MINE SITE C
REHABILITATION PLAN
REV 1

Prepared for:

ConocoPhillips Alaska Inc.

700 G St #1950
Anchorage, AK
(907) 276-1215

Prepared by:

PND ENGINEERS, INC.
1506 West 36th Avenue
Anchorage, Alaska 99503
(907) 561-1011

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Introduction

Purpose

Expansion of the existing Mine Site C is required to supply gravel fill material for future development and operational requirements within the Kuparuk River Unit. The purpose of this document is to establish an integrated mining and rehabilitation plan for excavation of material from within the mine site expansion area. This revised plan will adhere to the previously approved rehabilitation features to the maximum extent possible. This plan also provides revisions to the formerly proposed rehabilitation activities to include interim reclamation and rehabilitation activities prior to final closure and rehabilitation of the mine site.

Site Description

Mine Site C is located in the Kuparuk River Unit, on the North Slope of Alaska. Prior to mining, the location consisted of a large sedge-lined lake (Pothole Lake) and tundra typical of the Kuparuk River region. Approximately one third of Pothole Lake remains to the south of the mine site and is separated by an overburden dike. The northern portion of the mine has been repurposed as the fresh water reservoir supplying the Kuparuk Operations Center (KOC) and is separated from the adjacent portions of the mine by an overburden dike. Directly to the east is KOC; only an access road to Drill Site E separates the two facilities. A buffer of approximately 300 feet separates the west edge of the mine site from the Ugnuravik River, which flows north to the Arctic Ocean.

The proposed expansion cell is located due south of the existing mine site. The expansion cell is approximately 125 acres; the existing mine area is 155 acres.

Access to the site is from the northeast corner and continues along the eastern edge of the mine site. Previous material extraction has been optimized by maintaining a deep pit with steep side slopes. Previous development of the mine site has progressed from north to south and future development is expected to continue in this manner.

Lakes and adjacent habitat in the general area are known to be used by shorebirds such as plovers, sandpipers, and phalaropes. Waterfowl such as brant, white-fronted geese, pintail, long tailed duck, king eider, and pacific loon are also present in the region during summer months. This rehabilitation plan provides for the creation of waterfowl and shorebird habitat similar to those available in the surrounding area.

Background

ConocoPhillips Alaska Inc. (CPAI) first obtained the required permits to extract gravel from Mine Site C in 1979. Mining operations under the initial permit produced two pits north of the present mine site. Currently these pits are segregated from the remainder of the Mine Site C by an overburden dike. The northernmost pit is used as a water reservoir for KOC. The pit just south of the KOC reservoir contains overburden stockpiles from subsequent mine developments, which will later be referred to as the northeast interim reclamation area.

CPAI obtained the required permits for expanding Mine Site C to the northern edge of Pothole Lake in 1981. CPAI obtained a permit modification in 1984 allowing the expansion of the site into Pothole Lake. In 1996 and again in 2006, CPAI applied for and was granted additional permit modifications to extend the duration of gravel extraction activities from Mine Site C. This revised rehabilitation plan is based on the same objectives and general approach as the existing plan (submitted in 2007), authored by Lounsbury & Associates Inc. and ABR Inc., but with consideration for the expanded mine footprint.

Limitations

This revised rehabilitation plan assumes that Mine Site C will not be expanded beyond the proposed permit boundary. Final rehabilitation features will depend on the final configuration and the availability of overburden materials, which are not completely known at this time. A final survey of mine site topography and water levels will be performed prior to implementation of the rehabilitation plan to ensure that the plan is feasible with the final mine configuration. If final available overburden quantities differ from current estimates or it becomes desirable to expand this site or use the site in an alternative manner, the rehabilitation plan will again be reviewed and revised to ensure continued applicability.

Excavation Overview

Goals

Minimizing environmental impact and protecting worker health and safety during construction and mining is of the highest priority in this plan. The layout of the proposed mine expansion aims to maximize access to the most suitable construction materials while minimizing horizontal disturbance to the surface. Gravel extraction is optimized based on analysis of the "Greater Kuparuk Area Materials Exploration" geotechnical exploration report released September 6, 2012 by Golder Associates Inc.

