses side)

Evaluator's Names: Chris Bockey
Date: 12/31/2019

(Continued on Page 2)

Comments from item 2.

Moderate to weak construction-related contrasts in the background and seldom seen areas (5-15 and greater miles) would occur for the 10-11-year time period specified (Chapter 2.4.6.10.2) for drilling and from the presence of drill rigs and construction equipment. Moderate contrasts would be caused by the structural forms, lines, and colors and colors of lighting for facilities and vehicles. These contrasts would conform with Visual Resource Management Class III and IV management objectives (see following table). These noticeable forms and lines are required for function and the highly contrasting colors are needed for safety in the region's extreme weather conditions. Thus, they would cause strong contrasts in the characteristic landscape and mitigations of color would not be feasible.
Dark Sky BMP Re: down-shielded lighting – This BMP would limit direct (line-of-sight) visibility of the standard Osha-mandated lighting at facilities. However, down-shielding in snow cover conditions is known to increase reflectiveness toward the sky and the resultant sky glow and light dome would cause problematic navigation issues with humans and fauna.
Moderate contrasts would be reduced to weak during the operations, maintenance, and reclamation phases of the project. These phases would be portrayed by pads, roads, pipelines, and vehicles, and, eventually, less-noticeable forms, lines, and colors in the landscape.

BLM Visual Resource Management Class Objectives
Class I Objective The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic (design) elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III Objective The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective The objective Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture.
Source: BLM 1986, 2008b.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/08/2019
District Office: Arctic
Field Office:
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Willow	Varies	See 2020 FEIS - Appendix A: Figure 3.7.6 Visual Resource Management Classes
2. Key Observation Point (KOP) Name: Foreground-MiddlegroundViews		
3. VRM Class at Project Location: Class II	(Lat. Long) Varies	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Planar horizontal land, lakes and ponds.	Planar horizontal surface of grasses in summer turning to snow cover for 9-10 months..	None
LINE	Strongly horizontal land, lakes, and ponds..	Horizontal surface of grasses in summer turning to snow cover for 9-10 months.	None
COLOR	Very light to medium tan earth. Water reflecting colors of sky in summer turning to snow cover for 9-10 mo	Light to medium green turning to tan to brown grasses in summer and uniform snow cover for 9-10 months	None
TEX-TURE	Smooth land, lakes, and ponds	Smooth grasses and snow cover	None

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, planar pads and roads	Geometric patterns of present and absent grasses.	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Horizontal pads and curvilinear roads	Horizontal and angular lines at edges of geometric shapes.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Tans and greys	Greens, tans, and greys.	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth.	Smooth to coarse at a distance.	Moderate to coarse.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM		✓				✓			✓			
	LINE		✓				✓			✓			
	COLOR		✓				✓			✓			
	TEXTURE			✓				✓			✓		

2. Does project design meet visual resource management objectives? ___Yes ✓No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: Chris Bockey
Date: 12/31/2019

(Continued on Page 2)

Comments from item 2.

Strong construction-related contrasts in the foreground and middleground seen areas (0-5 miles) would occur for the 10-11-year time period specified (Chapter 2.4.6.10.2) for drilling and from the presence of drill rigs and construction equipment. Strong contrasts would be caused by the structural forms, lines, and colors and colors of lighting for facilities, equipment, and vehicles. These contrasts would not conform with Visual Resource Management Class II management objectives (see following table). These noticeable forms and lines are required for function and the highly contrasting colors are needed for safety in the region's extreme weather conditions. Thus, they would cause strong contrasts in the characteristic landscape and mitigations of color would not be feasible.

Dark Sky BMP Re: down-shielded lighting – This BMP would limit direct (line-of-sight) visibility of the standard Osha-mandated lighting at facilities. However, down-shielding in snow cover conditions is known to increase reflectiveness toward the sky and the resultant sky glow and light dome would cause problematic navigation issues for humans and fauna.
Strong contrasts would be reduced to moderate and then weak during the operations, maintenance, and reclamation phases of the project. These phases would be portrayed by pads, roads, pipelines, and vehicles, and, eventually, less-noticeable forms, lines, and colors in the landscape.

