

North Slope Borough

PLANNING AND COMMUNITY SERVICES DEPARTMENT



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Gordon R. Brower, Director

To: Planning Commission

From: Gordon R. Brower, Land Management Administrator

Date: October 18, 2019

RE: FINAL STAFF RECOMMENDATION – RZ 20-001, Nanushuk Rezone And Master Plan, Various Township, Ranges & Sections, Conservation District.

This is a staff recommendation prepared and issued pursuant to North Slope Borough Municipal Code (NSBMC) §19.60.030. These recommendations are subject to change prior to and during the Planning Commission's Public Hearing based on additional information and comments received.

Thank you- to the Planning Staff, Wildlife and Law departments, stakeholder and residents for support in the development of the final recommendations-

Oil Search Alaska, LLC plans to develop hydrocarbon deposits within the Pikka Unit as part of the Nanushuk Project. This project includes drilling, construction and production of hydrocarbons from the Pikka Unit. The proposed project includes gravel roads and pads, wells, gathering lines, processing and injection facilities, support infrastructure and export pipelines. Care has been taken to include subsistence related activities to promote a more balanced approach with the Nanushuk development, that include subsistence access ramps, a dual use boat ramp for response and local access.

The Nanushuk project is located 52 miles west of Deadhorse and is 7 miles northeast of Nuiqsut, on Oil Search Alaska, LLC-operated leases from the State of Alaska and surface lands owned by Nuiqsut village corporation- which is situated on the east Channel of the Colville River.

Purpose of this Project

The purpose of this project is to rezone sections of land in the Conservation District areas between the Alpine River Unit and the Kuparuk River Unit into Resource Development District lands and allow the official resource development district to be adjusted to allow the development of the Master Plan on the above mentioned project.

OSA has modified the project based on local community input and to enhance engineering operational efficiency. OSA proposes to make the following modifications to the Project:

1. Modify Nanushuk Drillsite B (ND-B) pad layout,
2. Relocate the TIP,
3. Modify the water source access road and pump house pad,
4. Update road and pad footprint and fill volumes,
5. Relocate the boat ramp and associated boat ramp access road, and
6. Implement early production.

These modifications update the requested rezone area listed below: in Table 1 of the Master Plan and Question 1 in the Chapter 19.60 and Chapter 19.70 Analysis in OSA’s July 2019 Rezone and Master Plan Application (OSA 2019) (OSA 2019).

The supporting permit figure set has been updated to reflect the proposed modifications. The figure changes are noted in Table 1 below.

These modifications update the requested rezone area listed in Table 1 of the Master Plan and Question 1 in the Chapter 19.60 and Chapter 19.70 Analysis in OSA’s July 2019 Rezone and Master Plan Application (OSA 2019) (OSA 2019).

The supporting permit figure set has been updated to reflect the proposed modifications. The figure changes are noted in Table 1 below.

Table 1. Project Figures Changes		
Figure	Title	Modification
1	Project Vicinity Map	Updated tie-in pad (TIP), boat ramp, boat ramp access road, water source access road, and pump house pad locations, and realigned Nanushuk Pipeline.
2	Proposed Rezone	Updated rezone area and acreage, updated TIP, boat ramp, boat ramp access road, water source access road, and pump house pad locations, and realigned Nanushuk Pipeline.
3	Nanushuk Project Area – Land Ownership	Updated TIP, boat ramp, boat ramp access road, water source access road, and pump house pad locations, and realigned Nanushuk Pipeline.
4	Project Overview	Updated TIP, boat ramp, boat ramp access road, water source access road, and pump house pad locations, and realigned Nanushuk Pipeline.
5	Project Components	Updated TIP, boat ramp, boat ramp access road, water source access road, and pump house pad locations. Added 12-inch water injection line to export/import pipe rack.
6	Nanushuk Drillsite A (ND-A) Pad Layout	Corrected pad dimensions.
7	Nanushuk Drillsite B (ND-B) Pad Layout	Updated pad layout.
8	Nanushuk Drillsite C (ND-C) Pad Layout	Corrected pad dimensions.
9	ND-A, ND-B, and ND-C Cross Section Profiles	Updated ND-B Plan section length.
10	Nanushuk Processing Facility (NPF) Pad Layout	None.
11	Nanushuk Operations Pad (NOP) Layout	None.
12	Tie-In Pad (TIP) Layout	Updated TIP location and layout.
13	Project Typical Pipelines	Added 12-inch water injection line to export/import pipe rack.
14	Typical Pipeline Road Crossing	None.
15	Water Intake and Pump House	Updated pump house pad and water source access road layout.
16	Pipeline River Crossings	None.

Table 1. Project Figures Changes

Figure	Title	Modification
17	Typical Road Sections	Removed 24-foot surface gravel boat ramp and water source access road section. Boat ramp and water source access roads are now consistent with other infield roads (32 feet at surface).
18	Types of Turnouts	None.
19	Miluveach River Bridge	None.
20	Kachemach River Bridge	None.
21	Culvert Types	None.
22	Boat Ramp Layout	Updated boat ramp layout and location.
23	Oliktok Dock Screeding Area	None.
24	Main Transportation Routes Overview	Updated TIP, boat ramp, boat ramp access road, water source access road, and pump house pad locations, and realigned Nanushuk Pipeline.
25	Operators within Project Vicinity	Updated lease ownership, TIP, boat ramp, boat ramp access road, water source access road, and pump house pad locations, and realigned Nanushuk Pipeline.

Notes: ND-A: Nanushuk Drillsite A; ND-B: Nanushuk Drillsite B; ND-C: Nanushuk Drillsite C; NPF: Nanushuk Processing Facility; NOP: Nanushuk Operations Pad; TIP: Tie-In Pad

Details regarding each change are provided below.

ND-B Pad Layout

OSA proposes to modify the proposed ND-B size and layout to accommodate the newly designed grind and inject (G&I) facility. The proposed changes will reduce the gravel footprint on the west and south sides of the pad, and increase the gravel footprint on the east side of the pad. The modified pad will be 20.8 acres, an increase of 1.3 acres from the previously proposed 19.5-acre pad.

OSA originally planned to construct Underground Injection Control (UIC) wells at each drill site located within the well row. These UIC wells were only capable of handling waste generated from the respective well pad. In October 2018, OSA reduced the overall number and location of UIC wells and relocated them to ND-B. In order to maintain disposal well sustainability with the reduced number of UIC wells, OSA designed the G&I facility at ND-B to handle all drilling and operational wastes, including accommodating waste deliveries from ND-A and ND-C.

The proposed modifications to ND-B will accommodate the G&I facility. The increased gravel footprint on the east side of ND-B will allow the G&I facility to be moved away from drilling and production operations to separate traffic related to processing and fracturing equipment, pipelines, and drill rigs as recommended by detailed facility siting reviews and advanced engineering. The new design and facility placement moves G&I delivery trucks and personnel traffic away from drill site equipment, pipelines, and wells; reduces overall drill site congestion; and enhances safety by reducing traffic.

Tie-in Pad

OSA proposes to move the TIP (0.8 acre) from the permitted location near Kuparuk River Unit (KRU) 2C to a location northeast of Kuparuk Central Processing Facility 2 (CPF2) to satisfy a request by the leaseholder and adjacent operator. The modified TIP location near CPF2 is near the location originally proposed and evaluated by the U.S. Army Corps of Engineers (USACE) in the Project Draft Environmental Impact Statement (EIS; USACE 2017). In its October 2018 USACE permit application (OSA 2018a), OSA moved the TIP near KRU 2C based on a request by the operator of the KRU. OSA's

current request is to relocate the TIP to a site adjacent to Kuparuk CPF2, because this site will interfere the least with existing operations.

The modified location will also reduce the Project pipeline length by 1 mile, including re-routing the pipeline north of Lake K213/M8103 and eliminating two pipeline-road crossings. As part of the modification, the pad will increase from 0.8 to 0.9 acre to accommodate access to existing powerlines, a telecom tower, and space for additional equipment during development and production of the Project.

Water Source Access Road and Pump House Pad

OSA proposes to modify the permitted pump house pad location and realign the water source access road. The modification will result in an overall increase in footprint from 2.2 acres (1.1-acre pad and 1.1-acre road) to 2.5 acres (1.1-acre pad and 1.4-acre road), an increase of approximately 0.3 acre.

The new pad location is located approximately 500 feet west of the originally proposed location. The new location will improve access to a deeper portion of Lake MC7903 and provide more consistent access to unfrozen water during the winter. The location and configuration of the water source access road intersection with the Access Road will change. The water source access road will increase from 24 to 32 feet surface width. The 32-foot road width will:

- Allow OSA to maintain consistency with all roads and pipeline/road crossings on the Project;
- Allow for construction and maintenance equipment to gain access to the north side of the pipeline; and
- Allow straight-line removal and replacement of pumps year-round.

Finally, the pipelines near the pump house pad will be realigned to cross the water source access road south of the pump house pad. This modification will change the pipeline length but will not alter the overall estimate of total vertical support members (VSMs).

Project Footprint Update

OSA proposes slight changes, both increase and decrease, to gravel road and pad layout as well as fill volumes across the entire Project. The primary updates are the result of more accurate surface contour data that was not available at the time the application was submitted. These changes generally represent small updates to the toe of slope footprint on the order of feet and do not reflect relocation or reconfiguration of affected infrastructure. These changes result in an increase in the project footprint by approximately 0.2 acre and a net increase in total fill volume of approximately 5,000 cubic yards.

Boat Ramp and Access Road Relocation

OSA proposes relocation of the boat ramp and associated access road from the permitted location on the Kachemach River, west of ND-B, to a location north of ND-B on the Colville River. OSA added the boat ramp and boat ramp access road to the Project in July 2018 in response to stakeholder feedback to allow local users to launch and retrieve boats (OSA 2018b). The initial conceptual location for the boat ramp was selected due to proximity to the original location of ND-B. The boat ramp and access road were included in OSA's USACE permit application in October 2018 (OSA 2018a) and in OSA's Rezone and Master Plan Application in July 2019 (OSA 2019). Since that time, OSA has continued to evaluate the boat ramp location, including further consultation with stakeholders from Nuiqsut. Stakeholder feedback received during a tour of the project area indicates that a boat ramp located north of ND-B on the Colville River is preferred by the community over the permitted Kachemach River location.

The relocated boat ramp will provide subsistence users with access directly to the East Channel of the Colville River. The ramp will be approximately 25 feet wide at the surface; the ramp’s slope could be up to 15 percent. Erosion protection will be added as necessary. The updated layout will continue to include a small staging and turnaround area with space for short-term parking of vehicles with trailers. The boat ramp access road will be 32 feet wide at the surface and will tie in to the ND-B access road approximately one-half mile south of ND-B.

As described in USACE’s Final EIS (USACE 2018) and Record of Decision (ROD; USACE 2019) “the boat ramp and subsistence ramps were included as mitigation measures for impacts to the human environment, specifically access to subsistence resources” (USACE 2019:11). Specifically, “both the subsistence ramps and the boat ramp will improve access for hunters to subsistence areas and will also provide access to the state road system” (USACE 2019:19).

The updated boat ramp location will have the same benefits as the previously proposed location. Based on additional community input, the updated location will help the boat ramp serve its intended purpose of improving access for hunters to subsistence areas and providing access to the state road system to an even greater extent as the community prefers the updated location for meeting community needs.

Early Production

OSA will initiate production at ND-B in 2022, with approximately 30,000 barrels of oil per day. Multi-phase fluids from ND-B will be transported for processing at Kuparuk CPF2 via the 24-inch multiphase pipeline to the NPF and the 18-inch Nanushuk export pipeline from the NPF to Kuparuk CPF2. Temporary pigging facilities will be installed on the NPF to accommodate the change in pipeline diameter. Seawater will be transported from Kuparuk CPF2 to the NPF via a new 12-inch water injection pipeline, and from the NPF to ND-B via the previously proposed 12-inch infield water injection pipeline. Once the NPF is operational in 2023 or 2024, the early production phase will end and the Nanushuk export pipeline will transition to carrying sales-quality oil from the NPF to Kuparuk CPF2.

SUMMARY

The following tables summarize updates to OSA’s July 2019 Master Plan (OSA 2019), reflecting the changes described above. The proposed area to be rezoned is shown on Figure 2 and described in Table 2. Table 2, below, updates Table 1 in OSA’s July 2019 Master Plan (OSA 2019).

Table 2. Rezone Locations		
Township^a	Range	Section(s)
Rezone Area – 13,492.2 acres^b		
11 North	5 East	SE ¼ of Section 25, East ½ of Section 36
11 North	6 East	West ½ of Section 1, East ½ and SW ¼ of Section 2, West ½ of Section 3, Section 4, NE ¼ of Section 9, Section 10, Section 11, Section 14, NE ¼ of Section 15, South ½ of Section 21, Section 22, Section 23, Section 24, NE ¼ of Section 25, North ½ of Section 26, NW ¼ of Section 27, North ½ and SW ¼ of Section 28, Section 29, South ½ of Section 30, West ½ and NE ¼ of Section 31, NW ¼ of Section 32
11 North	7 East	South ½ and NW ¼ of Section 19, West ½ of Section 29, North ½ and SE ¼ of Section 30, NE ¼ of Section 31, North ½ and SE ¼ of Section 32, Section 33
12 North	6 East	SW ¼ of Section 25, South ½ of Section 26, East ½ of Section 33, North ½ and SE ¼ of Section 35, West ½ of Section 36

^a All locations are based on the Umiat Meridian.

^b Rezone area includes updated boat ramp location identified by Nuiqsut whaling captains and search and rescue in June 2019.

Notes: SE: Southeast; SW: Southwest; NE: Northeast; NW: Northwest

Table 3, below, updates Table 2 in OSA's July 2019 Master Plan (OSA 2019) and provides location information for the updated project. All locations in bold are currently zoned as Conservation District.

Table 4, below, updates Table 3 in OSA's July 2019 Master Plan (OSA 2019) and provides an update to the estimated timeframes for major project components. The only substantial change in the project schedule is the addition of early production from ND-B in 2022.

Table 3. Project Components and Locations				
Project Component	Township^a	Range	Section(s)	Alaska Division of Lands
<i>Nanushuk Processing Facility</i>	11 North	6 East	SW ¼ of 11, NW ¼ of 14	392964, 392983
<i>Nanushuk Drillsite A</i>	12 North	6 East	SE ¼ of 26	393012
<i>Nanushuk Drillsite B</i>	11 North	6 East	04	392984
<i>Nanushuk Drillsite C</i>	11 North	5 East	East ½ of 36	393029
	11 North	6 East	NW ¼ of 31	392989
<i>Nanushuk Operations Pad</i>	11 North	6 East	SE ¼ of 24	392964
	11 North	7 East	SW ¼ of 19	393879
<i>Tie-in Pad</i>	11 North	9 East	SW ¼ of 21	025654
<i>Pump House Pad</i>	11 North	6 East	South ½ of 24	392964
<i>Nanushuk Boat Ramp</i>	12 North	6 East	NE ¼ of 33	393016
<i>Nanushuk Access Road</i>	10 North	7 East	NE ¼ of 02, N ½ of 03	390680, 390681
	11 North	6 East	S ½ and NW ¼ of 14, E ½ of 23, S ½ of 24	392964
	11 North	7 East	SW ¼ of 19, E ½ and NW ¼ of 30, NE ¼ of 31, N ½ of 32, S ½ and NW ¼ of 33, S ½ of 34, S ½ of 35	393879, 393881, 393880, 390692, 390691
<i>Mustang Road Upgrades</i>	10 North	7 East	01, E ½ of 02	390680
	10 North	8 East	NW ¼ of 05, N ½ of 06	025590
	11 North	8 East	SE ¼ of 31, S ½ of 32, N ½ and SW ¼ of 33	025585, 025586

Table 3. Project Components and Locations

Project Component	Township^a	Range	Section(s)	Alaska Division of Lands
Infield Roads ^b	11 North	5 East	SE ¼ of 25, NE ¼ of 36	391022, 393029
	11 North	6 East	S ½ and NE ¼ of 02, W ½ of 03, E ½ of 04, NE ¼ of 09, E ½ and NW ¼ of 10, W ½ of 11, NW ¼ of 14, S ½ of 21, S ½ and NE ¼ of 22, S ½ and NW ¼ of 23, S ½ of 24, NW ¼ of 28, E ½ and SW ¼ of 29, S ½ of 30, NW ¼ of 31	392982, 392963, 392984, 392985, 392986, 392983, 392964, 392987, 392966, 392967, 392988, 392989,
	12 North	6 East	SE ¼ of 26, E ½ of 33, E ½ of 35, W ½ of 36	393012, 393016, 393013, 393014
Miluveach River Bridge	11 North	7 East	SE ¼ of 34, SW ¼ of 35	390692, 390691
Kachemach River Bridge	11 North	6 East	NW ¼ of 28, NE ¼ of 29	392966, 392967
Nanushuk Pipelines ^c	10 North	7 East	N ½ and SW ¼ of 01, NE ¼ of 02, N ½ of 03	390680, 390681
	10 North	8 East	NW ¼ of 06	025590
	11 North	6 East	S ½ and NW ¼ of 14, E ½ of 23, S ½ of 24	392964
	11 North	7 East	SW ¼ of 19, SW ¼ of 29, E ½ and NW ¼ of 30, N ½ of 32, S ½ and NE ¼ of 33, S ½ of 34, S ½ of 35	393879, 393881, 393880, 390692, 390691
	11 North	8 East	S ½ of 23, N ½ and SE ¼ of 24, W ½ of 26, S ½ of 27, SE ¼ of 28, S ½ of 31, S ½ of 32, N ½ of 33	025570, 025587, 025586, 025585
11 North	9 East	S ½ of 17, SE ¼ of 18, N ½ of 19, NE ¼ of 20, W ½ of 21	025655, 025654	
Infield Pipelines	11 North	6 East	NW ¼ of 01, E ½ of 02, E ½ of 04, NE ¼ of 09, N ½ of 10, W ½ and NE ¼ of 11, NW ¼ of 14, S ½ and NE ¼ of 22, S ½ of 23, 26, NW ¼ of 27, N ½ of 28, E ½ and SW ¼ of 29, S ½ of 30, NW ¼ of 31	392962, 392982, 392984, 392985, 392986, 392983, 392964, 392987, 393686, 392627, 392966, 392967, 392988, 392989
	12 North	6 East	SW ¼ of 25, SE ¼ of 26, W ½ of 36	391553, 393012, 393014

Table 3. Project Components and Locations				
Project Component	Township^a	Range	Section(s)	Alaska Division of Lands
Potable Water System	11 North	6 East	S ½ of 24	392964
	11 North	7 East	SW ¼ of 19	393879

A. ^a All locations are based on the Umiat Meridian.

B. ^b Infield roads include ND-A, ND-B, and ND-C infield roads; the boat ramp; water source access roads; and three road turnouts with tundra access ramps.

