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January 23, 2017

Department of the Army
U.S. Army Engineer District, Alaska
Regulatory Division
P.O. Box 6898
JBER, Alaska 99506-0898

Attn.: Ms. Leslie Tose,
Project Manager

Re: Request for Modification of Permit to authorize gravel mining operations and enhancement activities within all of the designated Phase 3 area of the ASRC Colville Consolidated Use Gravel Pit. POA-1996-869. Colville River. T10N R5E, Sections 10, 11, 14, 15, 23. Umiat Meridian. North Slope.

This letter is a request to modify the currently active DA permit POA-1996-869, in order to authorize gravel mining and enhancement activities for the winter season beginning in 2018 within all of the Phase 3 permit area of the ASRC Colville Consolidated Use Gravel Pit. This will be the11th modification of the permit. The Phase 3 gravel mining area contains about 430 acres that is known to be underlain with mineable quantities of sand and gravel material. The estimated volume of the sand and gravel in the Phase 3 area is about 15 million cubic yards. It is anticipated that mining of all sand and gravel in the Phase 3 area may take ten winter operating seasons over a decade or longer to complete. This requested minor permit modification would be the eleventh modification of the original DA permit that was issued on June 23, 1997.

Proposed Activities

The proposed activities of mining up to about 15 million cubic yards of sand and gravel material will begin in the winter operating season of 2018 and continue during subsequent winter operating seasons until the sand and gravel deposit within Phase 3 is depleted. Enhancement activities will be done during the winter operation seasons.

At the start of each gravel mining operation both the overburden and gravel layers will be loosened by blasting prior to being excavated and removed. The gravel excavation activities will require the temporary stockpiling on ice pads of organic rich overburden material. After gravel excavation activities are completed the organic rich overburden will be backfilled into the excavated gravel pit prior to spring break up. The backfilled overburden will be used to construct the enhancements of waterfowl islands and shallow littoral habitat within the gravel pit area. After the excavation and backfilling is completed for each gravel pit, both the pit and the shallow littoral areas will naturally fill

with seasonal snowmelt and rainwater, and/or with water from the Colville River during spring break up flooding. All gravel mining activities, temporary overburden storage on ice pads, and overburden backfilling will occur during the winter season, and will be completed prior to the spring break up.

The sand and gravel mining and enhancement activities will be performed in accordance with the typical examples of a gravel excavation cell and mitigation enhancements shown on the attached project plans dated January 2017.

For beneficial reclamation purposes the proposed work will also include the backfilling into the gravel pits of clean organic rich and mineral soil materials to be obtained from activities at various locations in the Colville River delta area and vicinity, and from northeastern NPR-A.

Proposed Use of Sand and Gravel Material.

The use of the sand and gravel material excavated from the proposed gravel pit in the Phase 3 permit area will be for both private and public projects in the area.

Minor Permit Modification

Gravel mining and reclamation activities within the Phase 2 and Phase 3 permit areas received full public and agency review in 2012 and 2013. DA permit modifications were issued for sand and gravel mining and reclamation activities within the Phase 2 permit area on September 12, 2013 (modification #4), on September 16, 2013 (modification #5), and issued for sand and gravel mining and enhancement activities within the Phase 3 permit area on November 1, 2016 (modification #10).

The following is a list of the Corps public notice for permit, and the federal agency, state and borough approvals, that have been issued for gravel mining and enhancement activities within the Phase 3 permit area of the ASRC Colville Consolidated Use Gravel Pit:

- Corps Public Notice for Permit, POA-1996-869-M4. June 6, 2012. Revised June 11, 2012.
- ADEC Section 401 Certification, POA-1996-869. Original issued on August 15, 2012. Reissued on November 3, 2016.
- DNR SHPO, POA-1996-869. August 7, and July 6, 2012.
- USFWS, Section 7 consultation. POA-1996-869. March 4, 2013.
- North Slope Borough Permit 13-329, for POA-1996-869. Feb. 22, 2013.

Wetlands Functional Assessment:

- ASRC Gravel Mine Wetlands Functional Assessment, for POA-1996-869. April 16, 2013.

The Permittee Responsible Mitigation Plan for the Phase 3 area describes the enhancement work and the wetlands debits and credits that will result from the proposed gravel mining and enhancement activities within the Phase 3 area. A copy of the Permittee Responsible Mitigation Plan for the Phase 3 area is attached.

The following list of operational, management practices, enhancement activities and permit compliance reporting are consistent with the Project Description of May 1, 2012, the Public Notice of Permit for POA-1996-869 dated June 6, 2012, the special conditions of the currently permitted

activities in the Phase 3 area under DA permit modification #10, and the Permittee Responsible Mitigation Plan for the Phase 3 area that is being submitted with this permit modification application.

- A 500-foot wide buffer zone from the proposed material site mining area to the Colville River will be maintained free of development activities, including temporary stockpiling of overburden, excepting ice roads.

- All temporary stockpiled material placed on the tundra during the winter operating season will be placed on an ice pad and removed prior to spring break up.