General Description of Work

Excavation of gravel will occur solely within the permitted Mine Site C footprint. The proposed expansion area is covered by a layer of organic overburden; this layer is thin (less than 1 foot) outside the perimeter of Pothole Lake. Below the organic layer is an inorganic overburden layer ranging from 6 to 17 feet thick. It is expected that removal of overburden and mining of the gravel will proceed as material is needed. The mine site excavation is expected to take place in three separate removal activities, (1) removal of organic materials; (2) removal of inorganic overburden, and (3) removal of suitable gravel material (likely in two lifts). The organic overburden materials will be stockpiled separately from the inorganic overburden material. The perimeter side slopes within the expansion cell will be graded at a 3H:1V slope during excavation.

It is anticipated that approximately 2,180,000 in-situ cubic yards of overburden material will be removed from the entire extent of the proposed expanded mine site area. The organic materials will be stripped and stockpiled for use in rehabilitation of Mine Site C and/or other rehabilitation projects within the Kuparuk River Unit. The inorganic overburden will be excavated and placed directly within the currently exhausted portion of Mine Site C. It is estimated that a total of 6,000,000 in-situ cubic yards of gravel exists within the proposed expansion area, which will be used as needed during development of future

projects.

Rehabilitation Plan

Goals

The goal of this revised rehabilitation plan is to adhere to previously approved rehabilitation features to the maximum extent possible. Where the previously developed rehabilitation plan cannot feasibly be followed, the plan was amended to optimize the creation of a diversity of wildlife habitats.

The rehabilitation plan will minimize tundra impact by placing newly excavated overburden along the edges of the current mine site in areas where mining is no longer occurring. As the new expansion area is mined, the overburden will continue to be placed in this manner, thereby working toward final rehabilitation goals and reducing double handling and future disturbance of placed materials.

General Description of Work

Rehabilitation of the existing mine site has already begun with the placement of overburden from previous mining operations into the northeast corner of the mine site (northeast interim reclamation area). The overburden removed from the expansion area will be placed primarily along the northwest edge of the current mine site. Overburden will also be used to create water diversion dikes around the perimeter of the mine expansion. These dikes will safeguard the stability of the mine walls during mine operation and will be removed to within one foot of original ground surface elevation upon final closure. The removed dike material will be used in finish grading of the rehabilitated mine (shallow areas, islands, etc.).

At final closeout, the rehabilitated mine site will include both shallow littoral areas and deep-water habitat. The shallow littoral area will be formed by shaping the surface of the overburden material along the northern borders of the mine. The edge of the littoral shelf will be contoured irregularly and sloped at a 3H:1V to the mine floor providing the transition to deep-water habitat. Nesting islands will be constructed on the littoral shelves.

Design Elements

Northeast Interim Reclamation Area

An interim reclamation effort will be conducted at the existing overburden stockpile area (in the northeast corner of the mine site, see Figure 1). The eastern portion of the stockpile, adjacent to the mine site access road, is used as a snow dump area during winter months. As the snow melts, runoff flows to the west down the overburden slope causing erosion and deep channel cutting before the water collects in a pond at the base of the slope.

The interim reclamation work will include regrading the existing slope of the northeast overburden pile with terraces and constructing defined drainage pathways that utilize geotextile fabric and screened rock. This is intended to reduce erosion in this area from runoff associated with the adjacent snow dump. The overburden already in place will be regraded, and additional material will be imported from

the proposed mine site expansion as needed. To promote slope stability and enhance habitat value for wildlife, plant cultivation treatments will be applied as described in the revised revegetation plan for the site (Appendix).

The dike separating the northeast interim reclamation area from the existing mine site currently ranges in height from 5 to 8 feet above BPMSL. The dike will be built up to approximately 15 feet above BPMSL to provide further separation between the active mine site and wildlife area, and also increase water holding capacity in the pond. The additional water available in the pond will be beneficial to the Kuparuk field as it is a deep water source that is road accessible. The current Temporary Water Use Authorization (A2014-41) will be amended to account for the increased volume once the construction is completed.

Settlement

All areas of overburden placement will be subject to thaw and associated settlement. The degree of settlement is expected to be highly variable and dependent on several factors, including material gradation, ice content of the overburden, and submerged depth.