C. ^c Nanushuk pipelines include export pipeline, make-up water pipeline, make-up gas pipeline, and power and fiber optic cables.

Notes: ND-A: Nanushuk Drillsite A; ND-B: Nanushuk Drillsite B; ND-C: Nanushuk Drillsite C; NPF: Nanushuk Processing Facility; NOP: Nanushuk Operations Pad; TIP: Tie-In Pad

Table 4. Project Schedule			
Project Milestone #	Project Milestone	Proposed Start Date	Proposed End Date
1	Pre-pack and construct ice roads and pads (winter only)	2019 November	2023 May
2	Placement of temporary construction camps (off ice pad in winter only)	2020 December	2023 May
3	Gravel hauling and construction of roads and pads (construction in winter only, access from existing infrastructure in summer, gravel farming in summer)	2019 December	2021 May
4	Facilities construction (summer and winter)	2020 November	2024 June
5	Pipelines construction (winter only)	2020 December	2023 May
6	Placement of temporary construction camps (year-round)	2020 November	2021 December
7	NOP camp construction (year-round)	2021 January	2021 June
8	Screeding of barge landing at Oliktok Point area (summer), sealift deliver (summer), and transport of modules (winter or summer)	2023 August	2023 August
9	Drilling (year-round)	2021 January	2036
10	Early production	2022	2023
11	Operations (year-round)	2022 October	Life of Field

Notes: NOP: Nanushuk Operations Pad

The proposed modifications will result in minor changes in the length and footprint of project components. Table 5, below, updates Table 4 in OSA's July 2019 Master Plan (OSA 2019).

Table 5. Footprints of Project Components			
Project Component	Fill Type	Previous Project	Proposed Updates

		Length (miles)	Footprint (acres)	Length (miles)	Footprint (acres)
NPF	Gravel	--	17.1	--	17.1
ND-A	Gravel	--	16.2	--	16.2
ND-B	Gravel	--	19.5	--	20.8
ND-C	Gravel	--	18.0	--	18.0
NOP	Gravel	--	16.4	--	16.4
TIP	Gravel	--	0.8	--	0.9
Pump House Pad	Gravel	--	1.1	--	1.1
Boat Ramp	Gravel	--	2.0	--	2.2
Nanushuk Access Road	Gravel	9.2	72.8	9.2	72.7
Mustang Road Upgrades	Gravel	4.7	6.0	4.7	6.0
Infield Roads ^a	Gravel	13.0	95.8	13.3	103.7
VSMs	--	--	0.6	--	0.7
Total gravel fill	--	--	266.3	--	275.7
Temporary Impacts ^b	--	--	5.8	--	5.8
Total Footprint	--	--	272.1	--	281.5

^a Infield roads include ND-A, ND-B, and ND-C infield roads; the boat ramp access road; water source access road; and three road turnouts with tundra access ramps.

^b Temporary impacts include screeding and trenching for fiber optic cable.

Notes: ND-A: Nanushuk Drillsite A; ND-B: Nanushuk Drillsite B; ND-C: Nanushuk Drillsite C; NPF: Nanushuk Processing Facility; NOP: Nanushuk Operations Pad; TIP: Tie-In Pad; VSM: Vertical Support Member

Table 6, below, updates Table 6 in OSA’s July 2019 Master Plan (OSA 2019) and provides the updated length of project components.

Project Component	Length (miles)
Ice Roads	35–80 ^a
Gravel Infield Roads ^b	13.3
Gravel Access Road	9.2
Nanushuk Pipelines	22.2
Infield Pipeline	15.7
Potable Water Pipeline	0.2

^a Ice road length will vary by year based on construction needs, topography, other field conditions, and agency approvals.

^b Infield roads include ND-A, ND-B, and ND-C infield roads; the boat ramp access road; water source access road; and three road turnouts with tundra access ramps.

Table 7, below, updates Table 7 in OSA’s July 2019 Master Plan (OSA 2019) and provides pipeline diameter details.

	Pipeline	Diameter (inches)
Nanushuk Pipelines	Oil Export	18
	Make-up water (import)	20
	Bi-directional make-up gas (import)	6

	Water injection (import)	12
Infield Pipelines (each drillsite)	Multi-phase	24
	Water injection	12
	Gas lift	6
	Gas injection	6
Freshwater Pipeline		6

Project Location

T10N	R7E	Sec. 1, 2, 3, 6	Umiat Meridian
T10N	R8E	Sec. 5, 6	Umiat Meridian
T11N	R5E	Sec. 25, 36	Umiat Meridian
T11N	R6E	Sec. 1, 2, 3, 4, 9, 10, 11, 14, 15, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32	Umiat Meridian
T11N	R7E	Sec. 19, 29, 30, 31, 32, 33, 34, 35	Umiat Meridian
T11N	R8E	Sec. 23, 24, 26, 27, 28, 31, 32, 33	Umiat Meridian
T11N	R9E	Sec. 17, 18, 19, 20, 21, 28, 29	Umiat Meridian
T12N	R6E	Sec. 25, 26, 33, 35, 36	Umiat Meridian

Development Program Schedule

Estimated timeframes for major Project components are shown in Table 4, the timing and sequencing of some Project components will vary.

Drilling will include as many as three rigs drilling for up to 15 years. The first rig will be mobilized to the site as soon as gravel compaction has been achieved. The number of rigs used will be subject to market conditions and rig availability on the North Slope.

Operations will begin in 2022 and will continue through the 30-year design life of the Project.

The above project modifications are to amend the masterplan based on input from the community, stakeholder meetings, the land owner, community concerns to better balance the development proposal in relationship to subsistence access and community needs-

PROJECT COMPONENTS

The Project will include construction of three drill sites (ND-A, ND-B, and ND-C), NPF, NOP, TIP, camps and warehouses, facilities on all pads, infield pipelines, export and import Nanushuk

Pipelines; ice roads, access road, infield roads, boat ramp, and potable water system (Figure 5). - Minor upgrades and maintenance to the existing road system to facilitate transportation of sealift Modules- will occur if engineering and construction design determine it is required. Gravel material for project development will be sourced from one or more existing gravel mine sites, which will be permitted and operated independently of the Project. The footprint of fill needed for each project component is listed in Table 4 and the length of each project component is provided in Table 5. The project includes construction and operations easements that will be consistent with other projects permitted on the North Slope of Alaska.

Drill Sites

The project includes three gravel drill sites: ND-A, ND-B, and ND-C. The number and locations of the drill sites are dictated by the configuration of the oil reservoirs defined by previous exploration efforts, with consideration for site accessibility requirements, input from NSB residents, stakeholders and by operational constraints. Drill sites are also oriented with the long axis parallel to the prevailing northeast/southwest wind direction to minimize snow drifting, and accumulation.

The three drill sites will accommodate up to 151 total production and injection wells (43 at ND-A, 55 at ND-B, and 53 at ND-C) with 20-foot spacing between wellheads. Included in the 151 wells are two Class 1 underground injection control (UIC) disposal wells at ND-B (see Section 12.1). The grind and inject (G&I) facility will be constructed and operated on ND-B. Each drill site will accommodate drilling equipment and support facilities, including well testing equipment, well stimulation equipment, drilling mud and cement tanks, production gathering facilities and support modules, diesel fuel storage tanks, a communication tower, cold storage, emergency response equipment, process heater, and drilling laydown areas. Each drill site also includes space for temporary camps and offices.

Chronology of Events Leading to the Rezone Hearings

- July 11, 2019 - Meeting with Oil Search Alaska, LLC and NSB Planning & Community Services regarding the Nanushuk Rezone and Master Plan.
- July 11, 2019 – NSB received the Rezone and Master Plan application from Oil Search Alaska, LLC.
- July 16, 2019 – NSB Accepted application for Rezone and Master Plan to start the public review guidelines of Chapter 19.60. Emailed
- July 17, 2019 – Internal staff meeting with the Department of Planning & Community Services regarding the Nanushuk Rezone & Master Plan Project.

- July 18, 2019 - called City of Nuiqsut Mayor Vernon Bennett, regarding the Nanushuk Project and future meetings scheduled
- July 18, 2019 - Public Notice announcement on KBRW regarding August 29, 2019 Nanushuk Rezone and Master Plan.
- July 18, 2019 - Draft Staff Recommendation signed and sent out.
- July 19, 2019 - Joint meeting with NSB Dept. of Planning & Community Services and NSB Wildlife. The meeting was to go over the requirements of Title 19 process on Nanushuk Project.
- July 19, 2019 NSB Planning staff spoke with Village Mayor's Office, Village Liaison, City of Nuiqsut, Kuukpik Office and Native Village of Nuiqsut and emailed Public notice regarding Nanushuk Project for July 29, 2019 meeting.
- July 19, 2019 Posted public meeting in the Arctic Sounder
- July 19, 2019 - Public Notice for the August 29, 2019 Public Hearing, posted around Nuiqsut.
- July 19, 2019 Meeting with NSB Wildlife regarding Nanushuk Rezone & Master Plan.
- July 22, 2019 - Public Notice for the August 29, 2019 Public Hearing, posted around Utqiagvik.
- July 23, 2019 – Prepared Scoping Meeting for August 5, 2019, (regular City Council Meeting) rescheduled to August 6, 2019.
- July 24, 2019 called and emailed revised scoping meeting for August 6, 2019 at 6:00pm, Kisik Center to Native Village of Nuiqsut, City of Nuiqsut and Kuukpik Office.
- July 24, 2019 NSB Planning Staff posted Scoping Meeting around town in Nuiqsut.
- July 24, 2019 – Rescheduled Scoping meeting from July 26, 2019 to August 6, 2019. (July 26, 2019 is City of Nuiqsut City Council Meeting) Called and emailed Public Notice to Native Village of Nuiqsut, Kuukpik Office and City of Nuiqsut, and NSB Planning staff posted notice of Scoping meeting around Nuiqsut. (Scoping meeting: Aug 6, 2019 @ 6:00pm, Kisik Center).
- July 24, 2019 – Draft Staff Recommendation emailed

- July 25, 2019 – NSB Planning staff in Nuiqsut announced on VHF daily regarding Scoping Meeting for Nanushuk Rezone (Scoping Meeting scheduled for: August 6, 2019 @ 6:00pm, Kisik Center). And posted around Nuiqsut.
- July 30, 2019 – in Coordination with Kuukpik office regarding sending Oil Search Alaska, LLC’s application for Rezone & Master Plan for Nanashuk.
- August 1, 2019 – Oil Search Alaska, LLC requested an extension for public comments for the Nanashuk Project. Public hearing to be held in Nuiqsut on October 15, 2019.
- August 6, 2019 – Acceptance of Request for Special Meeting signed by the Land Management Administrator. Comment period for the Master Plan & Rezone is extended to October 10, 2019.
- August 6, 2019 – Scoping Meeting held in Nuiqsut at 6:20pm at the Kisik Center. The meeting was held to seek comments and/or concerns from the residents of Nuiqsut.
- August 8, 2019 – Confirmed date with the City of Nuiqsut for the Kisik Center.
- August 12, 2019 – Public Notice for Special Meeting posted in the Arctic Sounder until October 10th. (every other print until October 10th, 2019.).
- August 19, 2019 - Posted Public Notice on the Arctic Sounder for 5 consecutive issues for July – August, 2019.
- August 19, 2019 - Spoke with Kuukpik Office, request to be in the Tri-Lateral Meeting agenda regarding the Nanushuk Project. Tri-Lateral meeting will be after Nuiqsut Whaling. Kuukpik will call Planning Dept. with a confirmed date.
- August 21, 2019 – Thumb drive of Oil Search Alaska, LLC Nanushuk Rezone & Master Plan application given to Kuukpik Office.
- August 22, 2019 called and emailed Public Notice – Special Meeting for Nanushuk Rezone & Master Plan to City of Nuiqsut, Kuukpik Office, Native Village of Nuiqsut, Nuiqsut Village Liaison Office.
- August 26, 2019 – NSB Planning Staff posted the Public Notice Special Meeting Nanushuk Rezone & Master Plan around Nuiqsut (Trapper School, AC, Clinic, Gas Station, DMS & Post Office).
- August 27, 2019 - faxed revised date to KBRW to October 10th, 2019.
- September 9, 2019 – After consultation with the Planning Commission chairman Bodfish and concurrence of Oil Search Alaska LLC, the Special meeting and public notice was amended to October 11th, 2019 at 6:00pm at the Kisik Center.

- September 9, 2019 - Public Notice for Special Meeting for October 11th, sent out to the Arctic Sounder, NSB Planning staff posted at NSB DMS, AC and the Trapper School.
- September 9, 2019 – Planning Staff posted around town in Nuiqsut.
- September 10, 2019 – City of Nuiqsut clerk stated will post notice for Special Meeting date change to October 11, 2019 will post of the Nuiqsagmiut facebook page.
- September 11, 2019 – Joint meeting with NSB Planning, NSB Law and NSB Wildlife Dept. at 1:30pm at the Law Dept.
- September 12, 2019 – Joint Meeting with NSB Planning, NSB Wildlife and Oil Search Alaska, LLC, Assembly Conf Room.
- September 20, 2019 – OSA submitted an electronic version of the changes to the Rezone.
- September 26, 2019 Oil Search Alaska, LLC submitted changes to the rezone project description.
- September 27, 2019 – Introduce ordinance to the NSB Assembly.
- October 2, 2019, Stakeholder Meeting held in Utqiagvik with the Leadership, City of Nuiqsut, Native Village of Nuiqsut, NSB Law, NSB Wildlife, NSB Planning & Community Services and Oil Search Alaska, LLC at the BARC Building.
- After Nuiqsut Whaling – NSB Planning requested to go on the agenda for the Tri-Lateral meeting. The Tri-Lateral meeting will be held after AFN.

REZONE GUIDELINES IN CHAPTER 19;60 -ONLY APPLICABLE POLICIES WILL BE USED TO DEFINE THE RECOMMENDATIONS ;

§ 19.60.060 REZONING.

Rezoning are changes to zoning district boundaries as shown on the official zoning map. Prior to submission of an application, the developer is encouraged to contact the Administrator for the purpose of discussing the site, the proposed development and the approval procedure.

(C) Procedure. The application, acceptance and notice procedures for a rezoning shall follow the procedures set forth for conditional use in Chapter 19.60. The Planning or Zoning Commission's affirmative recommendations shall be forwarded to the Assembly.