- To avoid disturbances to spectacled eiders, excavation and high-noise activities such as blasting will be avoided during pre-nesting and nesting seasons (20 May through 1 August). No gravel mining activities are proposed to occur after spring break up. However, if project activities must be conducted after spring break up and during the nesting season, a U.S. Fish and Wildlife approved nest survey will be conducted to confirm the absence of nests in or within 600 feet (200 meters) of the project footprint.

- There will be no summer storage of overburden within the Phase 3 area unless there is an unanticipated natural event (act of nature) which requires site evacuation prior to completion of the year's winter season mining activities in case of a natural act-of-nature event such as river flooding, that causes untimely demobilization during the operating season. A normal sequence of wetland enhancement activities will resume as soon as is practicable. The demobilization will be reported in the annual report. Corrective actions for revegetation of the tundra under the ice pad may be required if tundra vegetation mortality exceeds 5 percent or more of the stockpile footprint. Corrective actions may include clean-up of substrate, seeding, fertilizing, or other activities.

- The top 12-18 inches of primarily organic overburden containing tundra rhizomes shall be stockpiled separately from other overburden and used as the top layer ('seed' layer) in mine site revegetation at the end of each winter operating season. This material shall be stockpiled on an ice pad, and be stockpiled separately from the temporarily stockpiled deeper overburden layers. This material shall be used on the constructed waterfowl island and shallow littoral reclamation sites that require the restoration of a vegetative community. The primary organic overburden that is to be obtained from the top 12-18 inches of the tundra surface will be obtained from an area that will be later excavated for gravel during the same winter operating season. No expansion of the footprint of disturbance in tundra wetlands will occur from this action. The primary organic overburden that is obtained from the top 12-18 inches of tundra will be spread as a layer of 1 inch to 4 inches thick as the top layer in mine site revegetation, excluding areas of steep slopes.

- For beneficial enhancement purposes the proposed work will include the backfilling into the gravel pits of clean organic rich and mineral soil materials to be obtained from activities at various locations in the Colville River delta area and vicinity, and from northeastern NPR-A.

- Performance Standards for Enhancement.

  <u>Gravel Pit Waterfowl Islands, with Shallow Littoral Area:</u>
  After gravel mining, stockpiled organic overburden material will be backfilled into the excavated mine pits to construct shallow water littoral habitat and waterfowl

islands. Enhancement activities will be performed in accordance with the typical examples of gravel mining and enhancement guidelines shown on the permit drawings dated January 2017. Waterfowl islands will be approximately 400' x 100' in size. They will have variable elevation from 1 foot to 4 feet above the predicted water surface, with an irregular perimeter. The littoral (shallow water) edges on the shorelines of the islands will be a minimum of 20 feet wide with a maximum slope of 1:20. Shallow water areas between islands will range between 1 to 3 feet in depth. To discourage predation from foxes and other predators, islands will be separated from the tundra shore by a channel at least 50 feet wide and 1 foot to 6 feet in depth. A narrow perimeter berm of backfilled overburden placed 3 to 5 feet tall around the constructed shallow littoral area is intended to increase local backfilled soil moisture and encourage revegetation by catching and holding snowmelt and rainwater until such time that the former gravel pit naturally fills with water. The final location of the islands and shallow littoral areas may be changed due to operational needs.

Constructed Littoral Area with Island and Uplands:
For each separate gravel mining cell, if the expected wetland credits to be gained from the construction of waterfowl islands and littoral area enhancements do not offset the expected wetland debits, then islands of tundra will be constructed in order to acquire the additional wetland credits. The islands of tundra will be constructed by leaving one half acre to one acre islands within excavated permanently flooded shallow water channels. The shallow water channels may, or may not be directly connected hydrologically to a gravel pit lake. The rationale would be to provide additional nesting islands, shallow water areas and upland areas at the site. This wetland conversion would improve waterfowl nesting habitat.

A channel at least 50 feet wide to discourage predation from foxes and other predators will be excavated to a depth of 1 foot below the anticipated water surface, so as to construct a permanently flooded shallow water littoral area. The channel will encircle an area of natural tundra, so as to leave an island. The island will be separated from the mainland by a distance of 50 feet. Overburden (from channel excavation) will be side cast adjacent to the channels, in a windrow approximately 25 feet wide by 6 feet high. The final surface of the windrow upland will be rough. The location of the constructed littoral area with island and uplands may be changed due to operational needs.

Vegetation:
Revegetation will be achieved by the distribution of stockpiled tundra rhizomes as a top layer of 1 inch to 4 inches thick on the surface of the constructed islands and in the shallow littoral areas. On constructed islands, a minimum of 20% vegetative ground cover of graminoids, forbs and shrubs will be established within 5 years after completion of enhancement activities. In littoral areas, a minimum density of 50 sprigs of graminoids (such as *Arctophila fulva, Carix aquatilis)* per square meter will be attained within at least 25% of the total submerged shallow littoral areas within 10 years after the shallow littoral areas have become permanently submerged.