BLM Visual Resource Management Class Objectives
Class I Objective The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic (design) elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III Objective The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective The objective Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture.
Source: BLM 1986, 2008b.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 12/31/2019
District Office: Arctic
Field Office:
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Willow EIS - Option 3	Varies	See 2020 FEIS - Appendix A: Figure 3.7.6 Visual Resource Management Classes
2. Key Observation Point (KOP) Name Foreground-Middleground Views		
3. VRM Class at Project Location Class III	(Lat. Long) Varies	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Planar horizontal land, lakes and ponds.	Planar horizontal surface of grasses in summer turning to snow cover for 9-10 months..	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Strongly horizontal land, lakes, and ponds.	Horizontal surface of grasses in summer turning to snow cover for 9-10 months.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Very light to medium tan earth. Water reflecting colors of sky in summer turning to snow cover for 9-10 mo	Light to medium green turning to tan to brown grasses in summer and uniform snow cover for 9-10 months	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth land, lakes, and ponds	Smooth grasses and snow cover	Moderate to coarse.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, planar road	Indistinguishable	Geometric structures for construction camp at DS2P, vehicles.
LINE	Curvilinear road	Indistinguishable	Vertical and horizontal lines at edges of geometric shapes associated with construction camp.
COLOR	Tans and greys	Indistinguishable	Light to dark structures and multicolored equipment of construction camp, vehicle lighting, sky glow.
TEX-TURE	Smooth.	Indistinguishable	Moderate to coarse.

SECTION D. CONTRAST RATING ✓ SHORT TERM __ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				✓				✓			✓	
	LINE			✓					✓			✓	
	COLOR			✓					✓			✓	
	TEXTURE				✓				✓			✓	

2. Does project design meet visual resource management objectives? ___Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
___Yes ___No (Explain on reverses side)

Evaluator's Names: Chris Bockey
Date: 12/31/2019

(Continued on Page 2)

Comments from item 2.

Weak construction-related contrasts in the foreground and middleground seen areas (0-5 miles) would occur for the time period specified for delivery of drillsite modules. Due to the existing infrastructure in the foreground and middleground area associated with Oliktok and Kuparuk, generally weak contrast would be caused by the introduction of temporary structural forms, lines, and colors and colors of lighting for construction camp facilities, equipment,vehicles and ice road. Degree of contrast is identified below.

Degree of Contrast Criteria
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.

BLM 1986, 2008b.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 01/09/2020
District Office: N/A
Field Office: N/A
Land Use Planning Area: N/A

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Willow	Varies	See 2020 FEIS - Appendix A: Figure 3.7.1 Visual Resource Analysis Area
2. Key Observation Point (KOP) Name Foreground-MiddlegroundViews		
3. VRM Class at Project Location Non-BLM Managed Lands	(Lat. Long) Varies	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Planar horizontal land, lakes and ponds.	Planar horizontal surface of grasses in summer turning to snow cover for 9-10 months..	None
LINE	Strongly horizontal land, lakes, and ponds..	Horizontal surface of grasses in summer turning to snow cover for 9-10 months.	None
COLOR	Very light to medium tan earth. Water reflecting colors of sky in summer turning to snow cover for 9-10 mo	Light to medium green turning to tan to brown grasses in summer and uniform snow cover for 9-10 months	None
TEX-TURE	Smooth land, lakes, and ponds	Smooth grasses and snow cover	None

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, planar pads and roads	Geometric patterns of present and absent grasses.	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Horizontal pads and curvilinear roads	Horizontal and angular lines at edges of geometric shapes.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Tans and greys	Greens, tans, and greys.	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth.	Smooth to coarse at a distance.	Moderate to coarse.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM		✓				✓			✓			
	LINE		✓				✓			✓			
	COLOR		✓				✓			✓			
	TEXTURE			✓				✓			✓		

2. Does project design meet visual resource management objectives? ___Yes ___No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: Merlyn Paulson/ Chris Bockey
Date: 01/09/2020

(Continued on Page 2)

Comments from item 2.