§ 19.60.060 REZONING (E) CRITERIA;

(E) Criteria. The Planning or Zoning Commission shall make a recommendation based on written findings that each of the following criteria have been addressed:

- (1) The proposed rezoning must comply with the policies in Chapter 19.70; (Administrator) staff is providing a recommendation based on applicable policies set-forth below**
- (2) The proposed rezoning is in an area with adequate services, including roads, parking, boardwalks, water, sewer, garbage collection, gas, electricity, drainage, police and fire protection or the developer has agreed to provide all the necessary improvements or services for the area; (Administrator) staff has evaluated the application, the applicant is providing the roads, and improvements and is co-operating with SA-10 in managing the waste management or seeking independent approvals through SA-10**
- (3) The comments from reviewing parties on the proposed rezoning have been adequately addressed; (Administrator) staff has conducted scoping meetings in Nuiqsut, engaged in a stakeholder/leadership meeting, worked with the wildlife and other stakeholder to incorporate concerns into the recommendations. Project masterplan amendments are provided reflecting changes in response.**
- (4) There is a demonstrated need for additional land in the zoning district being requested; (Administrator) in review of the application submitted- and the EIS conducted by the Corp of Engineers, there is a demonstrated need for additional lands to be rezoned to allow for the development of the Nanushuk Project- which will provide for local jobs, and oppurtunities, regional revenues, taxes and royalties to the State, Local entities.**
- (5) The resulting district or expanded district will be a logical, integrated area and will not constitute spot zoning; and- (Administrator) the resulting district is a logical expansion between two exiting districts (Alpine & Kuparuk) developments, and will not constitute spot zoning.**
- (6) An approved master plan is available for the area to be developed. (Administrator) A master plan is provided- and amendments are incorporated to allow for greater balance of local issues.**

(F) Assembly. The Assembly shall review and act on a rezoning by ordinance. The Assembly shall consider the application and Commission recommendation at its next regular meeting after receipt of the Commissions recommendation. Upon enactment of the ordinance, the Administrator shall cause the official zoning map to be changed accordingly. The Assembly's decision shall be final.

('75 Code, § 19.60.060)(Ord. 76-6-23, passed 4-12-90)

Rezoning Policies - NSBMC Chapter 19.60

This section applies only for projects proposing a change in boundaries. "Yes" answers indicate compliance with NSBMC § 19.60.060.

1. *Rezone Area:* Is the area to be rezoned at least an acre, or if less, is it expanding an existing zone? NSBMC § 19.60.060(B).

Response: Yes, the area to be rezoned is 13,492.2 acres for the Nanushuk Project (Project). See Master Plan for more details.

NSB Response: The rezone meets the requirements considering the area to be developed is going to be 13,492.2 acres, with the modifications the acreage will be 1,139.1 less.

2. *Adequate Services:* Are there adequate services, including roads, parking, boardwalks, water, sewer, garbage collection, gas, electricity, drainage, police and fire protection, or has the developer has agreed to provide all the necessary improvements or services for the area? NSBMC § 19.60.060(E)(2).

Response: Yes, OSA will provide all necessary services, including roads, parking, water, sewer, garbage collection, gas, electricity, drainage, and police and fire protection for the Project area. OSA plans to haul water, wastewater, and solid waste off-site during construction. Waste hauling will continue until the underground injection control (UIC) Class I wells are drilled and the grind and inject (G&I) facilities are commissioned. OSA intends to utilize nearby lakes for water needs during operations. Wastes unfit for the NSB landfill will go downhole using UIC wells.

During drilling and operations, G&I facilities will be available for disposal of Resource Conservation and Recovery Act (RCRA) exempt and non-hazardous waste and treated domestic camp wastes. This will minimize the risk of spills during fluid transport to an off-site disposal facility. Project modifications reduced the number of UIC wells from four to two. **The Nanushuk Operations Pad (NOP) will include a water/wastewater treatment plant designed to meet state and federal standards.** Treated domestic wastewater will be disposed of in the UIC wells. OSA will obtain all necessary state and federal permits and seek the NSB approvals for waste management. OSA intends to utilize nearby lakes for water needs during operations.

OSA understands that the Project is within NSB Service Area (SA) 10; however, coordination is needed between NSB, NSB Service Area 10 (SA10), and OSA to meet the service needs because SA10 facilities are not available in the Project area. OSA will work with NSB and SA10 to reach a conditional waiver agreement while SA10 facilities are developed.

NSB Response: Adequate services will be provided for the life of the project.

3. *Demonstrated Need: Is there a demonstrated need for additional land in the zoning district being requested? NSBMC § 19.60.060(E)(4).*

Response: Yes, the land is currently zoned as a Conservation District. The Conservation District will be required to be reclassified to Resource Development through the passage of an NSB Ordinance by the North Slope Borough Assembly. Through the National Environmental Policy Act (NEPA) process and collection of stakeholder comments, the Project footprint has been decreased, resulting in fewer acres requiring a land status change than was anticipated at the start of the Project planning process.

OSA has provided extensive avoidance, minimization, and mitigation measures as part of the NEPA and Clean Water Act Section 404 permitting process. These measures also take Alaska Department of Natural Resources (ADNR) lease stipulations, as well as the NSB, Nuiqsut and local landowner, Kuukpik Corporation (Kuukpik), requirements into consideration. Detailed mitigation techniques and best management practices according to resource categories (e.g., aquatic ecosystems, wetlands, wildlife, cultural resources, subsistence, air quality, spill response, and noise) are provided in the Nanushuk Master Plan and also in this analysis.

NSB Response: the project is located in between several other operating resource development districts. Based on the analysis of the EIS, and this review there is a demonstrated need of additional lands to develop this project.

For the Placer Unit, if there is potential for development (ASRC land lease) as Title 19 states that there needs to be insight gained on the “reasonable foreseeable future actions” development in the area of their project. (per NEPA and NSBMC) (G. Brower 10/02/19 Stakeholders meeting)

4. *Spot Zoning: Will the resulting district or expanded district will be a logical, integrated area that will not constitute spot zoning? NSBMC § 19.60.060(E)(5).*

Response: Yes, OSA will work with the NSB and adjacent landowners and lessees to find a logical, integrated area that avoids spot zoning. Please see the attached map.

NSB Response: The resulting district will be logical, integrated area and will not constitute spot zoning.

5. *Master Plan: Is there an approved master plan or was one submitted as part of the application? NSBMC § 19.60.060(E)(6).*

Response: Yes, a Master Plan is submitted as part of the Form 300 application for the proposed Project. The Master Plan includes Project components for infrastructure development and ongoing operations.

NSB Response: The proposed rezone is planned, phased, and must be developed as a unit under an approved Master Plan, with provisions, made for all necessary public and private facilities.

§ 19.70.010 INTRODUCTION.

The policies contained in this chapter are applicable to the approval of all development and uses within the Borough. Economic development and area-wide policies are applied to all lands and waters within the Borough boundary. Village coastal management, Beaufort offshore and transportation corridor policies are applied to approvals within their respective areas.
('75 Code, § 19.70.010)(Ord. 75-6-23, passed 4-12-90)

Village and Economic Development Policies - NSBMC Chapter 19.70

This section applies to all projects. “Yes” answers indicate compliance with NSBMC § 19.70.020 and § 19.70.030.

1. *Village Policies: Is the project consistent with all applicable village plans or policies? NSBMC § 19.70.020(A&B).*

Response: Yes, although the Nuiqsut Comprehensive Plan (dated January 2016) has yet to be finalized at the communities request, the Nanushuk Project, which incorporates extensive stipulations and mitigation measures required by the State, the NSB and the surface estate owner to minimize Project impacts, and specifically impacts to subsistence resources and activities, is in full compliance with the provisions of the Plan (http://www.north-slope.org/assets/images/uploads/NUI_Final_Draft_Jan2016.pdf) OSA has an ongoing stakeholder engagement program that includes regular public meetings to inform Nuiqsut residents (including subsistence users) of planned activities, and to obtain feedback and recommendations regarding additional mitigation measures it might implement to minimize impacts on subsistence resources and activities.

NSB Response: The Nanushuk Project is 7 miles northeast of Nuiqsut, on Oil Search Alaska, LLC-operated leases from the State of Alaska and Nuiqsut, which is southeast of the East Channel of the Colville River.

Other developments such as GMT-1 and GMT-2 are outside the three mile municipal boundary of the village of Nuiqsut. Nuiqsut has not published it's comprehensive plan but the community has expressed a willingness to be connected to a road system per the 2005 NSB Community profile. (RZ 2005 and GMT-2, CPAI GMT-1 Final Staff Recommendation). There is now a road system to GMT-1 and GMT-2. {The project being outside of the village district boundry – but certainly within the village area of influence- the area needed to provide for the contemporary subsistence needs of the village. }

Paisagich – a recommendation relied from important guidance provided in the Paisagich, Nuiqsut Heritage Cultural Plan. The subsistence resource abundance and cultural heritage it provides are critical to the community of Nuiqsut. A wide variety of mammals, fish and birds provide sustenance taken together. These animals remain the staple food resources of the Nuiqsut people. Inupiat culture is a human manifestation of the land and sea that sustain it. The places that were important long ago continue to be important today. History and living experience comes together at the hunting and fishing camps. Today, as in the past, subsistence harvest of wild resources is thee central occupation of traditional Inupiat. Most of the people in Nuiqsut and other northern Alaska villages are traditionalist. Despite their acceptance of many elements of Euro-American culture, technology and economy, these people continue to participate in and depend on the subsistence way of life, either as hunters, or as sponsors, and sharers of the hunt. Subsistence provides such necessities as food and clothing, and it organizes the people's lives seasonal, socially, and ceremonially in the defining patterns of their culture. RZ15-001 GMT-1 and GMT-2 Rezone and Master Plan Update. (A complete copy of the Paisagich, Nuiqsut Heritage Cultural Plan, is provided as Attachment 1).

NSB: Paisagich – a recommendation relied from important guidance, for their way of life which combines hunting, fishing and trapping.

Continued abundance of land and sea animals and the people's access to them are the essentials of village life. Today, both the health of arctic environments and the people's access to them are in jeopardy. More than a century of accelerating change-ushered in by American whalemens, carried on by the current rush for oil and gas-has shaken the natural and social systems of the Far North. Changing patterns of land use and ownership could fragment the open-range commons of an earlier day. Rapid change continues, and the forces of change converge in Nuiqsut. Governments and private interests plan many ventures in the Nuiqsut area. Whether benevolent, exploitative, or combinations of the two, these ventures will add to the dynamics of change affecting the cultural landscape, valued and used by the Nuiqsut heritage community. (Page 2) (Nuiqsut Paisagich: Nuiqsut Heritage "A Cultural Plan" February 1979).

Inupiat who retain this close relationship to the land, who understand the ways of the seasons and the animals, and who teach this knowledge to the young-they are the Real People, those who are most admired and emulated. The resettlement of Nuiqsut provided the opportunity to perpetuate these traditional values in a modern context. (Page 4) (Nuiqsut Paisagich: Nuiqsut Heritage "A Cultural Plan" February 1979).

The site of Itkilikpaat, located at the confluence of the Itkilik and Colville Rivers, illustrate how resources availability influences settlement patterns. During part of the winter of 1907-08, Vilhjalmur Stefansson lived at eh site, which, in his words, was "...about the only place on the (lower) Colville which seems to have food supplies enough to make wintering safe...there is excellent fishing in the autumn and several varieties of fish can be caught there in some numbers all winter." (Page 20) (Nuiqsut Paisagich: Nuiqsut Heritage "A Cultural Plan" February 1979). ...

The main reason for Itkillitkpaat's importance was its fishery. In conjunction with other resources, such as caribou and ptarmigan, it's provided usually dependable food supplies. But even this fishery was variable, and from time to time families would move their camps to alternate fishing sites, such as Kayuktisiluk or Tiragroak.(page 20) (Nuiqsut Paisagich: Nuiqsut Heritage "A Cultural Plan" February 1979).

NSB - On August 6th, 2019 a Scoping Meeting was held in Nuiqsut, at the Kisik Center to collect comments and concerns from Nuiqsut residents. Some of the concerns were Air Quality and Health Impacts, adding another oil field so close would affect the air more than what is being affected right now. More fish would be affected with mold, Near the ND-A pad, this is an area where many residents go fishing. There is a green haze that comes from the oil fields that would make it heavier and thicker. The caribou are sicker now than in the past from the green haze produccd by the oil industry, they claim 16 caribou were taken but only 4 were good enough to eat. The air traffic with the new air oil field would increase and affect subsistence. The ND-A pad is close to a family member grave site. The ND-B is less than a ¼ mile from where a family member (grandmother) is buried. A Community member mentioned there is a lot of activity around the 3 proposed drill sites, heavy ice road areas. There is mention of a grave site father of Richard Tukle (Ivik) is buried across the river a quarter mile of ND-B. The grandfather buried a child between Neil Allen camp and ND-A across the river.

Both the construction of the Alpine Satellite Development site and the Nuiqsut Constructors gravel mine to provide material for Nanushuk have potential to provide greater local employment opportunities than is generally available at this time, Both Oil Search Alaska, LLC and the mine site operator, Kuukpik, have indicated that they will train and use local residents as part of their development plans.

The Alaska National Interest Lands Conservation Act (ANILCA) § 810 mandates special consideration for subsistence resources and uses. Stipulations in the plan must address a way to assure continued reasonable access by subsistence users through development areas, avoiding, to the greatest extent possible, any restrictions on access to subsistence resources. Arctic Slope Regional Corporation and Kuukpik Corporation lands also fall within the ANILCA mandate.

The Nanushuk Project will result in additional development into traditional, cultural and habitat areas that Nuiqsut people depend on for subsistence.

The issue of the cumulative effects of oil and gas development is complex and requires local, regional, state and federal agencies to openly discuss the potential effects of the proposed development, but also the proposed development in combination with other existing or reasonably foreseeable developments. The North Slope Borough and the communities have repeatedly appealed to landholders and managers to undertake a comprehensive planning effort for the entire NPRA and adjacent regions to identify the scope, intensity, direction, and consequences of industrial development to help in the effort to identify what development might ultimately be judged appropriate, acceptable, and desirable for the proposed development in the region and all of NPRA. A cumulative effects analysis should be updated to fully understand the impacts. The land is very rich ecologically and nutritionally for subsistence resources. The potential that lands needed for subsistence resources and activities minimize subsistence by continued incremental site selection for development. Displacement of subsistence resources from their traditional areas poses a significant impact to a subsistence-based community and threatens traditional and cultural activities. *{ In 2004, the North Slope Borough Assembly created the subsistence Mitigation advisory committee for the NSB mayor- the Nanushuk project should contribute to the mitigation efforts to minimize the displacement and contribute to the mitigation fund. }*

The exploration and development continue to erode and displace the subsistence way of life. The proposed development area is not only extremely ecologically and nutritionally sensitive, but is also central to our Inupiat identity and provides one of the principal means by which we pass our tradition and culture on to our younger generation. Many traditional areas are being encroached upon and occupied by industrial development. This development leads to the deterioration of traditional ties to the land. *{ Having said that- it is also important to denote- that development when properly administered and organized by incorporating traditional knowledge to the design- and embracing subsistence and creating new access modes- are proving to be community sensitive and allow for the infrastructure to be used successfully for enhanced subsistence opportunities. }*

By nature's own design for the Arctic, the coastal areas were created with the best ecologically and nutritionally rich habitat for subsistence resources. This is solidly documented in many western science wildlife studies and traditional and contemporary knowledge. In the areas east, west, north and south of Nuiqsut, the land is undergoing development, The North Slope Borough is very concerned about the traditional and subsistence resources and the proposed activities in these areas and finds it necessary to protect the public health safety and welfare by encouraging Responsible resource development that takes into account traditional uses, while minimizing and mitigating negative impacts.

Development in very sensitive areas and most importantly, subsistence resource rich areas require appropriate mitigation. To address the displacement of subsistence resources and activities are to be incorporated into existing programs to address ongoing development. To

continue development in area where a high subsistence priority exists without addressing the cumulative effects of the development in the proposed area and adjacent areas constitutes negligent development. (Alpine Satellite Development Staff Recommendation September 20, 2004).

Displacement is an ongoing impact in the development areas, studies conducted over the years have already shown the displacement of core calving areas of caribou. Radio satellite collared caribou in the industrialized areas of the oil fields have shown avoidance to pipelines; it is foreseeable that pipelines will continue to be an issue. Areas where pipelines are low, at a minimum of 5-feet, have continued to be problematic.

The following excerpts address the displacement issue:

Spatial records of caribou hunting patterns by Nuiqsut hunters in 1993 and 1994 provide support for the claim of displacement from traditional hunting areas. As previously discussed, caribou is the major terrestrial big game resource harvested by Nuiqsut hunters. No caribou were harvested in the development area northwest of the community in 1993. (Fall and Utermohle 1995; Petersen 1995). In addition, few caribou were harvested on the periphery of the development area. About eighty percent of the community's annual harvest in 1993 came from areas distant (16+ miles) from development. The following year, same situation was shown by information collected by the North Slope Borough's Department of Wildlife Management (North Slope Borough 1997). Caribou harvest data from 1993 and 1994 are the only years for which we have spatial references on recent caribou harvest locations. Mapping of general hunting areas was collected for Nuiqsut in 1979 and 1986. These use area maps indicate that the areas northwest of the community falls within the customary caribou hunting areas of Nuiqsut.