Hydrology:
Hydrology is anticipated to be re-established naturally, from snowmelt or flooding, within 5 years. Success has been achieved when the gravel pit is full of water, and appropriate water depths around the waterfowl islands have been achieved.

- The enhancements for each gravel mining cell will be preserved under a deed restriction. The deed restriction will consist of a written notice describing the limitations on the property, and the legal land description of the location of the enhancements. The written notice will describe the restriction on future gravel mining, including other subsurface resource access activities that may adversely affect the aquatic resources within the enhancement mitigation areas of constructed waterfowl islands, shallow littoral areas and a wetland-upland complex. The written notice will be recorded by ASRC in the Alaska Department of Natural Resources Recorder's Office, Barrow Recording District. The location of the mitigation features in the recorded notice will be based on the post-mining as-built survey, as described in the Performance Standards section of the permittee responsible mitigation plan. A copy of the recorded deed restriction will be submitted directly to the Alaska District Office, Corps of Engineers – Regulatory, within 60 days of the completion of the as-build survey plan.

- The gravel mining in a new cell will not begin before the completion of enhancement activities in the previously mined cell has been completed. Revegetation is not included as an enhancement activity.

- An annual report of the activities conducted during the previous work year will be submitted to the Alaska District Office, Corps of Engineers – Regulatory. The annual report shall delineate the locations of past (complete), current (on-going) and projected (next year) mining operations and enhancement activities. Supportive documentation will be included, including an as-built survey, photographs, summary data tables, etc., in sufficient detail to determine permit compliance. The Annual Report for each year will be submitted by January 15 of the following year, for a period of 5 years or until the project satisfies the performance standards of the permittee responsible mitigation plan. The annual reports shall be submitted directly to the Alaska District office at email: regpagemaster@usace.army.mil or mail at: North Section Chief, Regulatory Division - CEPOA RD, PO Box 6898, JBER, Alaska 99506.

Please contact me if you have any questions or require any additional information at 907-229-7400, or via email at tom@mortensen.com.