Strong construction-related contrasts in the foreground and middleground seen areas (0-5 miles) would occur for the 10-11-year time period specified (Chapter 2.4.6.10.2) for drilling and from the presence of drill rigs and construction equipment. Strong contrasts would be caused by the structural forms, lines, and colors and colors of lighting for facilities, equipment, and vehicles.These noticeable forms and lines are required for function and the highly contrasting colors are needed for safety in the region's extreme weather conditions. Thus, they would cause strong contrasts in the characteristic landscape and mitigations of color would not be feasible.

Dark Sky BMP Re: down-shielded lighting – This BMP would limit direct (line-of-sight) visibility of the standard Osha-mandated lighting at facilities. However, down-shielding in snow cover conditions is known to increase reflectiveness toward the sky and the resultant sky glow and light dome would cause problematic navigation issues for humans and fauna.

Strong contrasts would be reduced to moderate and then weak during the operations, maintenance, and reclamation phases of the project. These phases would be portrayed by pads, roads, pipelines, and vehicles, and, eventually, less-noticeable forms, lines, and colors in the landscape.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/08/2019
District Office: Arctic
Field Office:
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Willow	Varies	See 2020 FEIS - Appendix A: Figure 3.7.1 Visual Resource Analysis Area
2. Key Observation Point (KOP) Name Background-Seldom Seen Views		
3. VRM Class at Project Location Non-BLM Managed Lands	(Lat. Long) Varies	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Planar horizontal land, lakes and ponds.	Planar horizontal surface of grasses in summer turning to snow cover for 9-10 months..	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Strongly horizontal land, lakes, and ponds..	Horizontal surface of grasses in summer turning to snow cover for 9-10 months.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Very light to medium tan earth. Water reflecting colors of sky in summer turning to snow cover for 9-10 mo	Light to medium green turning to tan to brown grasses in summer and uniform snow cover for 9-10 months	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth land, lakes, and ponds	Smooth grasses and snow cover	Moderate to coarse.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, planar pads and roads	Geometric patterns of present and absent grasses.	Strongly planar vertical and horizontal drill and valve structures. Cylindrical tanks. Geometric roads, pads, vehicles.
LINE	Horizontal pads and curvilinear roads	Horizontal and angular lines at edges of geometric shapes.	Strongly vertical and horizontal lines. Vertical and horizontal lines at edges of geometric shapes
COLOR	Tans and greys	Greens, tans, and greys.	Light to dark orange structures and multicolored equipment. White, blue, and red facility, vehicle lighting, sky glow.
TEX-TURE	Smooth.	Smooth to coarse at a distance.	Moderate to coarse.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) STRONG	MODERATE	WEAK	NONE	VEGETATION (2) STRONG	MODERATE	WEAK	NONE	STRUCTURES (3) STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓			✓		
	LINE			✓				✓			✓		
	COLOR			✓				✓			✓		
	TEXTURE			✓				✓				✓	

2. Does project design meet visual resource management objectives? ___Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
✓Yes ___No (Explain on reverses side)

Evaluator's Names: Merlyn Paulson/ Chris Bockey
Date: 01/09/2020

(Continued on Page 2)

Comments from item 2.

Overall contrast would diminish based on viewer location and proximity to existing drilling infrastructure in the area of Kuparuk.

In viewing areas distant from the area of Kuparuk, moderate to weak construction-related contrasts in the background and seldom seen areas (5-15 and greater miles) would occur for the 10-11-year time period specified (Chapter 2.4.6.10.2) for drilling and from the presence of drill rigs and construction equipment. Moderate contrasts would be caused by the structural forms, lines, and colors and colors of lighting for facilities and vehicles.
These noticeable forms and lines are required for function and the highly contrasting colors are needed for safety in the region's extreme weather conditions. Thus, they would cause moderate contrasts in the characteristic landscape and mitigations of color would not be feasible.
Dark Sky BMP Re: down-shielded lighting – This BMP would limit direct (line-of-sight) visibility of the standard Osha-mandated lighting at facilities. However, down-shielding in snow cover conditions is known to increase reflectiveness toward the sky and the resultant sky glow and light dome would cause problematic navigation issues with humans and fauna.

Moderate contrasts would be reduced to weak during the operations, maintenance, and reclamation phases of the project. These phases would be portrayed by pads, roads, pipelines, and vehicles, and, eventually, less-noticeable forms, lines, and colors in the landscape.

Additional Mitigating Measures (See item 3)