This is consistent with local reports and several published records on this topic dating back to the early 1980's (Kruse et al 1981, 1982; Haynes and Pedersen 1989). Caribou harvest locations survey information recorded by the North Slope Borough in Nuiqsut provides additional corroboration (North Slope Borough 1997).

Key informants described the same situation of displacement for all other resources in 1998. It appears that a general shift in harvest areas used by Nuiqsut is ongoing. The developed area to the northeast of the community is not being used for the collection of community subsistence resources. The reasons are many, but, difficult of access, lack of privacy when hunting, loss of cultural landmarks, uncertainty regarding regulations in the area, and oil field security enforcement figure prominently.

Subsistence hunter displacement due to the aforementioned factors and concerns about the health of the resources in the development areas, have been noted for some time (Haynes and Pedersen 1989; Galginaitis et al 1984; U.S. Army Engineer District, Alaska 1997).

While we use dated studies, which should be used- it may be important to sanction new studies that change the use patterns of subsistence areas by making available roads and access ramps to balance the competing uses of the land. There are many indications the new developed areas in the consolidated Alpine areas- that allow for more access conventionally from roads and access ramps, as reasonable and successfully opportunities. Vs the old style where accommodation was not part of the review- .

NSBMC § 19.70.020(A): Development and uses will not be allowed which grossly violate guidelines on the rate or amount of growth adopted by a village as a part of its Comprehensive Development Plan.

Response: OSA does not believe this is applicable to the Project.

NSBMC § 19.70.020(B): Development and uses in a village are required to be consistent with the relevant adopted village Comprehensive Development Plan.

Response: OSA does not believe this is applicable to the Project

NSB Response: The Nuiqsut Paisagich “The Cultural Plan” is used by Nuiqsut as a Traditional Land Use plan and is still relevant today. The modifications to the project and working with the village leadership demonstrate accommodations have been made to respect the rate of growth needs in the area. The project is outside of the village district- but immediately within the village area of influence

2. *Employment: Will the project provide local employment for Borough residents? NSBMC § 19.70.020(D) and § 19.70.030(B))*

Response: Yes, please refer to the Economic Development Plan submitted as part of this Master Plan package for specific approaches and actions implemented to meet these requirements. OSA has employed qualified Nuiqsut and NSB residents for oil field services jobs (e.g., subsistence representatives, ice road monitors, community liaisons) and will continue to do so as the Project progresses during construction. The Project could create approximately 1,300-1,600 jobs on the North Slope at the peak of construction. OSA will evaluate future long-term employment opportunities for Nuiqsut and NSB residents as the Project moves toward the operations phase. As many as 4,600 new jobs could be created throughout the Project life cycle.

- OSA will work with Kuukpik, the City of Nuiqsut, and the NSB to ensure that Nuiqsut and NSB residents have opportunities to apply for work on the Project and will provide local North Slope companies with opportunities to compete for contract work associated with the Project. OSA will also work with contractors, trade associations, Alaska Process Careers Consortium, and Iļisaġvik College to develop training programs for North Slope residents, if needed.
- A training program will be implemented to include North Slope Training Cooperative (NSTC) requirements. NSTC training addresses the following topics: camps and safety

orientation, use of personal protective equipment, hazard communication, pipeline awareness, environmental excellence, and hazardous waste awareness.

- OSA will have trained staff on-site at all times who are familiar with project-specific subsistence, environmental, social, and cultural concerns, and will periodically provide awareness training and oversight to contractors and subcontractors as it pertains to their scope of work.
- OSA has an ongoing stakeholder engagement program that includes regular public meetings to inform Nuiqsut residents (including subsistence users) of proposed activities, and to obtain feedback and recommendations on how these activities can be performed, to avoid conflicts with subsistence activities.

NSB Response: NSB highly encourages local employment opportunities for Borough residents that express an interest in work. The construction of Nanushuk has significant opportunities to employ local residents with trades such as Welding, Heavy Equipment Operators, Laborers, and Mechanics from within the North Slope and may also provide opportunities to participate at a contractor level. Additionally, the operational needs of Nanushuk may provide additional opportunities on maintenance throughout the production life of the Nanushuk project. Development and uses are encouraged which provide local employment in the villages.

3. *Flexibility: Will flexible employment procedures allowing for subsistence leave be used? NSBMC § 19.70.030(C).*

Response: Yes, OSA recognizes the importance of granting leave for North Slope employees to pursue subsistence activities with their families and communities. For both year-round and seasonal employment, flexible employment procedures will be implemented, including allowing reasonable administrative leave requests by local residents to pursue subsistence and cultural activities. These will be considered and granted by the employee's manager on a case-by-case basis.

NSB Response: Subsistence is the way of life on the North Slope employed in the North Slope oil fields work shifts, particularly 2 weeks on and 2 weeks off or even 3 weeks at a time. During the employee's time off, they can pursue subsistence activities

4. *Training: Will job training programs be provided for Borough residents? NSBMC § 19.70.030(D).*

Response: Yes, OSA participates in job fairs and actively promotes training and job opportunities for prospective candidates—in particular, candidates from the North Slope region and the community of Nuiqsut. OSA directly supports educational and training programs, including the Alaska Native Science and Engineering Program (ANSEP) and GeoFORCE Alaska, both of which are programs through the University of Alaska. OSA actively supports the Arctic Education Foundation and engages with the Nuiqsut Trapper School and Iļisaġvik College. OSA is supporting an internship with Alaska Clean Seas for a position that will be sourced out of Nuiqsut.

NSB Response: NSB greatly emphasizes contracting the North Slope contractors. Training is always available and the training can be a big pay off when it is utilized in a way that lets employees and/or residents gain credentials to work in a high up position, if chosen to do so.

5. Suppliers: Will local suppliers or subcontractors be used? NSBMC § 19.70.030(A).

Response: Yes, OSA is committed to providing opportunities for Kuukpik companies or joint venture in support of its projects, provided the contractors and suppliers are competitive, meet safety and schedule requirements, and meet quality performance expectations. OSA's activities provide numerous job opportunities for local residents, including ice road construction and monitoring, food service positions, seismic crew employment, subsistence representatives, and polar bear monitoring positions. OSA has contracted with Nanuq AFC for ice road construction, Ukpagvik Inupiat Corporation for survey services, SAExploration for seismic surveys, Arctic Slope Regional Corporation (ASRC) Energy Services (AES) for permitting support and fluids management, and Arctic Catering for food service and housekeeping at temporary camps during exploration activities.

NSB Response: Pursuant to NSBMC 19.70.030 (A) Development which uses suppliers or subcontractors from within the Borough for work which can be accomplished competitively by local private businesses or regional or village corporations. NSB supports and encourages OSA to use local suppliers and contractors.

6. Arts: Will uses/developments relate to or encourage Iñupiat arts and crafts? NSBMC § 19.70.030(E).

Response: Yes, OSA is supportive of cultural and traditional activities including Iñupiat arts and crafts and connects regularly with Iñupiat History, Language and Culture (IHLC), Iñupiat Community of the Arctic Slope (ICAS), Arctic Slope Native Association (ASNA), the Arctic Economic Council (AEC), and Native Village of Nuiqsut (NVN) both while on the Slope and when in Anchorage. In 2018, Oil Search partnered Armstrong Energy Corporation and Repsol Oil and Gas USA LLC to provide flights for the Nuiqsut Dancers to attend and perform at the Annual Alaska Federation of Natives Convention and the Kuukpik banquet held in Anchorage from October 18-20. OSA provides funding to the City of Nuiqsut to support annual holiday and traditional cultural community celebrations (including Piuraagiaqta), to the Alaska Eskimo Whaling Association in support of the Nuiqsut Whaling Captains' Association and to the NVN and Kuukpik to support annual gatherings in the community.

NSB Response: NSB supports Inupiat arts and craft made by local artists. The NSB encourages the applicant to consider Inupiat arts and craft for display in its facilities and offices that reflect local art, when opportunities arise.

7. Local Energy: Will uses/developments use locally obtained energy? NSBMC § 19.70.030(F).

Response: No locally obtained energy sources are available for the Project. Power generation facilities consisting of gas-powered turbines will be located at the Nanushuk Processing Facility (NPF). Power will be supplied to other project facilities, including drill rigs via power cables. When power from the NPF is not available, diesel-fired engines will be used to power the drilling rigs.

8. *Low-Cost Energy: Will uses/developments contribute to lower-cost fuel or power? NSBMC § 19.70.020(C).*

Response: Natural gas utilization by the Project is not anticipated to result in changes to fuel or power prices for NSB residents. The energy needs of Nuiqsut are currently being met with gas produced as part of the Alpine Development.

NSB Response: NSB encourages OSA to use clean burning, locally produced natural gas to generate energy.

9. *Revenue: Will uses/developments generate tax revenues that exceed NSB's expenditures on these developments/uses? NSBMC § 19.70.030(G).*

Response: Yes. The Project will generate tax revenues for the NSB that will exceed its expenditures on this proposed development. In addition, once the Nanushuk Project is complete and the Pikka Unit is put into production, OSA will pay millions of dollars annually in royalties to the State of Alaska and the ASRC, which share the royalty interest in many of the Pikka Unit leases. Permit fees will also help offset NSB expenses associated with the development.

Community investment, taxes, and employment opportunities will directly or indirectly benefit community residents, Kuukpik, NVN, City of Nuiqsut, ASRC, and NSB. OSA is working diligently to identify significant opportunities for social investment in its Alaska lease area based on community, land owner, and regional interests and needs.

NSB Response: Pursuant to NSBMC § 19.70.030 (G) – the generation of excess of tax revenues over demand for expenditures by the development. NSB recognizes the revenues of this proposed project will bring to residents as well as landowners.

Coastal Management Policies; Subsistence, Tundra, and Watershed Protection

This section applies to all projects. “Yes” answers indicate compliance with § 19.70.050 and § 19.60.040.

1. *Demonstrated Need: Is there a significant public need for the proposed use and activity? NSBMC § 19.70.050(J)(1).*

Response: Yes, hydrocarbons developed and produced from Nanushuk will help offset production declines from Alaska's North Slope. Development will also benefit local, state,

and national economies through local hire for jobs created during construction and operations, tax revenues, revenue sharing, royalties, and new resources to help meet U.S. domestic energy demand.

NSB Response: Yes, there is a significant need.

2. Subsistence Protection:

A. Will the project avoid depleting subsistence resources below the subsistence needs of local residents of the Borough? NSBMC § 19.70.050(A).

Response: The Project is not expected to deplete subsistence resources below the subsistence needs of local residents. OSA has consulted with the community of Nuiqsut and NSB, and has developed feasible and prudent mitigation measures to avoid or reduce potential adverse impacts to subsistence resources and ecosystems.

The Project has been modified to reflect Alternative 5 of the Nanushuk Project Final Environmental Impact Statement (Final EIS; U.S. Army Corps of Engineers [USACE] 2018) as the preferred alternative. Based on analysis presented by USACE in the Final EIS, this update has the potential to reduce fill in wetlands as well as impacts to other resources.

Mitigation measures to protect subsistence resources include:

- Power and fiber optic cables will be installed on the HSMs using messenger cables, avoiding the use of overhead powerlines. Avoidance of overhead powerlines reduces the potential for bird strikes and limits creation of predator perching opportunities on power poles.
- Project facilities are located to reduce impacts to hydrology and fish through minimization of the gravel fill footprint within 500 feet of fish-bearing water bodies, where practicable.
- Any water intake structures in fish-bearing or non-fish-bearing waters will be designed, operated, and maintained to prevent fish entrapment, entrainment, or injury. All water withdrawal equipment must use fish screening devices approved by the Alaska Department of Fish and Game (ADF&G).
- All water withdrawal will be conducted in compliance with water withdrawal authorizations and fish habitat permit stipulations to maintain adequate lake volumes in fish-bearing lakes.
- Pending commercial agreements and availability of supply, seawater purchased from a third party will be used to supply make-up water, minimizing use of local freshwater sources and avoiding the need for additional seawater treatment and transportation infrastructure.
- Removal of snow from fish-bearing rivers, streams, and natural lakes will require prior written approval by ADF&G. Compaction of snow cover overlying fish-bearing water bodies is prohibited except for approved crossings. If ice thickness is not sufficient to facilitate a crossing, ice or snow bridges may be required.

- OSA will consult with ADF&G to identify locations of known brown bear den sites. If occupied den sites are identified, they will be reported to ADF&G's Division of Wildlife Conservation. If occupied den sites are identified within 0.5 mile of proposed activities, they will either be avoided or alternate mitigation measures, developed in consultation with ADF&G, may be employed.
- OSA will consult with the U.S. Fish and Wildlife Service (USFWS) to identify the locations of known polar bear den sites. A maternal den survey will be conducted to identify these areas as necessary. OSA will work with the relevant agency to identify and implement the appropriate mitigation measures. Letters of Authorization (LOAs) for incidental and intentional take of polar bears will be obtained from USFWS. Known occupied den sites will be avoided by at least 1 mile, and all sightings will be reported to USFWS. As part of the LOA application and other state/local permits, a Polar bear/Wildlife Interaction Plan will be developed.
- The Polar Bear Interaction Plan and the Wildlife Avoidance and Interaction Plan will provide personnel with guidance to minimize the possibility of wildlife interactions and impacts to bears and human safety.
- Permanent, staffed facilities will be sited, to the extent practicable, outside identified brant, whitefronted goose, snow goose, tundra swan, king eider, common eider, Steller's eider, spectacled eider, and yellow-billed loon nesting and brood rearing areas. Bird nesting and brood rearing areas were considered during determination of facility locations. Placement of new gravel fill on the tundra is not planned to occur during the bird nesting season, minimizing the potential for disturbances to nesting birds and broods.
- Roads and pipelines will be separated by a minimum of 500 feet, where feasible, to minimize caribou disturbance and excessive snow drift accumulation and reduce the risk of vehicle impacts to the pipeline.
- All pipelines, HSMS, and suspended cables will be elevated a minimum of 7 feet above the tundra surface, except where pipelines intersect a road or pad.
- Project facilities were located to reduce impacts to wildlife, for example, by moving the Miluveach River Bridge and access road away from ADF&G-identified sensitive brown bear denning habitat.
- Facility lighting will be designed to minimize the impact on visual aesthetics and the occurrence of bird strikes. The facility lighting will minimize light visible from the outside of Project facilities by using downward illumination (e.g., downcast floodlights), excluding use of horizontally aimed floodlights, locating mast poles away from the pad edge, use of lighting fixtures with lamps contained within the reflector, and shading externally facing windows on buildings.

NSB Response: NSB Planning encourages OSA to use best available technology to monitor caribou and fish studies that will minimize helicopter and fixed wing aircraft activities. Mitigation measures will be incorporated into the proposed Rezone. The NSB is to help identify and avoid mitigate or prohibit the negative impacts of development. One of the purposes of the Resource Development District according to §19.40.080(A)(1) – “Do not permanently and seriously impair the capacity of the surrounding ecosystem to support the plants and animals which Borough residents depend for subsistence.”

When extensive adverse impacts to a subsistence resource are likely and cannot be avoided or mitigated, development shall not deplete subsistence resources below the subsistence needs to local residents of the Borough. Intent: the impacts addressed in this policy may result from a single project or from a series of projects. To implement this policy, the NSB would need to establish (a) documentation of subsistence needs; and (b) a preponderance of the evidence indicating that the project will deplete a subsistence resource below the level necessary to meet those needs. Displacement of the subsistence resources from previous rezones indicates that infrastructure deviates migration patterns.

Subsistence resources, traditional access and land use sites were being encroached upon then and are still an issue today.

a.

NSB Response: Study designs will be discussed and coordinated with the NSB Department of Wildlife Management (DWM) for submittal to the NSB by 1 March 2020 and each year thereafter as necessary. The DWM and Planning will review, seek revisions as appropriate, and approve the study designs by 1 April 2020 and each year thereafter as necessary.

- b. An annual report will be prepared and distributed to NSB Wildlife Management and Planning departments by 15 February and a meeting scheduled with NSB Wildlife Management and Planning, to occur by 1 April. This meeting will discuss the results and the potential need for adjustments to scope to assess possible impacts to caribou, waterbirds, fish, and subsistence users. The Land Management Administrator and Director of the Department of Wildlife Management will make the final decision of whether study designs need to be altered and/or additional data collection or analyses are required.
- c. Oil Search Alaska (OSA) will consult with KSOP on study design prior to submittal to the NSB and provide KSOP with annual reports.
- d. OSA will make data available from their studies annually to the NSB Wildlife Management and within a year of completion of the study to the general public through a data archive (e.g., UAF's Geographical Information Network of Alaska [GINA], Alaska Ocean Observing System [AOOS], etc.).
- e. OSA will provide the DWM with reports from studies (wildlife, habitat, erosion etc.) required by other agencies involved in permitting lands associated with Nanushuk Development Project.
- f. To the extent practicable, OSA and its contractors will minimize flights by hiring local boat drivers, snow machine drivers, and allowing their contractors to camp at a study site.