The settlement for the littoral shelf based on water content of the overburden is estimated to be approximately 50% of the depth of material that thaws, or 3–5 feet. To account for this settlement, the littoral shelf will initially be overbuilt to elevation approximately 54 feet above BPMSL (BP Mean Sea Level). The intent is to provide a final water depth, after settlement, of between one and three feet.

Water Recharge and Overflow

Mining operations within Mine Site C are planned to continue for approximately twenty years and will occur in phases as gravel materials are needed. As the mine expansion progresses, inorganic overburden will be stripped and constructed into a dike that surrounds the perimeter of the active mine site.

The water diversion dikes are intended to prevent surface water flow into the mine. Prior to final mine closure, water levels will be maintained at less than +15 feet BPMSL via pumping as needed for mine access and operation. During the period after active water level maintenance and prior to full recharge, minor erosion may occur along the walls of the mine site; however this erosion will stabilize once the mine site has been fully recharged.

Once the water elevation within the mine reaches the final rehabilitation design recharge elevation (approx. +53 feet BPMSL), the water diversion dikes will be removed to within 1 foot of tundra elevation. A hydraulic connection will be provided between the deep water area of the mine site and the KOC water reservoir once operations at KOC are complete and a potable water source is no longer required.

Littoral Zone

During final rehabilitation, overburden placed in the northern portion of the site during the life of the mine will be worked and shaped to form a shallow littoral area. The amount of shallow water habitat will be limited by the amount of inorganic overburden available from the mine activities. The terraces and slopes created during the interim reclamation effort should have established vegetation by this

time, which will provide added stability to the shallow littoral areas after the mine site is flooded. Deeper terraces and slopes will provide varying habitats at depth.

An additional littoral area will be constructed in the southwest corner of the proposed expansion area, using material from overburden stockpile near the Kuparuk Industrial Center (KIC) estimated at 175,000 cubic yards. The water depth in these littoral areas will range from zero to three feet deep, providing suitable habitat for emergent aquatic vegetation.

Islands

Several nesting islands for waterfowl, ranging in size from 300 square feet to one acre, will be constructed within the shallow littoral area. These islands will provide nesting areas for birds. The tops of the islands will be 2-3 feet above the water surface, and their side slopes will be sloped at approximately 10H:1V to allow birds easy access. Islands will be at least 30 feet from the shoreline, to provide protection from terrestrial predators (e.g. foxes).

Deep Lake

The area of the final deep-water habitat is expected to be approximately 230 acres in total (including the existing mine area) with the final water level elevation approximately 53 feet. The maximum depth of the lake is expected to be approximately 48 feet, with the majority of the area greater than 30 feet in depth. Overburden material will be used to ensure all mine site slopes are a maximum of 3H:1V.

Material Sources

Overburden removed during mining operations will provide most of the rehabilitation materials. An existing overburden stockpile located at KIC will also be used for the mine site rehabilitation as needed.

Dikes

Material from the existing dikes that surround the mine site will be removed and the dike material used for restoration grading. The volume of dike material is expected to be approximately 165,000 cubic yards. A portion of the dike separating the mine site from the KOC water reservoir will be removed to hydraulically connect the water bodies and maintain the desired water level.

Access Roads

The access road into the mine site paralleling the eastern edge of the site will be relocated to provide access to the expansion area. Any excess material will be used for slope stabilization and island construction at closure of the mine.

KIC Overburden Stockpile

There is currently a stockpile of overburden material near the Kuparuk Industrial Center estimated at 175,000 cubic yards. This material is planned to be used in the final rehabilitation of Mine Site C.

Water Level Maintenance

As long as Mine Site C is in operation, the water level in the mine will be maintained below approximately +15.0 feet BPMSL by pumping. This is necessary to prevent movement of water into the

active mine areas and to prevent potential contamination of the KOC water reservoir. The dike separating the mine site from the water reservoir will remain in place until the reservoir is no longer needed to provide water for the KOC facilities. Final rehabilitation, after closure of the mine and KOC facilities, will include the installation of a weir into this dike to maintain the desired final water level, allowing water from the Ugnuravik River to flood into and hydraulically connect to the deep water habitat of the rehabilitated mine site.