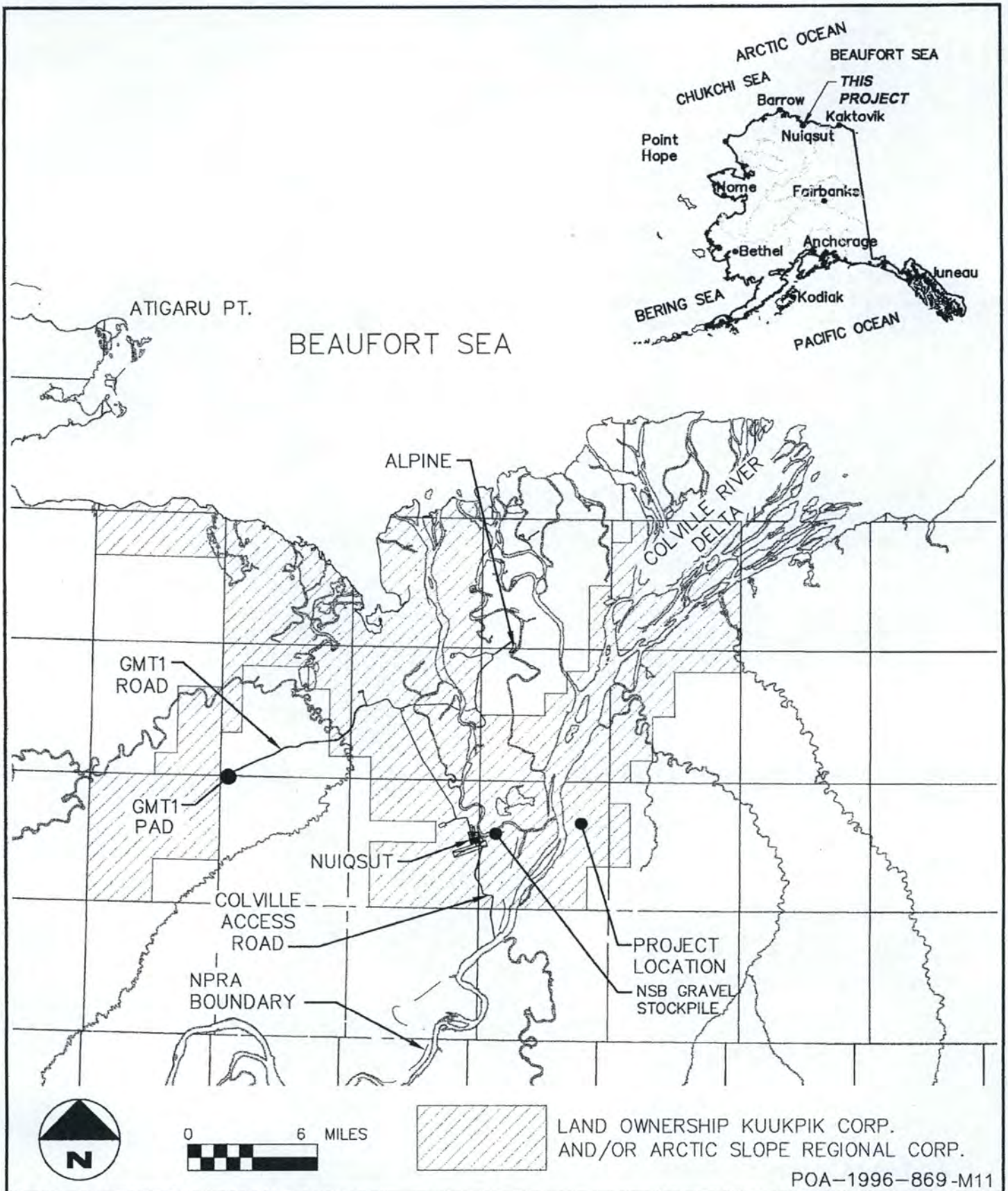
Regards,

Thomas W. Mortensen
Authorized Agent for ASRC

cc: Erik Kenning, ASRC.

attachments:

Permit Drawings, Sheets 1 - 6. Typical Examples of Gravel Mining and Enhancements. January 2017.
Permittee Responsible Mitigation Plan for all of the Phase 3 area. January 23, 2017.



POA-1996-869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

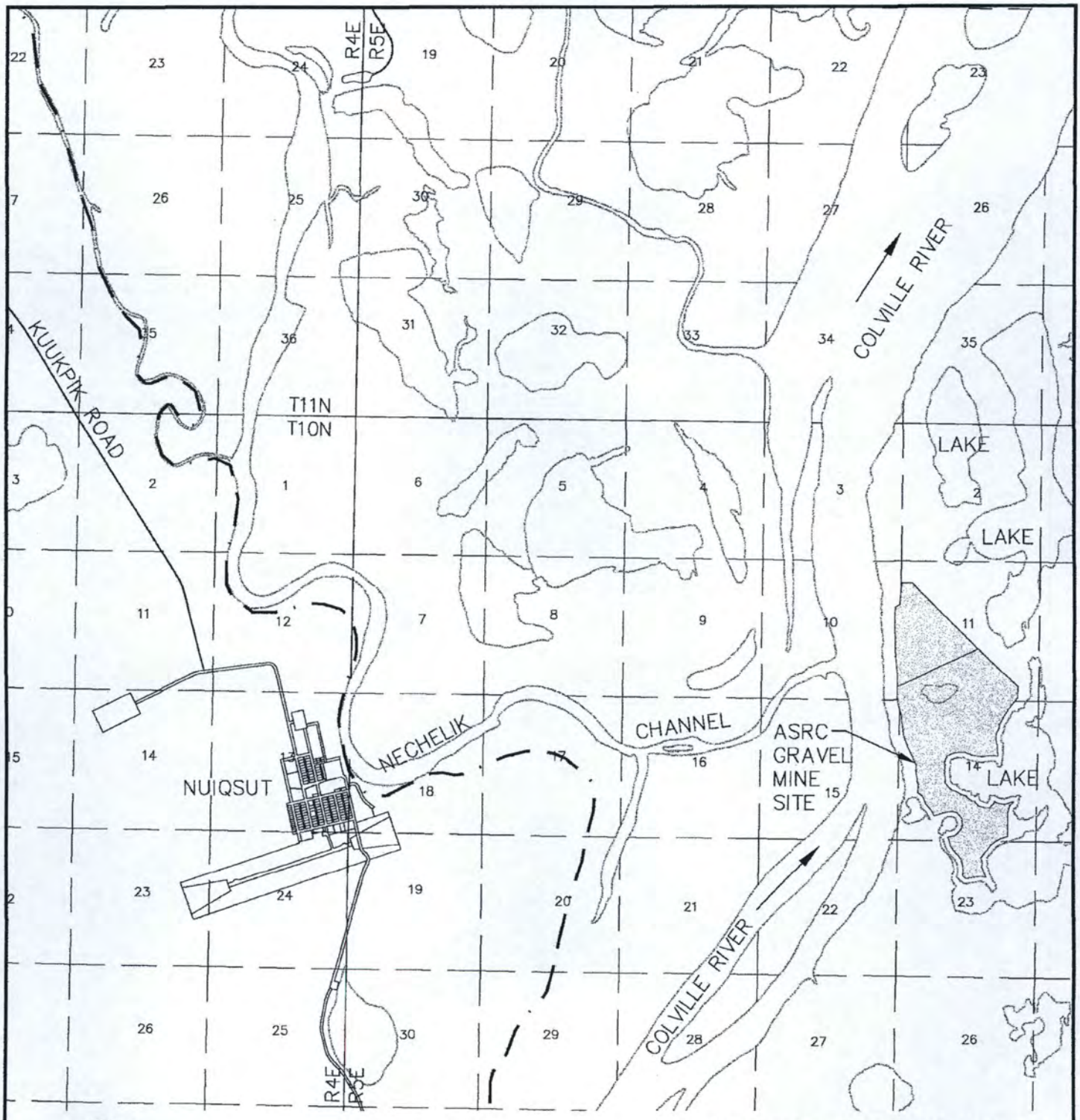
Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE

VICINITY MAP – COLVILLE RIVER DELTA

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 1 of 6
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16-04-04-1



USGS MAP, HARRISON BAY A–2

POA–1996–869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

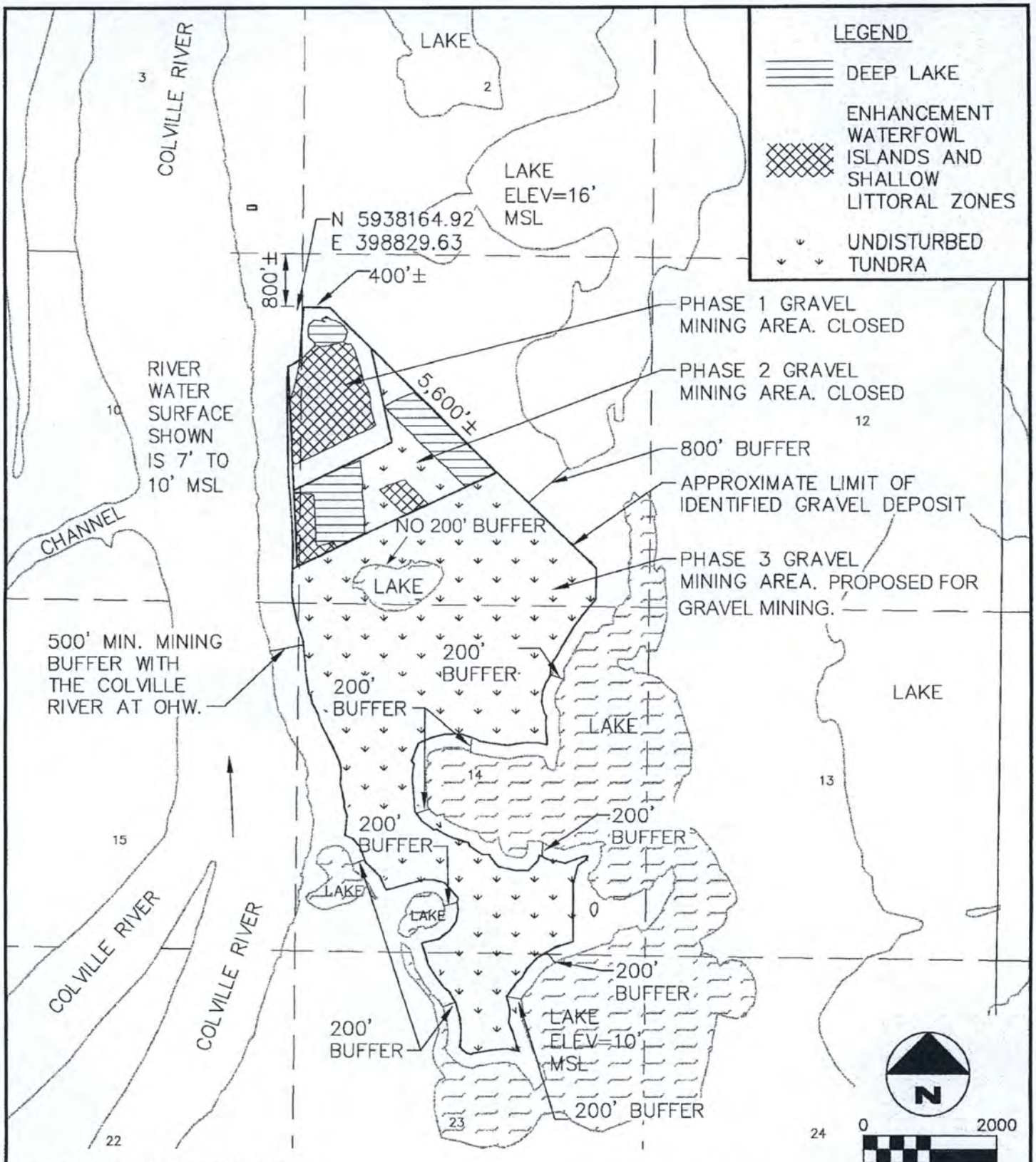
Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE

JANUARY 2017 VICINITY MAP 2

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 2 of 6
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16–04–04–1



IN CASE OF DISCREPANCY ON THIS SHEET 3, WRITTEN MEASUREMENTS ARE SUPERIOR TO SCALED MEASUREMENTS.