- g. To the extent practicable, OSA will involve students from Nuiqsut (or other North Slope communities if no students are available from Nuiqsut) in their studies.

1. Caribou

OSA will fund a caribou study to analyze the distribution and movements of caribou around the eastern Colville River Delta and adjacent areas to assess habitat relationships and possible impacts from development.

- a. OSA will fund a third party contractor to :
- i. characterize pre-construction caribou movements utilizing historic telemetry data
 - ii. assist ADF&G in the collection of GPS telemetry data (e.g. potential purchase of additional caribou collars or database management etc.)
 - iii. determine caribou pre- and post-construction movement rates in relation to roads pipelines and pads associated with their project.
 - iv. Characterize habitat conditions (e.g. snow melt, vegetation habitat, plant biomass, infrastructure etc.) within the study area using best available technology.
 - v. Evaluate these indices of habitat conditions, with particular attention to possible impacts from development, on the distribution of caribou utilizing the study area.

2. Waterbirds

A considerable amount of information has been collected by the oil and gas industry concerning impacts to waterbirds on the North Slope. That information has not been comprehensively summarized in a useful way for the development and implementation of appropriate mitigation measures. Thus, OSA and its contractor will conduct a review of existing information on impacts to nesting and brood rearing waterbirds from oil and gas development and activities.

3. Fish

Fish studies required by these stipulations will be conducted by a third party. These studies will provide baseline data in order to help detect possible impacts, mitigate impacts, or conduct a damage assessment in the event of oil spills and/or release of oil-related products. Potential impacts are not restricted to population level effects.

- a. OSA will supplement on-going studies conducted by ConocoPhillips of the Nuiqsut fall fishery to fill data gaps and to help detect potential project related impacts on fish and the subsistence fishery on the Colville River and water bodies associated with OSA infrastructure

- b. OSA will conduct studies during the open water and overwintering seasons by collecting data on fish (distribution, relative abundance, species composition, age, diet) and their habitat (temperature, salinity, turbidity, currents). These studies will be conducted on the east channel of the Colville River near production pads and will extend to where the channel flows into marine waters at the mouth of the Colville River. This study will be conducted for three years after which DWM staff and OSA will assess whether the study provides sufficient data to detect potential impacts of project related activities. If data are not sufficient, additional studies may be required.
- c. Fish detected with water mold (or other newly emerging infections) in both the Nuiqsut Fall Fishery and in areas associated with OSA influence will be recorded, collected, and reported to the DWM.

B. Will the project avoid precluding access to subsistence resources? NSBMC § 19.70.050(J)(3)(b), and NSBMC § 19.70.050(D).

Response: Yes, the gravel roads will be open for Kuukpik shareholders and Nuiqsut residents, and OSA plans to construct three tundra access ramps to facilitate access for off-road travelers. A boat ramp will be constructed north of ND-B on the Colville River. The boat ramp project was located on the lower Kachemach River and was requested by the community of Nuiqsut in 2014 to give residents the ability to launch and retrieve boats, thereby maintaining or facilitating access to water-based subsistence activities. The boat ramp will include a small staging and turnaround area with enough space for short-term parking of vehicles with trailers. The boat ramp location was identified by Nuiqsut whaling captains and search and rescue in 2019.

NSB Response: A boat ramp was requested by the community of Nuiqsut, OSA took into consideration the area recommended by the community of Nuiqsut. By developing a boat ramp in the project area- it helps to mitigate subsistence access and local access issues, while enhancing respond planning standards for the project.

The boat ramp will be beneficial during the early winter season as last year there were a lot of Search & Rescue calls that occurred at Oliktok Point. Would be cost saving for S&R for the long trek. This may be a way to mitigate our subsistence loss and a way for our food securities. (Kosbruk, 10/2/19).

An overall view of cumulative impacts concerning the village of Nuiqsut needs to be fully evaluated and appropriate mitigation concerning resource displacement, access, and safety should be addressed. At a minimum, a forum on cumulative impacts and mitigation should be considered by a multi-agency panel geared to implement a program response strategy.

The gravel roads are available for Nuiqsut residents for use in subsistence activities. The intent is to ensure that development will not preclude reasonable subsistence user access to a

subsistence resource on which subsistence hunters depend on. Reasonable access is access using means generally available to subsistence users. Reasonable opportunities for access customary subsistence resources must not be precluded. Precluding access addresses not only means of access, but access to where resources are present and can be used by subsistence users.

A major concern of the North Slope Borough is the effects of the cumulative impacts of this development. The incremental encroachment onto traditional subsistence hunting areas has overwhelmed the traditional lifestyle of the village of Nuiqsut, according to National Research Council in their March 2003 report on "Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope. (Alpine Satellite Development CD3, CD5, CD6, CD7 Page 4).

Precluding access to subsistence resources will increase for the residents of Nuiqsut. The hunters and camp site users will have to go further out to hunt for their resources, which will increase the cost of fuel and wear and tear on their snowmachines and four wheelers. Mitigation measures will have to be taken into consideration.

The greatest proportion of caribou, both summer and winter, were harvested at Fish & Judy creeks, in the Nuiqsut area, and in the Colville River Delta including Nigliq and the Nigliq Channel. The Nuiqsut area itself is the second largest winter and fourth largest summer harvest locations in 1993, 1994-1995, 2000 and 2001. (04-001 Alpine Satellite Development p. 12)

It is a common practice for experienced Nuiqsut hunters to take younger, less experienced hunters to Fish or Judy creeks, Nigliq, and Colville River Delta, or Itkilikpaat during the summer and winter to stay at one's own or a relative's or a friend's cabin or camp site, set a net for fishing and harvest caribou. These activities provide multiple traditional foods for the community through sharing and distribution upon the hunter's return. Furthermore, they serve to transfer to younger hunters a multi-generation knowledge of and identification with specific harvest, processing and storage methods and traditional harvest locations. In sum, these subsistence activities in these specific locations reinforce the cultural identity of the community and residents' identification with their unique history, (04-001 Alpine Satellite Development P. 12) Not only do the Nuiqsut hunters share with the community, they share and barter their harvests with family and friends within the State of Alaska as well as the lower forty eight states.

The data collected by the NSB is broader in scope, geographically and by species, than the Moulton data. Harvest information collected by the NSB includes data for Char (iqalukpik), burbot (tittaaliq), pike (siulik), salmon, and grayling (sulukpaugaq), in addition to the cisco and whitefish species addressed by Moulton. The NSB harvest locations reflect those reported in the 2003 Nuiqsut SRB&A interviews, with summer and winter fishing taking place in the Nigliq Channel, Colville River and Delta, and in Fish and Judy creeks, as well as other locations in specific seasons using both nets and angling gear (Brower and Hepa 1998; SRB&A 2003).

Waterfowl harvested by the Inupiat's of Nuiqsut occupy two habitats in the greater area. Ducks, geese, and brant nest in the west tundra to the north and molt. Eiders nest on the sandy areas of the Colville River Delta and the barrier islands, molting after their arrival. Both groups of waterfowl raise their young in the area until fall, when they migrate south. Nuiqsut hunters harvest waterfowl in May and June during the migration using snowmobiles and boats. Geese hunting areas include the Fish and Judy creeks area, the Colville River Delta, the area around Nuiqsut extending to the Fish and Judy creeks area, along the Colville River up to Sentinel Hill, the area Ocean Point, and along Itkillik River. The NSB collected waterfowl harvest data for 1994-1995, 2000, and 2001 (Brower and Hepa 1998, NSB 2003). 79 percent of geese, including white fronted and Canada, were harvested in the Fish and Judy creeks area (63 percent) and the Colville River Delta (16 percent). Of the remaining 21 percent, most were harvested up the Colville River from Ocean Point to Umirak. (04-001 Alpine Satellite Development p.12)

Wolverine harvest locations reported for 1994-1995, 2000 and 2001 are divided evenly between the Colville River Delta and Fish and Judy creeks (48 percent) and other areas (52 percent), 55 percent of wolves harvested during these years were harvested in the Fish & Judy creeks area, with the balance harvested elsewhere. One hunter, explaining where wolves, and wolverines could be found, said, "Wolf, wolverine, and caribou go to the lowest levels, which have the best hiding spots. These are rivers, bluff bases, creeks, frozen ground, and low level places that allow them to hide" (SRB&A 2003).

Moose (tuttuvak) are hunted from the Colville River Delta area upstream to Ninuluk Creek, up the drainages of the Itkillik River and Fish and Judy creeks, For 1994-1995, five moose harvests were reported (Brower and Hepa 1989). Moose offer a significant amount of meat per animal harvested because of their relatively large size compared to other terrestrial mammal subsistence resources. (04-001 Alpine Satellite Development p.12)

August is the only month for Nuiqsut residents to harvest moose according to subsistence regulations. Many hunters plan their work schedules around this harvest period in order to participate. Trips including extended families and friends, as many as six boats full, travel at this time to Fish and Judy creeks, up to Colville River to general area of Umiat, or up to Itkillik River. (04-001 Alpine Satellite Development p.12)

Subsistence

- a. OSA will fund a contractor to design and conduct a subsistence study that investigates the effects of their development activities and associated infrastructure to subsistence hunters from Nuiqsut. The third party contractor will be chosen in consultation with the DWM and Planning. The study should focus on all OSA facilities adjacent to the Colville River that are subject to this re-zone. The project should at a minimum:
 - i. Examine possible effects from OSA developments and activities to subsistence activities

- ii. Document hunter concerns and opinions about impacts from the OSA facilities and activities

C. Will the project avoid depleting the productivity of subsistence resources and their ecosystems? NSBMC § 19.70.050(J)(3)(a).

Response: Yes, the project is not expected to deplete the productivity of subsistence resources and their ecosystems. Nuiqsut is the community closest to the project area. OSA leadership has traveled to Nuiqsut to learn more about the environment and culture and will continue to do so as part of its ongoing investment in Alaska. OSA is continuously learning valuable knowledge about the cultural landscape, subsistence way of life, challenges facing the community, and important subsistence areas as documented in the Nuiqsut Paisanich, Nuiqsut Heritage: A Cultural Plan (1979) as well as by active and recent subsistence users. OSA works cooperatively with the community of Nuiqsut to communicate project activities in a timely manner and sustains a dialogue to minimize effects to local subsistence practices and areas. OSA engages regularly with the Kuukpikmiut Subsistence Oversight Panel (KSOP) and employs community liaisons to maintain consistent dialogue with community members, hunters, whalers, and area subsistence users. OSA has consulted with the community of Nuiqsut and NSB, and has developed feasible and prudent mitigation measures to avoid or reduce potential adverse impacts to subsistence resources and ecosystems. Mitigation measures include:

- Traditional and customary access to subsistence areas will be maintained.
- OSA has an ongoing stakeholder engagement program to inform the residents of Nuiqsut, including subsistence users, of proposed activities and to obtain feedback and recommendations regarding how these activities can be performed to avoid conflicts with subsistence activities. Updates of planned and ongoing activities will be provided to local residents and Subsistence Representatives to ensure that activities are conducted to minimize potential impacts to local subsistence activities.
- OSA will consult with the potentially affected subsistence communities and the NSB regarding proposed operations and measures to prevent unreasonable conflicts. The proposed Project activities will be on surface lands owned by Kuukpik and the State of Alaska. OSA will coordinate operations with Kuukpik. Community meetings are planned for the future.
- Subsistence Representatives will be employed by OSA to ensure that activities are conducted to minimize potential impacts to local subsistence activities. Records of all concerns expressed by subsistence hunters during OSA operations will be maintained.
- Impacts to subsistence use areas will be minimized through location of project facilities (including the Miluveach River Bridge) away from subsistence use areas near the mouth of the Miluveach River.
- Pipelines will have a non-reflective finish to reduce reflectivity and potential impacts to wildlife from visual disturbances. Bridge locations have been chosen to minimize impacts to boaters and subsistence use areas. Clearance for the Kachemach River crossing will maintain adequate freeboard to minimize interference with vessel-based subsistence activities.

- Tundra access ramps will be constructed at three previously proposed road turnouts on infield roads to Nanushuk Drillsite A (ND-A), Nanushuk Drillsite B (ND-B), and Nanushuk Drillsite C (ND-C) to facilitate access for off-road travelers.
- A boat ramp, including a small staging and turnaround area with enough space for short-term parking of vehicles with trailers, will be constructed north of ND-B to allow local users to launch and retrieve boats.
- OSA will work with Kuukpik to establish access agreements for use of project gravel roads and ice roads, thus increasing potential access routes for subsistence activities.
- OSA will provide regular project updates to the community and leadership in Nuiqsut during Project development and will incorporate measures to address concerns into project designs, where practicable. Additionally, OSA will continue to communicate regularly with the community and leadership in Nuiqsut throughout construction and operations.
- OSA will interface with the KSOP to minimize conflict with subsistence users.

NSB Response: Subsistence is part of a rural economic system, called a “mixed, subsistence-market” economy, wherein families invest money into small-scale, efficient technologies to harvest wild foods (ADF&G 2000). Fishing and hunting for subsistence provide a reliable economic base for many rural regions. Domestic family groups who have invested in fish wheels, gill nets, motorized skiffs, and snowmobiles conduct these important activities. Subsistence is not oriented toward sales, profits, or capital accumulation (commercial market production), but is focused toward meeting the self-limiting needs of families and small communities. Participants in this mixed economy in rural Alaska augment their subsistence production by cash employment. Cash (from commercial fishing, trapping, and/or wages from public sector employment, construction, fire-fighting, oil and gas industry, or other services) provides the means to purchase the equipment, supplies, and gas used in subsistence activities. The combination of subsistence and commercial-wage activities provides the economic bases for the way of life so highly valued in rural communities (Wolfe and Walker 1987).

A diverse seasonal abundance of terrestrial mammals, fish, birds, and other resources is available in the immediate area surrounding Nuiqsut. Traditional subsistence activities in the Nuiqsut area revolve around caribou, marine mammals, and fish. Moose, waterfowl, and furbearers were secondary but important supplementary resources. Nuiqsut’s location on the Colville River, some 35 miles upstream from the Beaufort Sea, has been prime area for fish and caribou harvests, but is less advantageous for marine mammals harvests (ADCED 2003). The Colville River is the largest river system on the North Slope and supports the largest overwintering areas for whitefish (Craig, 1989).

Nuiqsut is situated closer to current and foreseeable areas of petroleum development than any other community on the North Slope. This development has deterred subsistence resource users from hunting, fishing and gathering their former harvest areas east of the Colville River and at coastal areas such as Oliktok Point (Fuller and George 1999; IAI 1990). According to Circumpolar Research Associates (CRA 2002),

Other harvested marine mammals included polar bear and bearded and ringed seals. Fish (broad whitefish and least and arctic cisco) comprised 34.6 percent of the total harvest in Nuiqsut in 1992. Approximately 28 percent of the total harvest in 1992 was land mammals (caribou and moose). The harvest of birds (geese and eiders) was approximately 3 percent of the total harvest in 1992. The highest Nuiqsut household participation rates were fishing, caribou hunting, and moose, bear, and sheep hunting (Fuller and George 1999). The data for 1994-1995, collected by the NSB Division of Wildlife, were presented in a different format from that used by ADF&G (Brower and Hepa 1998). This was an exceptional year in that Nuiqsut crews harvested no whales. Caribou contributed 58 percent of edible pounds of wild foods for the sampled period, with fish contributing 30 percent, moose and bird each 5 percent, marine mammals 2 percent and wild plant foods less than 1 percent of edible pounds harvested (Brower and Hepa 1998, p. 15).

3. Cultural and Historic Site Protection:

A. *Has the project identified all cultural or historical sites, including sites where traditional activities take place? NSBMC § 19.70.50(E), § 19.70.050(F), § 19.70.050(G), and § 19.70.060(J).*

Response: Yes, three cultural resources investigations have been conducted in support of the project: two surveys by HDR, Inc. (HDR), in 2015 and 2017, and a supplemental survey by Mobley and Associates (Mobley) in 2016. Archaeological surveys will be conducted in 2019 to determine possible archaeological and cultural resources sites near the proposed activities. For all surveys, the field crews were led by archaeologists meeting the Secretary of Interior's (SOI's) standards for archaeology.

- In 2015, HDR conducted a survey along potential road and pipeline alignments, as well as at the potential locations of operations pads and associated Project infrastructure (HDR 2017). HDR conducted aerial reconnaissance and intensive aerial and pedestrian survey, and revisited the locations of numerous previously recorded cultural sites. The survey resulted in the identification of one site and one determination of [historic] eligibility.
- In 2016, Mobley performed a supplemental cultural resources investigation for the Project to provide survey coverage for a design change regarding the location of ND-A. Mobley's survey was primarily an aerial reconnaissance, supplemented by pedestrian survey where warranted. No cultural resources were identified.
- In 2017, HDR conducted a supplemental survey to identify cultural resources and provide management recommendations to OSA for those resources that could be affected by potential Project design changes. The investigation included background research and a field survey with limited subsurface testing. The field survey included a combination of intensive and reconnaissance aerial surveys, along with windshield and pedestrian surveys. As a result of the field survey, no new Alaska Heritage Resources Survey (AHRs) or Traditional Land Use Inventory (TLUI) sites were identified; however, three

isolates were recorded that did not warrant AHRS designation because they were indeterminate in age, consisting only of discarded fuel cans and oil drums.