Rehabilitation Schedule

Current plans for the operation and maintenance of the facilities in the Kuparuk River Unit call for Mine Site C to be active for not less than 20 years. Planned future oil field development could also depend on gravel from Mine Site C. Final site rehabilitation will commence when additional gravel needs for construction activities in the Kuparuk area are no longer anticipated. A complete rehabilitation schedule and final rehabilitation plan will be submitted at that time.

To the extent practical, interim rehabilitation activities will occur during the operation of the mine. Examples (described above) include regrading the northeast interim reclamation area and placing overburden along the northwest edge of the mine to begin construction of the shallow littoral areas. These interim efforts will minimize double handling of materials, as well as reduce rehabilitation time and costs.

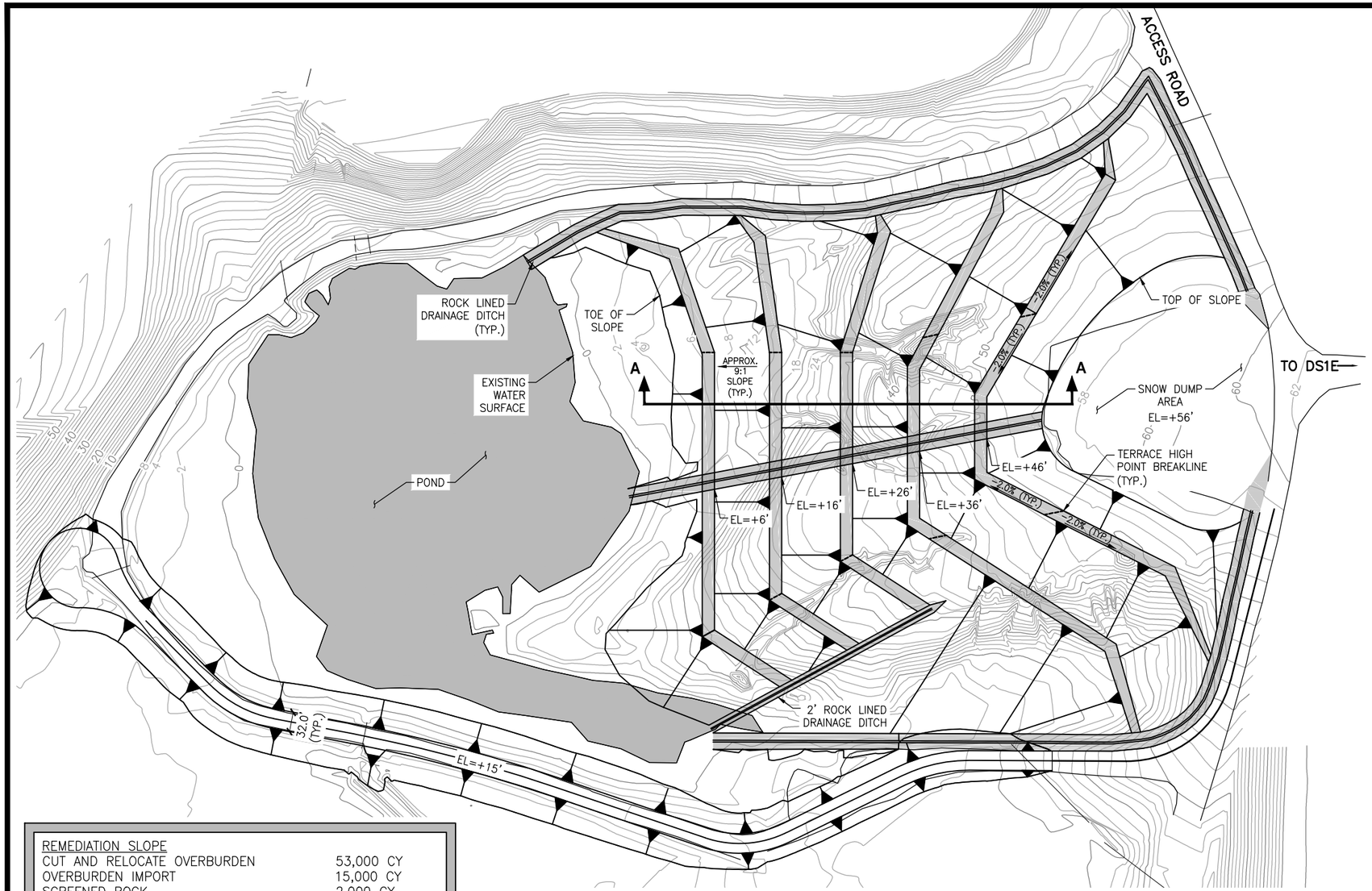
Rehabilitation Monitoring

Rehabilitation Construction

A CPAI representative with knowledge of the rehabilitation intent will monitor the construction of the rehabilitation features. The individual will explain the plan to the construction supervisor, and monitor the rehabilitation efforts. Additionally, the filling process will be visually monitored for scour and erosion.