USGS MAP, HARRISON BAY A–2
POA–1996–869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

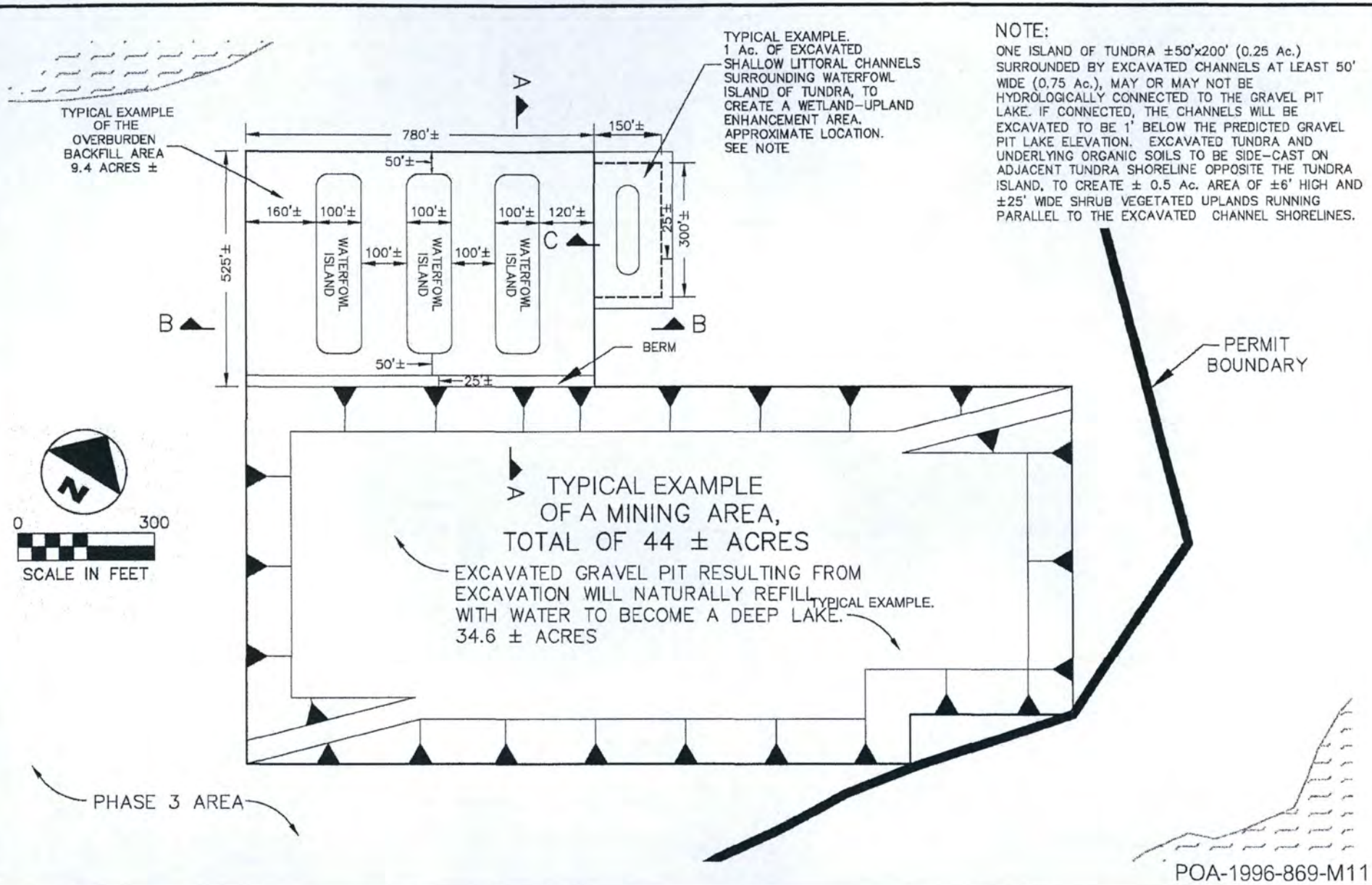
ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE.

LOCATION OF EXISTING AND

PROPOSED PHASE 3 MATERIAL SITE

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 3 of 6
SCALE: 1" = 2000'	CHECKED BY: GD	W.O. No: 16–04–04–1