Prior to any exploration or development project, OSA retains the services of professional archaeologists and cultural anthropologists to identify and/or confirm the location(s) of documented Traditional Land Use areas and cultural artifacts within the proposed project area. **OSA obtained a Certificate of TLUI Clearance from the NSB for the Nanushuk project in June 2019.**

NSB, state, and local entities will be notified immediately in the event that prehistoric, historic, or other cultural resources are discovered during construction or operations. Mitigation measures include:

- A site-specific survey was conducted and, to the extent possible, project facilities will be located outside of a 500-foot buffer from documented cultural resources.
- If prehistoric, historic, or other cultural resources are discovered during OSA operations, all work in the vicinity of the discovery will cease and ADNR-State Historic Preservation Office (SHPO) and NSB-Department of IHLC will be notified. Measures to mitigate impacts to prehistoric, historic, and other cultural resources identified by the archaeologist, ADNR-SHPO, and NSB-IHLC will be implemented.

NSB Response: The cultural or historic sites must be avoided and OSA must consult the NSB Cultural Coordinator as well as appropriate local, state, and federal agencies and potentially survey and excavate the site prior to disturbance.

A concern regarding a burial site of a family member is near the NPD (Kosbruk 10/2/19)

B. Will the project avoid interference with cultural or historical sites, including sites where traditional activities take place? NSBMC § 19.70.50(E), § 19.70.050(F), § 19.70.050(G), and § 19.70.060(J).

Response: Yes. OSA's projects will be modified as needed to avoid impacting these identified areas of cultural significance. The NSB, state, and local entities will be notified immediately in the event that prehistoric, historic, or other cultural resources are discovered during construction or operations.

NSB Response: The proposed development shall not significantly interfere with traditional activities at cultural or historic sites. A stipulation for this project, as with all other new developments in the North Slope Borough, shall be to cease all work in an area where newly discovered historic or cultural sites have been found in the process of construction until an archeological investigation can be conducted.

4. Air and Water Quality Protection: Will development comply with state or federal land, air and water quality standards? NSBMC § 19.70.050(H) and § 19.70.050(I)(3).

Response: Yes.

NSB Response: OSA must comply with all local, state, and federal regulations. Nuiqsut is cautious of industrial air quality monitoring practices. Nuiqsut residents have expressed concerns over air quality around Nuiqsut. OSA shall conduct air quality monitoring and reports made to the Community of Nuiqsut as well as the NSB Planning Commission on an annual basis. Mitigation measures will be considered to address health impacts to the Community of Nuiqsut.

Air quality:

Air quality in the project area is within health-based regulatory standards. While the Project will introduce new sources of air quality emissions, power will be generated using the best available technologies, resulting in the lowest possible air emissions and maintaining current air quality. Construction will occur over approximately 4 to 4.5 years. During this period, emissions will consist of fuel-combustion emissions from on-road and non-road heavy equipment used to construct gravel pads and access roads, processing modules, pipelines, and utilities. Additionally, small electric-powered generator engines, heaters, and other fuel-burning equipment, as well as fugitive dust sources such as gravel excavation, stockpiles, and placement, will contribute to emissions during construction.

The drilling phase may include up to three drilling rigs, one at each drill site, for up to 15 years. To reduce emissions, natural gas-fired electric power generation will power field operations and drilling operations, including drilling rigs, after drill site and central processing facilities have been commissioned and reach steady-state operations in Year 5. During the drilling phase, engines or turbines will power drilling activities and electricity generation, mobile and portable combustion sources, and process boilers and heaters.

The project will meet applicable National Ambient Air Quality Standards and Alaska Ambient Air Quality Standards in the project area and Nuiqsut (USACE 2018). OSA will implement the following mitigation measures:

- Proposed air emissions will be required to demonstrate compliance with human health based ambient air quality standards using computer modeling approved by the Alaska Department of Environmental Conservation (ADEC). Permits will not be issued by ADEC unless this demonstration is made.
- An incinerator is not being proposed as part of the project, thereby reducing overall project air emissions.
- Post-construction, natural gas-fired combustion turbines will be used for power generation and compression, which minimizes the use of diesel fuel use. Combustion turbines will be equipped with appropriate technologies to ensure efficient combustion, increased fuel efficiency, and reduced greenhouse gas emissions rates. Combustion turbines at the NPF will be equipped with waste heat recovery units for process and space heat, eliminating the need for additional fuel fired heaters.

- Gravel road and pad installation will occur during winter construction seasons and maintenance of the gravel roads will implement measures to suppress generation of road dust as needed.

NSB Response: An Air Quality permit application will be submitted to Alaska Department of Environmental Conservation. Also, Oil Search Alaska, LLC will develop a comprehensive Oil Discharge Prevention and Contingency Plan (C-Plan) to address possible spills that will be approved by the State of Alaska. Implementation of this plan will reduce the risk of damage to the environment from an oil spill.

Oil Search Alaska LLC will adhere to all other regulations and stipulations posed by the State of Alaska Department of Environmental Conservation regarding air quality.

Water quality:

OSA plans no surface water discharges for the project, but if water discharges were to occur, they would be monitored according to an Alaska Pollutant Discharge Elimination System (APDES) permit issued by ADEC. Monitoring is required as part of permit compliance. Storm water inspections will be performed in accordance with the Nanushuk Project APDES permit.

State of Alaska permits are obtained for water withdrawal and are monitored for water quality parameters and fisheries presence before use. OSA obtained a Certificate of Reasonable Assurance under Section 401 of the Clean Water Act. The certificate identifies stipulations, best management practices, provisions under Section 401, and Alaska Water Quality Standards required to avoid impacts to water quality.

NSB Response: OSA will adhere to all other regulations and stipulations posed by the State of Alaska Department of Environmental Conservation regarding water quality.

Water Quality

OSA will collect data on water quality and hydrology to help detect potential project related impacts on fish and the subsistence fishery:

1. Water monitoring (temperature, salinity, turbidity, currents, and contaminants) will occur during the open water season in the Colville River and streams associated with OSA infrastructure. OSA facilities are in close proximity to the Colville River and if an oil spill and/or oil-related product release occurs, information on sheetflooding, seasonal river discharge, and drainage and water parameters will be essential to assess and mitigate the impacts of a spill. This study will be conducted for three years after which DWM staff and OSA will assess whether the study provides sufficient data to detect potential impacts of

project related activities. If data are not sufficient, additional studies may be required.

2. Bridges and culverts will be inspected and photographically documented at a range of different water levels. Impoundment of water adjacent to facilities and roads will be documented and used to assess pre- vs. post- construction conditions.

5. *Noise Mitigation: Will vehicles/vessels/aircraft avoid disturbance of areas where noise-sensitive species are concentrated at times when such species are concentrated? NSBMC § 19.70.50(I)(1).*

Response: Yes, OSA will not develop a project-specific airstrip, which will eliminate regular fixed-wing air traffic into the project area and reduce noise/disturbance impacts to local residents, subsistence users, and wildlife. Drill sites will receive turbine-generated power from the NPF via power cables, thus minimizing noise impacts at individual drill sites. The routine use of helicopters during drilling and operations activities will be avoided to minimize noise and impacts related to aesthetics, wildlife, and subsistence. OSA will interface with KSOP to minimize conflicts with subsistence users.

NSB Response: Helicopter or fixed wing aircraft use in support of exploration activities shall maintain an altitude of 1,500 feet over concentrations of 25 or more caribou, and with hunter in the area of pursuit of subsistence animals. Vehicles, vessels, and aircraft that are likely to cause significant disturbance must avoid areas where species that are sensitive to noise or movement are concentrated at times when such species are concentrated. Concentrations may be seasonal or year-round and may be due to behavior (e.g., flocks or herds) or limited habitat (e.g., polar bear denning, seal haulouts). Horizontal and vertical buffers will be required where appropriate. Concern for human safety will be given special consideration when applying this policy. Improved monitoring and analysis of flights, flight purposes, and other flight patterns will help to better estimate the impacts of aircraft, and potentially reduce impacts. Prohibiting the use of air boats in places where residents are actively traveling by boat to harvest subsistence resources will reduce potential disruptions to subsistence users and resources.

6. *Waste Handling:*

A. *Will industrial and commercial development be served by solid waste disposal facilities that meet state and federal regulations? NSBMC § 19.70.50(I)(4).*

Response: Yes, OSA will permit and construct two Class 1 UIC waste disposal wells (one primary, one backup) to be used for disposal of RCRA exempt and non-hazardous waste and treated domestic wastewater from the project camps.

Waste management activities will be conducted in general accordance with best environmental practices as described in the North Slope Environmental Field Handbook and the Alaska Waste Disposal and Reuse Guide (Red Book). Attention will be focused on waste

minimization, segregation, reuse, and recycling, when practicable. Non-hazardous solid waste will be trucked off-site and disposed of at the NSB landfill.

Solid, non-burnable waste will be deposited in dumpsters located at each site and backhauled to the NSB landfill as needed. The food waste that could attract wildlife will be stored in enclosed wildlife-resistant containers and backhauled to the NSB landfill when full. Cold winter temperatures will result in the food waste being frozen soon after placement into the containers.

Hazardous and universal waste, as defined by RCRA, will be managed on-site prior to being transported off-site for disposal and recycling. All hazardous waste generated by the Project will be handled by qualified persons and disposed of in accordance with regulations.

During drilling and operations, G&I facilities (UIC Class I well) will be available for disposal of RCRA exempt and non-hazardous waste. This will minimize the risk of spills during fluid transport to an off-site disposal facility. Project modifications have reduced the number of UIC wells from four to two.

NSB Response: OSA must adhere to local, state, and federal regulations regarding solid wastes. New and expanding waste management systems will require approval from the NSB Mayor, pursuant to NSBMC Title 9.

B. If the development is not on a central sewage system, will a facility be installed to impound and process effluent to meet state and federal quality standards? NSBMC § 19.70.50(I)(5).

Response: Yes, OSA plans to haul water, wastewater, and solid waste off-site during construction. Waste hauling will continue until the disposal wells are drilled and the G&I facilities are commissioned. Wastes unfit for the NSB landfill will go downhole using the UIC wells. The NOP will include a water/wastewater treatment plant designed to meet state and federal standards. OSA will obtain all necessary state and federal permits.

If the disposal wells are not available, domestic wastewater will be managed, treated at a permitted wastewater treatment facility located on State land and discharged or disposed off-site in compliance with all federal, state, and NSB standards.

OSA understands that the project is within NSB SA10; however, coordination between NSB, NSB SA10, and OSA are needed to meet the service needs because SA10 facilities are not available in the project area. OSA will work with NSB to reach a conditional waiver agreement while SA10 facilities are developed.

NSB Response: New and expanding waste management systems will require approval from the NSB Mayor, pursuant to NSBMC Title 9.

7. Facility Siting, Design, and Operations:

- A. Will impermeable lining and dikes be installed for all oil and fuel storage facilities with a capacity of 660 gallons or larger? NSBMC § 19.70.050(I)(11).

Response: Yes, All fuels and hazardous substances used by the project will be handled and stored on-site in compliance with state and federal regulatory guidance; the project's Oil Discharge Prevention and Contingency Plan (ODPCP); and Spill Prevention, Control, and Countermeasure (SPCC) Plan. The ODPCP will comply with State of Alaska requirements in Alaska Statute 46.04.030 and 18 Alaska Administrative Code (AAC) 75, as well as U.S. Department of Transportation (USDOT) requirements in 49 Code of Federal Regulations (CFR) 194. The SPCC Plan will comply with U.S. Environmental Protection Agency (EPA) regulations in 40 CFR 112. All fuels and chemicals will be stored in appropriate primary containment. Secondary containment areas will be designed in compliance with all applicable permits and regulations.

OSA has adopted the following best management practices for fuel handling and storage:

- External pipe walls will be coated with fusion-bonded epoxy. Pipelines containing temperature-controlled fluids and multiphase product will include an insulation system consisting of polyurethane foam insulation covered with an interlocked sheet metal jacket. Pipeline facilities will include pig launchers and receivers capable of handling in-line inspection tools as well as maintenance and cleaning tools.
- Where pipelines cross road embankments, coated and insulated pipelines will be encased in structural steel pipe casings buried within the roadway section. Casings for pipeline-road crossings will extend a minimum of 2 feet beyond the road embankment toe.
- All pipelines will be designed above ground, and the Miluveach River and Kachemach River crossings are located in the vicinity of proposed roads, allowing better access for leak detection, maintenance, and potential spill response.
- Gravel road connection to existing infrastructure provides reliable year-round, rapid access to project facilities in the event of an emergency, including a blowout, oil spill, or need for medical evacuation.
- Periodic surveillance of the pipelines will be conducted in accordance with federal regulatory requirements, American Society of Mechanical Engineers (ASME) B31.4 requirements, and ADEC regulations (18 AAC 75). Leak detection systems and surveillance will be compliant with ASME codes and state and federal standards. For pipeline-river crossings, either isolation valves or vertical loops will be used, depending on the type of pipeline.
- All fuel and hazardous substances used by the project will be handled and stored on-site in compliance with state and federal regulatory guidance and the project's ODPCP and SPCC Plan. All fuels and chemicals will be stored in appropriate primary containment. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the project area using a licensed, commercial transporter following USDOT regulations for safe transport of materials to minimize spill risk.

- The project will employ trained North Slope employees and contractors who are familiar with North Slope oilfields and industry requirements regarding environmental and regulatory compliance standards. Personnel will be trained regarding Nanushuk Operational Plans, including oil handling, waste management, snow removal, spill prevention, and wildlife interaction, thus minimizing the potential for these impacts during daily operations.
- Dedicated spill response equipment will be positioned throughout the field to minimize spill response time. This allows responders to address a potential spill and start response as soon as possible, while minimizing the amount of fluid that may be released and associated impacts. The locations and types of oil spill response equipment, and equipment deployment times, will be identified in detail in the project's ODPCP.
- OSA will maintain its membership with Alaska Clean Seas and the Mutual Aid Agreement with other North Slope operators to provide resources to respond to spills, which may require resources other than those readily staged on pad. Membership in Alaska Clean Seas supports faster response time, especially if additional equipment or personnel are required to address an accidental release.
- OSA has adopted the Alaska Safety Handbook, North Slope Environmental Field Handbook, and Red Book as guidance for standard operating procedures and best management practices for workplace health, safety, and environmental and waste management. Drip pans or liners will be placed under parked vehicles and equipment to capture fluids.
- Fuel and hazardous substance transfers will be performed in accordance with OSA's Fluid Transfer Procedures included in OSA's ODPCP and the Fluid Transfer Guidelines in the North Slope Environmental Field Handbook. This plan includes the use of surface liners under all potential spill points. Adequate spill response equipment will be on hand at all times.
- All containers of fuel or hazardous substances will be labeled with the contents and lessee's or contractor's name.

NSB Response: NSB concurs with the explanation given by OSA. The NSB remain cautious to institute best management practices for refueling with additional fuel technicians to monitor refueling operations.

- B. *Are uses and developments that could impact water quality (such as hazardous materials and waste storage) at least 1500 feet from water bodies? NSBMC § 19.70.050(J)(3)(d).*

Response: Due to the numerous lakes, ponds, and rivers in the area, it is not possible to locate all facilities 1,500 feet away from the shorelines of all lakes or rivers. There are approximately 20 lakes greater than 5 acres within 1,500 feet of the pads. Fuel and other potentially hazardous materials will be stored at the drillsites, NPF, and NOP, but will be stored in appropriate primary containment areas. Any hazardous wastes generated will be shipped by licensed transporters to authorized facilities. Between shipments, hazardous waste can be collected and managed in Satellite Accumulation Areas under the supervision of environmental staff.

OSA is taking all feasible and prudent steps to avoid adverse impacts to nearby water bodies from facilities located near shorelines. All fuels and hazardous substances used by the project will be handled and stored on site in compliance with state and federal regulatory guidance and the project's ODPCP and SPCC Plan. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.

NSB Response: The intent is to minimize the impact of contaminants on fish wildlife, and the environment including wetlands, marshes, and marine waters. System integrity is essential for spill prevention. Pursuant to NSBMC 19.70.050 (J)(3)(d) – development on or near a shoreline that has the potential of adversely impacting water quality (for example, landfills, hazardous materials, storage areas, dumps, and the like). (Near, as used in the phrase **Near the Shoreline** is defined as that area within a 1,500-foot setback from the mean high water mark along the coast, lake shore, or river). As mentioned above, additional fuel technicians should be required during fueling operations including measures to have spill response equipment such as duck ponds, oil absorbent pads readily available.