Post Construction

A CPAI representative will monitor the rehabilitated site for two years after final rehabilitation activities are completed and the site has filled with water to the desired elevation.

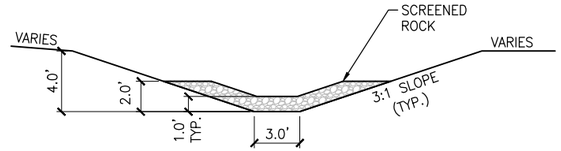


PLAN

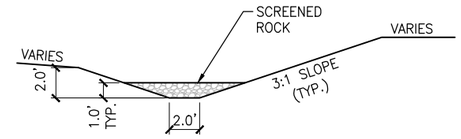
NOTE:
SURFACE CONTOURS SHOWN AT 2' INTERVALS

SCALE IN FEET
100 0 100 200 300

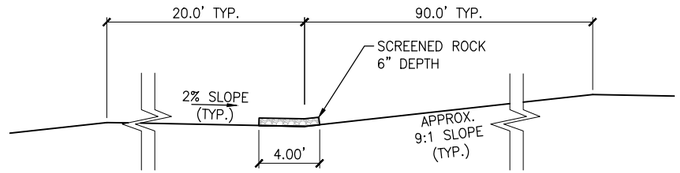
REMEDIATION SLOPE		
CUT AND RELOCATE OVERBURDEN		53,000 CY
OVERBURDEN IMPORT		15,000 CY
SCREENED ROCK		2,000 CY
GEOTEXTILE FABRIC		117,500 SQ.FT.
DIKE VOLUMES		
OVERBURDEN	(TO ELEV 11')	34,500 CY
GRAVEL	(4' CAP TO ELEV 15')	13,500 CY
WATER VOLUMES		
WATER	(TO ELEV 13')	79 MIL GAL
WATER	(TO ELEV 7')	41.5 MIL GAL
USABLE	(80% OF WATER TO 7')	33.2 MIL GAL



TYPICAL ROCK LINED DRAINAGE DITCH

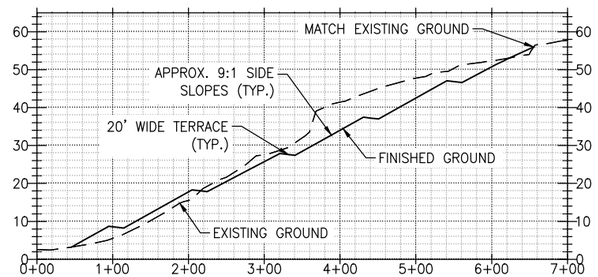


2' ROCK LINED DRAINAGE DITCH



TYPICAL TERRACE

NOTE:
TERRACES ARE CROSS-SLOPED AT APPROX. 2.0% TO DRAIN TOWARDS DITCHES.



SECTION A-A
SCALE 1H:5V

REV	DATE	DESCRIPTION

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D
ENGINEERS, INC.

PROJECT:
MINE SITE C - NORTHEAST INTERIM RECLAMATION AREA

TITLE:
PLAN AND PROFILE
FIGURE 1

DESIGNED BY:	JYG	DATE:	12/5/14
CHECKED BY:	DST	PROJECT NO:	131094

SHEET NO: 1 OF 1