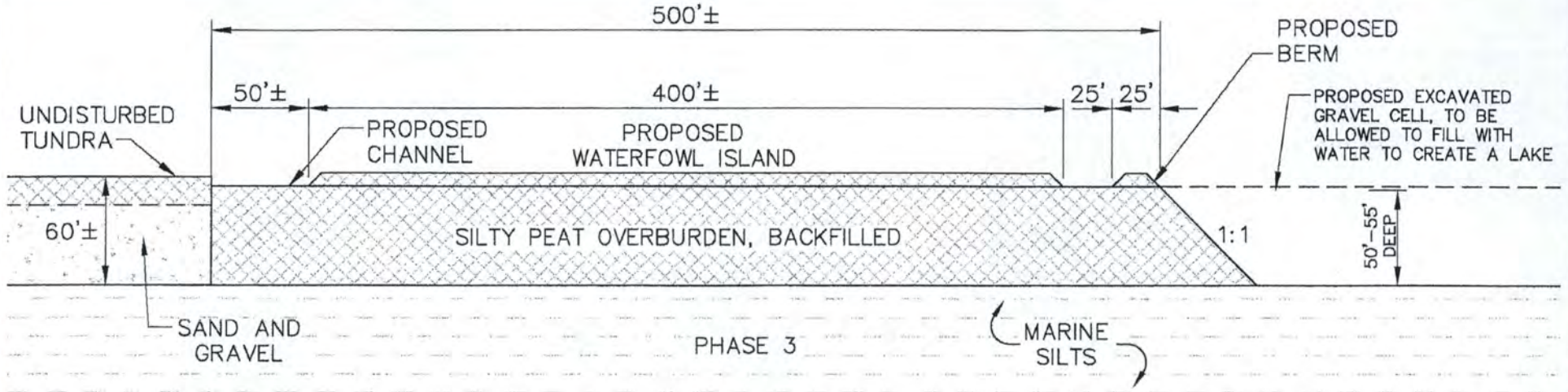
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE.
PHASE 3 AREA. PROPOSED GRAVEL EXCAVATION CELL AND OVERBURDEN BACKFILL AREA AND ENHANCEMENT PLAN. TYPICAL ISLAND AND LITTORAL AREA POST EXCAVATION CONDITION AND WETLAND – UPLAND ENHANCEMENT AREA. PLAN VIEW, DETAILS.

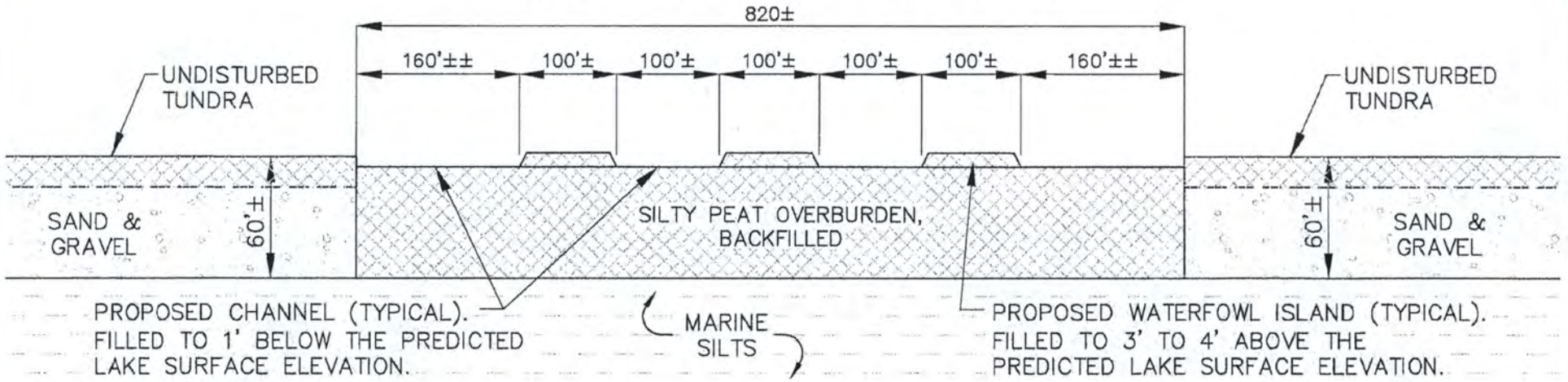
DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 4 of 6
SCALE: 1" = 300'	CHECKED BY: GD	W.O. No: 16–04–04–1



SECTION A–A

SCALE: NONE

TYPICAL EXAMPLE BACKFILL ENHANCEMENT AREA



SECTION B–B

SCALE: NONE

POA-1996-869-M11

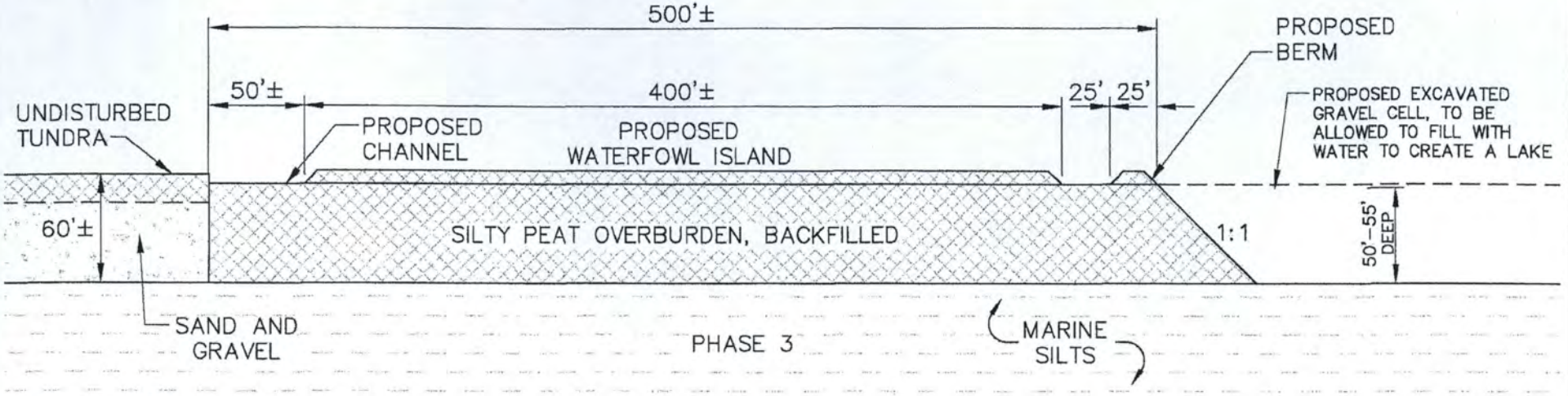
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