C. *Will transportation facilities, including pipelines, avoid obstructing wildlife and allow wildlife? NSBMC § 19.70.050 (J)(3)(f) and § 19.70.050(L)(5).*

Response: All new pipelines will be supported on common vertical support members (VSMs) placed 55 to 60 feet apart. Where feasible, pipelines will be located parallel to gravel roads at a distance between 500 and 1,000 feet to minimize caribou disturbance and excessive snow drift while facilitating access for visual pipeline inspection, monitoring, repairs, modifications, and testing. All pipelines, horizontal support members (HSMs), and suspended cables will be a minimum of 7 feet above the tundra surface, except where pipelines intersect a road or pad or tie into a facility. Additional wildlife impact mitigation measures are:

- All pipelines, HSMs, and suspended cables will be elevated at river crossings.
- Pipelines will have a non-reflective finish to reduce reflectivity and potential impacts to wildlife.
- Power and fiber optic cables will be installed on the HSMs using messenger cables, avoiding the need for power poles and associated fill.
- At pipeline river crossings, all pipelines, HSMs, and suspended cables will be elevated to maintain adequate clearance.

NSB – A means of providing for unimpeded wildlife crossing shall be included in the design and construction of structures such as roads and pipelines that are located in areas used by wildlife. Pipeline design shall be based on the best available information and include adequate pipeline elevation, ramping or burial to minimize disruptions of migratory patterns and other major movements of wildlife. Aboveground pipelines shall be elevated a minimum of seven feet from the ground to the bottom of the pipe, except at those points where the pipeline intersects a road, pad, or caribou ramp. In areas used by wildlife, a seven foot minimum pipeline elevation where elevation is the preferred means or providing for

unimpeded wildlife crossings. This area is depicted as a migratory route for caribou. OSA must develop a mitigation plan to address, and minimize impacts to migration events, insect relief, distribution, user access are part of the record that need to be addressed

D. Will transportation facilities and utilities be consolidated to the maximum extent possible to avoid duplication? NSBMC § 19.70.050(J)(3)(h) and § 19.70.050(K)(6).

Response: Yes. OSA has incorporated design features that consolidate facilities and avoid duplicative infrastructure needs. Examples include:

- Upgrades to the existing Mustang Road to connect with the proposed Access Road. This minimizes additional gravel fill or wetlands impacts by avoiding the construction of an entirely new or parallel gravel road in that portion of the Project area.
- No airstrip is proposed, thus removing the need for additional development or new gravel material to construct Nanushuk facilities.
- Any discharges resulting from the placement of VSMS will be sidecast onto an ice pad to avoid a discharge of fill material into wetlands and water bodies. Sidecast materials will be removed from the ice pad and used to backfill any excavated areas (or hauled off-site for approved disposal), avoiding the need for additional fill material discharges to the tundra.
- Seasonal ice pads and roads will be used to support winter pipeline and gravel infrastructure construction. This method avoids the need for additional fill during construction; minimizes the potential transfer of sediment to wetlands, water bodies, and aquatic habitats; and avoids duplicative infrastructure needs.
- The NOP facilities used to support field-wide operations will be co-located with the operations camp to house operations and maintenance personnel, resulting in less fill material or need for additional gravel pads.
- The export and import pipelines will be co-located with existing pipelines and/or gravel roads associated with the Southern Miluveach and Kuparuk River Units between the Mustang Pad and CPF2. Where available, co-location with existing pipelines and roads minimizes impacts to the aquatic environment compared to spacing the two features farther apart.
- On-site processing minimizes the length of the multiphase pipeline and potentially allows for a smaller total processing facility footprint relative to construction of pre-processing facilities at each drill site.

NSB Response: Transportation facilities and utilities must be consolidated to the maximum extent practicable.

E. Are mitigation measures in place to ensure that shoreline dynamics will not be altered and to minimize environmental degradation of coastal lands and waters? NSBMC § 19.70.050(J)(3)(i) and § 19.70.050(L)(1).

Response: Not applicable. Mining will occur at a permitted and existing gravel mine site. Shoreline dynamics and efforts to minimize environmental degradation are presumably addressed in permit applications, plans, and approvals associated with the mine sites and mine site operators. Gravel mining will occur during winter and will be accessed via ice road when wetlands are frozen and covered by snow and ice. The majority of, if not all, gravel placement will occur during winter to minimize impacts to tundra, vegetation, and water quality. Gravel hauling will use ice roads from the mine site to the project area. This is a standard, demonstrably effective North Slope practice for gravel transportation, minimizing degradation to coastal lands and waters.

OSA has adopted the following mitigation measures for gravel mining operations:

- Gravel stockpiling is not proposed as part of the project. Gravel will be transported directly from the material site and placed on the permitted project footprint.
- Gravel material for project development will be sourced from one or more existing gravel mine sites, which will be permitted and operated independently of the project.
- Gravel roads and pads are located outside the ADNR 0.5-mile setback from the Colville River, to the extent practicable, minimizing potential impacts to the watershed and subsistence users in the project vicinity.
- Roads will have standard minimum thickness (5 feet) to protect underlying permafrost by insulating and maintaining stable permafrost conditions.
- Pads will have standard minimum thickness (6 feet) to protect underlying permafrost by insulating and maintaining stable permafrost conditions. Pads are at least 1 foot thicker than roads due to higher thermal loads associated with pads.
- The following engineering methods will be employed to minimize heat transfer from infrastructure on pads to the underlying permafrost:
 - In well conductors, the gap between the well conductor and inner pipe will be filled with polyurethane foam.
 - Thermosyphons will be installed adjacent to well rows and at-grade heated structures (e.g., the warehouse and cold storage).
 - Heated at-grade structures will be constructed with 4 to 8 inches of rigid insulation installed approximately 24 inches below the foundation/floor slabs.
 - Flare stack height will be selected to reduce ground-level radiant heat intensity to levels that will protect personnel, structures, and equipment as well as to avoid permafrost degradation (typically 1,500 British thermal units per hour per square foot [btu/hr/ft²]).
- Gravel roads provide all-season access to parallel export and import pipelines and infield pipelines for visual inspection and for routine and emergency maintenance and repairs. This also reduces the need for tundra travel associated with these activities. Roads and pipelines will be located within 1,000 feet of each other where feasible.

NSB Response: All bridges and roadways should be engineered not to impact shoreline dynamics and minimize environmental degradation of coastal lands and waters.

F. Does the project avoid placement of structures in floodplains subject to a 50-year recurrence level and in geological hazard areas? Or has applicant demonstrated that no feasible and prudent alternatives exist? NSBMC § 19.70.050(J)(3)(j).

Response: OSA plans to construct bridges over the Miluveach and Kachemach Rivers. Both bridges are designed to maintain adequate freeboard.

OSA has adopted the following mitigation measures to avoid placement of structures in floodplains and keep structures away from geological hazard areas:

- Drill sites are located east of the Colville River and as far east as practicable, while still meeting the project's purpose and need to produce commercial quantities of crude oil from the target reservoirs. The location of drill sites avoids placement of surface facilities west of the East Channel of the Colville River (East Channel), which eliminates the need for associated transportation and pipeline infrastructure to access this area.
- Locating drill sites as far east as practicable from the Colville River minimizes the distance of gravel road and pipeline needed to tie into existing infrastructure.
- ND-C has been relocated to a suitable location outside the Colville River floodplain, minimizing placement of gravel within the floodplain.
- Project roads are located to reduce impacts to hydrology through minimization of the placement of gravel fill within the floodplain. In addition, the placement of the Miluveach River and Kachemach River bridges at narrow portions of those rivers minimizes placement of gravel fill in the floodplain and piers below ordinary high water.
- Bridge abutments will be designed using sheet piles to minimize the gravel fill footprint, road embankment erosion, and stream scour.
- OSA plans to construct five culverts at streams and concentrated drainages. Drainage culverts will be sited and designed to pass the 50-year flood event, with headwater elevation not exceeding the diameter of the culvert. Culverts will also facilitate water passage to maintain the existing hydrological flow. Prior to construction, an engineer will walk and slope-stake roads to determine the precise locations of drainage structures and determine on-site conditions for final layout.
- Fish passage culverts will be designed at stream crossings where ADF&G determines that fish are present, and design will be in accordance with ADF&G Title 16 fish passage standards. Flow velocities at culvert outlets will be analyzed, and outlet erosion control measures will be designed as necessary to prevent channel degradation.
- To maintain natural drainage patterns, cross-drainage culverts will be installed within the access and infield roads to reduce impoundment and allow conveyance of surface water flow that intersects the road. As a general guideline, cross-drainage culverts will be sited approximately every 500 feet along the alignment during initial design efforts, although exact placement of culverts will depend on actual in-field local drainage patterns.
- In accordance with permits, ice road crossings of designated streams and rivers will be slotted, breached, or weakened upon completion of use.

- Existing barge infrastructure at Oliktok Point will be used to avoid the need to construct new marine facilities to support sealift module delivery.
- No causeways, docks, artificial gravel islands, or bottom-founded structures will be constructed for the Project.
- Seasonal ice pads and roads will be used to support winter pipeline and gravel infrastructure construction, avoiding the need for additional fill to support construction.

NSB Response Development is required to be located, designed and maintained in a manner that prevents significant adverse impacts on fish and wildlife and their habitat, including water circulation and drainage patterns and coastal processes.

I. Will mining operations, including sand and gravel extraction, in the coastal areas be conducted in a manner that avoids environmental degradation of coastal lands and waters? NSBMC § 9.70.050(K)(1).

Response: Not applicable. Gravel will be purchased from a permitted gravel mine. No mining will occur on beaches, barrier islands, or offshore shoals.

NSB Response One objective is to prevent unnecessary or undue degradation of the lands and protect health. An estimated of 3 million cy of gravel will be needed to construct proposed project facilities. Clean gravel material for project development will be obtained from one or more of the existing mine sites, located on the North Slope in the vicinity of the project area. Likely sources include Mine Site F, owned and operated by the NSB, and /or the ASRC Mine Site. Both potential gravel sources are less than 15 miles from the NPF.

J. Will development be located, designed and maintained so as to prevent significant adverse impacts on fish and wildlife and their habitat, including water circulation and drainage patterns and coastal processes? NSBMC § 19.70.050(K)(2).

Response: Yes, OSA plans to construct two bridges and five culverts at stream crossings or concentrated drainages to facilitate water passage. The bridges are designed to withstand a 200-year flood. Drainage culverts will be sited and designed at streams and concentrated drainages to pass the 50-year flood event, with headwater elevation not exceeding the diameter of the culvert. OSA has adopted the following mitigation measures to prevent significant adverse impacts to fish and wildlife habitat, including drainage patterns:

- Fish passage culverts will be designed at stream crossings where ADF&G determine fish are present. Steel pipe culverts will be constructed in winter to avoid adverse impacts on fish, wildlife, water circulation, and drainage patterns. Multiple culverts will be installed during summer to allow compaction of gravel around the culverts. Fill slopes will be stabilized to prevent erosional impacts to aquatic environments. Culverts will be designed and installed using current engineering practices and ADF&G standards to promote fish passage.
- Based on stakeholder feedback, ND-B has been relocated approximately 3,200 feet east to a location southeast of Lake 9211, minimizing the ND-B access road and infield pipeline by approximately 0.7 mile.

- No processing of multiphase fluids will occur on the drillsites with the exception of fluids which are required for well testing for Alaska Oil and Gas Conservation Commission regulatory purposes.
- All on- and off-pad pipelines will be elevated above grade on VSMs to reduce impacts to permafrost.
- Road widths have been designed, in part, based on the weights and sizes of vehicles expected to travel on them. Access roads to the boat ramp and pump house pad will be constructed to a minimum 24-foot-wide surface to minimize gravel fill relative to the 32-foot-wide gravel access road and ND-A, ND-B, and ND-C infield roads.
- Gravel road footprints have been further minimized by using 2:1 side slopes instead of 3:1 side slopes, and by reducing the access and infield road widths to 32 feet at the surface.
- Pad and road layouts consider topography and maintenance of natural drainage patterns and avoid ponds, lakes, and streams, where possible, to minimize gravel requirements and water ponding, and maintain natural drainage patterns. Where natural drainage patterns are crossed, roads will be designed perpendicular to the general flow direction, to the extent practicable. Layout design also considers the effects of spring breakup and other flood events.
- In addition to minimum gravel thickness criteria, gravel facilities located within the floodplain will be built to more conservative elevations based on hydrologic conditions, including both open-water and ice-affected stage frequency conditions, to minimize potential effects on hydrology.
- Drill sites are oriented with the long axis parallel to the prevailing northeast/southwest wind direction to minimize snow drift and related maintenance activities, resulting in a minimization of potential effects on hydrology during spring breakup.
- Pads and roads will be designed to limit point sources of runoff to the surrounding tundra. Instead, both snowmelt and rain water on the pad will primarily seep directly through the gravel.
- Drill site locations are designed to minimize lengths of infield roads and pipelines, with considerations for hydrology, wetlands, and subsistence use.
- All drill sites are sized to minimize overall gravel requirements, while maintaining space for a sufficient number of well heads to meet the overall Project purpose. Well-head spacing has been reduced from 30 feet to 20 feet to further minimize drill site footprint.
- External corrosion inspections of pipelines will be conducted during winter and will be supported by approved tundra travel vehicles to avoid impacts associated with summer tundra travel. Regular ice road use will be limited to construction activities to minimize the need for annual withdrawal of water for ice road construction. Ice roads to support development drilling and operations are not planned for use on a regular basis.
- Drilling for VSMs will occur from an ice road, and drilling cuttings will be placed onto the ice around each VSM. The drilling cuttings will be removed once VSM installation is complete.
- Trenching will occur during winter, and all trenched materials will be temporarily placed onto an ice pad adjacent to the trench. Trenched materials will be taken off the ice pad and backfilled into the excavation once trenching is complete. This will avoid a discharge of fill material into wetlands.

- Where natural drainage patterns are crossed, roads will be designed perpendicular to the general flow direction to the extent practicable. All pipelines, HSMs, and suspended cables will be elevated at river crossings to maintain adequate freeboard.

NSB Response – All causeways are required to be sited and designed to allow free passage of fish, marine mammals, and molting birds with due consideration for migration patterns; to prevent changes in water circulation patterns that will have significant adverse impacts on fish and wildlife; and to ensure adequate sediment transport. The NSBCMP Atlas depicts the area as being in a caribou migratory route that may be impacted. Joint State/Federal and Local Agencies shall conduct additional studies concerning caribou migratory impacts from elevated pipelines needs to be done. Some information from the NSB Wildlife Department on caribou suggest migratory movements may be deflected or halted from getting to their original areas, that these animals are also expected by subsistence users.

K. Will resource extraction support facilities, including administration offices, operations, residence, and other uses not absolutely required in the field be located in a designated service base which is sited, designed, constructed and maintained to be as compact as possible and to share facilities to the maximum extent possible? NSBMC § 19.70.050(K)(3).

Response: Yes. The NOP will include facilities to support field-wide operations. To the extent practicable, facilities will be located in a designated service base.

NSB Response: Pipelines, roads and structures will be designed as compact as possible.

N. Will transportation facilities and utilities be consolidated to the maximum extent possible? NSBMC § 19.70.050(K)(6).

Response: Yes. Transportation facilities and utilities have been consolidated to the maximum extent possible. Connection to the existing gravel road system eliminates the need for a Project-specific airstrip. Drill sites have been located as far east as practicable from the Colville River, which will minimize the length of gravel road and pipeline needed to tie into existing infrastructure.

NSB Response: the roads and other transportation infrastructure is designed to be consolidated

O. Will development be located, designed and maintained in a manner that does not interfere with the use of a site that is important for significant cultural uses or essential for transportation to a subsistence use area? NSBMC § 19.70.050(K)(8).

Response: Prior to any exploration or development project, OSA retains the services of professional archaeologists and cultural anthropologists to identify and/or confirm the location(s) of documented Traditional Land Use areas and cultural artifacts within the proposed Project area. OSA obtained a Certificate of TLUI Clearance from the NSB in June 2019. OSA will not limit the use/crossing of facilities for subsistence use by subsistence users. OSA will also construct three subsistence pullouts so hunters may park vehicles along the

road system while they hunt. These pullouts will include ramps to facilitate access to essential subsistence use areas.

NSB Response: we are learning new details today about road use by local nuiqsut residents- when properly balanced provides for enhanced access- and increases access points. New studies are encouraged to look at the use of industrial roads that balance reasonable access to subsistence resources. Mitigation measures will be taken into consideration and will be suitable to the Community of Nuiqsut.

P. Will siting, design, construction and maintenance of transportation of utility facilities (including ice roads) minimize alteration of shorelines, water courses, wetlands, tidal marshes? NSBMC § 19.70.050 (L)(2).

Response: OSA has designed the Nanushuk Project to have as little gravel fill as possible, resulting in minimal impacts to wetlands. OSA has placed the drill sites as far east of the Colville River as practicable to avoid placement of surface facilities west of the East Channel of the Colville River. OSA will be connecting into the existing road system, allowing the use of the existing Deadhorse Airport to support field logistics and eliminating the need for a new Project-specific airstrip. The existing barge infrastructure at Oliktok Point will be used to avoid the need to construct new marine facilities to support sealift module delivery.

Project road width has been reduced to the extent possible to minimize gravel fill. Gravel roads will be constructed to be 24 feet (approximately 44 feet at the base) to 32 feet (approximately 52 feet at the base) wide at the surface, but may be wider at curves to accommodate larger module transport.

Seasonal ice pads and roads will be used to support winter pipeline and gravel infrastructure construction, avoiding the need for additional fill to support construction.

Drilling for VSMs will occur from an ice road, and drilling cuttings will be sidecast onto the ice around each VSM, avoiding a discharge of fill material into wetlands and/or waters of the U.S. (WOUS), since the sidecasting will not change the bottom elevation of a wetlands and/or WOUS or replace any portion of a WOUS with dry ground. The drilling cuttings will be removed once VSM installation is complete.

Trenching will occur during winter, and all trenched materials will be temporarily sidecast onto an ice pad adjacent to the trench. Trenched materials will be taken off the ice pad and backfilled into the excavation once trenching is complete. This will avoid a discharge of fill material into wetlands and/or WOUS from the sidecast.

NSB Response: the project is in accord with the policy

Q. Will siting, design, construction and maintenance of transportation and utility facilities (including ice roads) minimize significant disturbance to important habitats and avoid critical fish migration periods? NSBMC § 19.70.050(L)(2).

Response: Yes, OSA has designed the Project to minimize disturbance to important habitats. Drill sites will be located as far east of the East Channel of the Colville River as practicable. This will avoid placement of surface facilities, including associated transportation and pipeline infrastructure, west of the East Channel. The location of ND-C was within the floodplain in OSA's original permit application submitted to USACE in 2015. Fish passage culverts will be designed to meet ADF&G Title 16 fish passage standards. Flow velocities at culvert outlets will be analyzed and designed with erosion control measures, as necessary, to prevent channel degradation. Pending commercial agreements and availability of supply, make-up water will be purchased from a third party to minimize the use of local freshwater sources. Bridge abutments will be designed using sheet piles to minimize gravel fill, road embankment erosion, and stream scour. Water withdrawals will be conducted in compliance with water withdrawal authorizations and fish habitat permit stipulations to maintain adequate water volumes in fish-bearing lakes.

Regular ice road use will be limited to construction activities to minimize the overall Project water withdrawal needed. Ice roads will not be used on an ongoing basis to support drilling and operations. Ice-road crossings of designated streams and rivers will be slotted, breached, or weakened upon completion of use in accordance with requirements to minimize impacts to fish, hydrology, and interrelated resources. Project facilities will be located to reduce impacts to hydrology and fish through minimization of the gravel fill footprint within 500 feet of fish-bearing water bodies, where practicable. There are 8 fish bearing waterbodies within 500 feet of Project infrastructure.

NSB Response to N, O, P and Q: The NSB recognizes OSA's efforts to minimize subsistence impact in the design of the infrastructure; however, NSB remains cautious that additional concerns or impacts related to displacement may not be adequately addressed.

*R. Will the project maintain the natural permafrost insulation quality of soils and vegetation?
NSBMC § 19.70.050(L)(3).*

Response: Engineering methods will be employed to minimize heat transfer from infrastructure on the pads to the underlying permafrost, including:

- Roads will have standard minimum thickness (5 feet minimum) to protect underlying permafrost by insulating and maintaining stable permafrost conditions.
- Pads will have standard minimum thickness (6 feet minimum) to protect underlying permafrost by insulating and maintaining stable permafrost conditions. Pads are at least 1 foot thicker than roads due to higher thermal loads associated with pads.
- All on- and off-pad pipelines will be elevated above grade on VSMs to reduce impacts to permafrost.

- Except for removal of snow and ice in excess of 4 inches from work areas, disturbance of the tundra, including vegetation and organic cover, will be avoided during gravel placement to minimize impacts to permafrost.
- The following engineering methods will be employed to minimize heat transfer from infrastructure on pads to the underlying permafrost:
- In well conductors, the gap between the well conductor and inner pipe will be filled with polyurethane foam.
- Thermosyphons will be installed adjacent to well rows and at-grade heated structures (e.g., the warehouse and cold storage).
- Heated at-grade structures will be constructed with 4 to 8 inches of rigid insulation installed approximately 24 inches below the foundation/floor slabs.
- Flare stack height will be selected to reduce ground-level radiant heat intensity to levels that will protect personnel, structures, and equipment as well as to avoid permafrost degradation (typically 1,500 btu/hr/ft²).
- Ice roads will be routed and constructed to minimize impacts to sensitive vegetation (e.g., willow) per NSB requirements.
- Buried utility installations that are not covered by gravel fill (e.g., in roadways) will be revegetated using transplanted sprigs, cultivars, or seed either gathered on-site or otherwise obtained that match the native plant species that occur near the trenched area. Revegetation work shall be performed by the end of the first growing season following the utility installation. Revegetation will be monitored in subsequent growing seasons, and additional efforts will be performed until revegetation of the site is complete.
- Discharge of domestic treated wastewater to the tundra at the Project site is not planned during normal conditions. As a result, a number of impacts will be minimized, including
- Personnel will be required to stay on gravel or ice surfaces to minimize impacts to the tundra, unless their specific job duties require them to be on the tundra and the activity is properly permitted.
- Dust control measures will be implemented to reduce the incidence of dust on vegetation and snow.
- Snow removal management measures will be implemented to reduce the potential for gravel fill to be pushed off pads during snow removal.

NSB Response: the project design meets the policy

- S. *Will airports and helicopter pads be sited, designed, constructed and operating in a manner that minimizes impact on wildlife? NSBMC § 19.70.050(L)(4).*

Response: Yes, an airstrip will not be constructed as part of the Project. During construction, drilling, and operations, the commercial airport in Deadhorse, located approximately 52 miles away, will support air transport of Project personnel, small materials, and supplies to the North Slope. Personnel and materials flown into Deadhorse will be driven to the Project area via the existing road system and ice roads until the proposed gravel access road is completed.

The NOP includes space for a helipad. During construction, helicopters will be used to support ice road layout, survey, and summer cleanup efforts. These activities usually take place in July or early August and last approximately 4 weeks, with daily helicopter traffic. These operations will occur during migratory bird nesting, brood-rearing, molting, and fall-staging periods for most of the species in the Project area. The timing will not interfere with the breeding period, when birds are less focused on hazards. The extent of effect will be limited to the area where helicopter use is required and may affect a few individuals, but will not likely have population-level effects for any avian species in the Project area.

For terrestrial animals, noise-sensitive areas have been defined and include Nuiqsut, Helmericks homestead, and areas near the Project used by local residents seasonally for subsistence. The NSBMC Section 19.70.050(L)(5) requires that helicopter pads will be sited, designed, constructed, and operated to minimize their impact to wildlife.

OSA will participate in Nuiqsut summer helicopter conference calls to discuss reducing impacts on noise-sensitive areas during their summer routine operational periods. The conference calls will help OSA develop best management practices based on seasonal operational needs. OSA will use these best management practices to train pilots and personnel to reduce impacts to wildlife.

During operations over the life of the Project, helicopters may be used in the event of health or safety emergencies; however, routine helicopter use is not planned under normal operations, which will minimize noise and impacts related to aesthetics, wildlife, and subsistence.

NSB Response: helicopter pad will be sited, designed, constructed and operating in a manner that minimizes impact on wildlife and subsistence users.

- T. *Will pipelines be situated and sufficiently high (7 feet preferred, 5 feet required) to avoid interference with wildlife movement? (§ 19.70.050(L)(5))*

Response: Yes, all pipelines, HSMs, and suspended cables will be a minimum of 7 feet above the tundra surface, except where pipelines intersect a road or pad or tie into a facility.

NSB Response: Aboveground pipelines will be supported by VSMs and pipelines will be at least 7 feet above the tundra for most pipelines route.

U. Is the project sited, designed and constructed to minimize loss of life or property due to riverine flooding, icings, stream bank erosion, oceanic storms, sea waves, ice gouging and override and shore erosion? NSBMC § 19.70.050(L)(6)

Response: Yes, the import and export pipelines cross the Miluveach River and the ND-C pipelines cross the Kachemach River. The pipeline crossings may require placement of VSMs below ordinary high water. All bridge and pipeline river crossings will be elevated to maintain adequate freeboard. VSMs placed within known floodplains will be designed to withstand the effects of scour, bank migration, and forces from ice floe impacts. As with other rivers on the North Slope, the Miluveach and Kachemach Rivers reach their peak annual flow rate during spring breakup, when the area is inundated with snowmelt run-off from the drainage basin¹. Observations made in 2010² and 2011³ indicate that ice breaks up and moves down the river channel in a typical breakup scenario. During winter, both rivers most likely freeze to the bottom for their entire lengths ⁴. Site-specific data such as direct discharge, peak discharge, and bathymetric cross-sections are described further in the 2015 Colville River Delta Spring Breakup Report. This data was used in the design elements of the two bridge structures and two pipeline river crossings to minimize erosion and flooding during normal and peak seasonal flow.

NSB Response: the project is sited, designed and constructed to minimize loss of life or property due to riverine flooding, icings, stream bank erosion. The project components, are designed to be well past the 50-year recurrence factor and exceeds the policy.

8. Reclamation: Will residential development associated with industrial and resource extraction development be removed and the area rehabilitated to standards consistent with the NSB Coastal Management Program when the industrial or extractive use is completed unless removal is more environmentally harmful than not removing it? NSBMC § 19.70.50(I)(10).

Response: Yes, the NOP will include facilities to support field-wide operations and an operations camp to house operations and maintenance personnel. Site closure, upon completion of production activities, will be conducted in accordance with federal and state leases and permits. Site closure will meet the requirements of the Pikka Unit Approval, general requirements in the ADNDR Division of Oil and Gas North Slope Areawide Lease Mitigation Measures, requirements stipulated by the NSB as part of the development permit, and other permit conditions and stipulations required by state and federal agencies with regulatory authority over the Project.

At the conclusion of production, abandonment of Project facilities will be conducted in accordance with ADNDR Division of Oil and Gas North Slope Areawide Lease Mitigation measures and in compliance with all permit and lease requirements.

NSB Response: agree- however discussion about reclamation should be discussed 12-months prior to the cessation of permitted activities with the NSB.

STAFF RECOMMENDATION:

Staff recommendations are intended for the Planning Commission's review for the proposal and to help inform prior to the Public Hearing.

Staff believes OSA's proposed development has met the approval criteria for this development and recommends that the Planning Commission recommend approval of this rezoning to the Assembly, subject to the Stipulations and Mitigation Measures listed below. Additional stipulations maybe added by the Planning Commission, if not already addressed in this memorandum.

STIPULATIONS AND MITIGATION MEASURES:

1. Oil Search (Alaska) LLC shall contribute to the NSB Mitigation Fund Advisory at fifty thousand dollars \$50,000.00 annually.
 - a. Study designs will be discussed and coordinated with the NSB Department of Wildlife Management (DWM) for submittal to the NSB by 1 March 2020 and each year thereafter as necessary. The DWM and Planning will review, seek revisions as appropriate, and approve the study designs by 1 April 2020 and each year thereafter as necessary.
 - b. An annual report will be prepared and distributed to NSB Wildlife Management and Planning departments by 15 February and a meeting scheduled with NSB Wildlife Management and Planning, to occur by 1 April. This meeting will discuss the results and the potential need for adjustments to scope to assess possible impacts to caribou, waterbirds, fish, and subsistence users. The Land Management Administrator and Director of the Department of Wildlife Management will make the final decision of whether study designs need to be altered and/or additional data collection or analyses are required.
 - c. Oil Search Alaska (OSA) will consult with KSOP on study design prior to submittal to the NSB and provide KSOP with annual reports.
 - d. OSA will make data available from their studies annually to the NSB Willdife Management and within a year of completion of the study to the general public through a

data archive (e.g., UAF's Geographical Information Network of Alaska [GINA], Alaska Ocean Observing System [AOOS], etc.).

- e. OSA will provide the DWM with reports from studies (wildlife, habitat, erosion etc.) required by other agencies involved in permitting lands associated with Nanushuk Development Project.
- f. To the extent practicable, OSA and its contractors will minimize flights by hiring local boat drivers, snow machine drivers, and allowing their contractors to camp at a study site.
- g. To the extent practicable, OSA will involve students from Nuiqsut (or other North Slope communities if no students are available from Nuiqsut) in their studies.

2. Caribou

OSA will fund a caribou study to analyze the distribution and movements of caribou around the eastern Colville River Delta and adjacent areas to assess habitat relationships and possible impacts from development.

- a. OSA will fund a third party contractor to :
 1. characterize pre-construction caribou movements utilizing historic telemetry data
 2. assist ADF&G in the collection of GPS telemetry data (e.g. potential purchase of additional caribou collars or database management etc.)
 3. determine caribou pre- and post-construction movement rates in relation to roads pipelines and pads associated with their project.
 4. Characterize habitat conditions (e.g. snow melt, vegetation habitat, plant biomass, infrastructure etc.) within the study area using best available technology.
 5. Evaluate these indices of habitat conditions, with particular attention to possible impacts from development, on the distribution of caribou utilizing the study area.

3. Waterbirds

A considerable amount of information has been collected by the oil and gas industry concerning impacts to waterbirds on the North Slope. That information has not been comprehensively summarized in a useful way for the development and implementation of appropriate mitigation measures. Thus, OSA and its contractor will conduct a review of existing information on impacts to nesting and brood rearing waterbirds from oil and gas development and activities.

4. Fish

Fish studies required by these stipulations will be conducted by a third party. These studies will provide baseline data in order to help detect possible impacts, mitigate impacts, or conduct a damage assessment in the event of oil spills and/or release of oil-related products. Potential impacts are not restricted to population level effects.

- a. OSA will supplement on-going studies conducted by ConocoPhillips of the Nuiqsut fall fishery to fill data gaps and to help detect potential project related impacts on fish and the subsistence fishery on the Colville River and water bodies associated with OSA infrastructure
- b. OSA will conduct studies during the open water and overwintering seasons by collecting data on fish (distribution, relative abundance, species composition, age, diet) and their habitat (temperature, salinity, turbidity, currents). These studies will be conducted on the east channel of the Colville River near production pads and will extend to where the channel flows into marine waters at the mouth of the Colville River. This study will be conducted for three years after which DWM staff and OSA will assess whether the study provides sufficient data to detect potential impacts of project related activities. If data are not sufficient, additional studies may be required.
- c. Fish detected with water mold (or other newly emerging infections) in both the Nuiqsut Fall Fishery and in areas associated with OSA influence will be recorded, collected, and reported to the DWM.

5. Water Quality

- A. OSA will collect data on water quality and hydrology to help detect potential project related impacts on fish and the subsistence fishery:
 1. Water monitoring (temperature, salinity, turbidity, currents, and contaminants) will occur during the open water season in the Colville River and streams associated with OSA infrastructure. OSA facilities are in close proximity to the Colville River and if an oil spill and/or oil-related product release occurs, information on sheetflooding, seasonal river discharge, and drainage and water parameters will be essential to assess and mitigate the impacts of a spill. This study will be conducted for three years after which DWM staff and OSA will assess whether the study provides sufficient data to detect potential impacts of project related activities. If data are not sufficient, additional studies may be required.
 2. Bridges and culverts will be inspected and photographically documented at a range of different water levels. Impoundment of water adjacent to facilities

and roads will be documented and used to assess pre- vs. post- construction conditions.

6. Subsistence

A.OSA will fund a contractor to design and conduct a subsistence study that investigates the effects of their development activities and associated infrastructure to subsistence hunters from Nuiqsut. The third party contractor will be chosen in consultation with the DWM and Planning. The study should focus on all OSA facilities adjacent to the Colville River that are subject to this re-zone. The project should at a minimum:

- i. Examine possible effects from OSA developments and activities to subsistence activities
- ii. Document hunter concerns and opinions about impacts from the OSA facilities and activities

7. Cumulative Effects

OSA will fund a contractor to design and conduct a cumulative impact study. This study will take into account the progress made as outlined in the ConocoPhillips white paper on cumulative effects as stipulated in the North Slope Borough Ordinance Serial No. 75-06-72, generally known as Greater Moose's Tooth Two (GMT2). The Oil Search study will take results, lessons learned, and methods developed, especially new quantitative and qualitative approaches, from this white paper and apply it to a topic(s) that will be mutually agreed upon (see general provisions above) by OSA and NSB-DWM within four months after the ConocoPhillips white paper has been completed. The OSA cumulative impact project will then be completed within two years.

cc: NSB Planning Commission
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Files

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