TYPICAL EXAMPLES. ASRC CONSOLIDATED GRAVEL
PHASE 3 WATERFOWL ISLANDS ENHANCEMENT SECTION VIEWS.
A-A AND B-B
NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 5 of 6
SCALE: NONE	CHECKED BY: GD	W.O. No: 16–04–04–1



SECTION A–A

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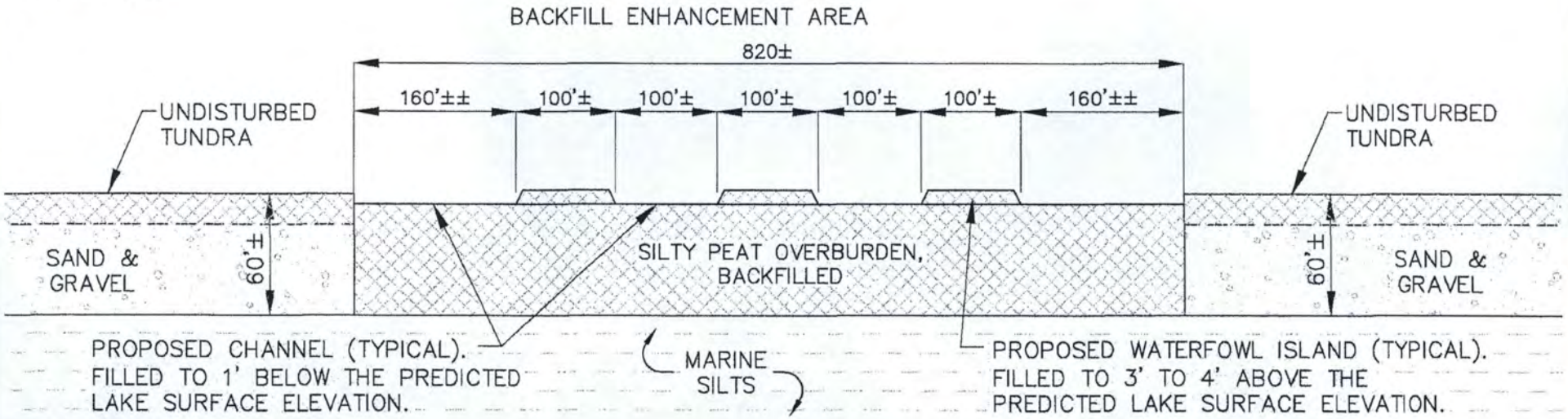


SECTION B–B

SCALE: NONE

POA-1996-869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

TYPICAL EXAMPLES. ASRC CONSOLIDATED GRAVEL SITE.
PHASE 3 WATERFOWL ISLANDS ENHANCEMENT SECTIONS VIEWS.
A–A AND B–B.

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 6 of 6
SCALE: NONE	CHECKED BY: GD	W.O. No: 16–04–04–1

ASRC COLVILLE CONSOLIDATED USE GRAVEL PIT
POA-1996-869-M11

Compensatory Mitigation Plan. Permittee-Responsible

for

Gravel Mining Operations within All of the Phase 3 Permit Area

Arctic Slope Regional Corporation
Applicant

Tom Mortensen Associates LLC
Agent

January 23, 2017
(Revised April 14, 2017)

COMPENSATORY MITIGATION PLAN. PERMITTEE-RESPONSIBLE.

For the

ASRC COLVILLE CONSOLIDATED USE GRAVEL PIT. POA-1996-869-M11.

PHASE 3, All.

CONTENTS

Permittee Responsible Compensatory Mitigation Plan.

1 Objectives

The applicant plans to use on-site, out-of-kind, permittee responsible mitigation to offset unavoidable impacts of gravel mining in wetlands. The objective of this compensatory mitigation plan is to maintain and enhance functions for flood flow regulation, sediment removal and waterfowl habitat, through conversion of semi-permanently flooded sedge meadow to a deep water lake containing constructed islands with shallow littoral waters, and small areas containing shallow water wetlands, with tundra islands and uplands. Additionally, the mitigation will improve ecosystem services for local subsistence activities.

In this compensatory mitigation plan the term *enhancement* is being used as defined in The Final Mitigation Rule published in the Federal Register on April 10, 2008, Subpart J, Compensatory Mitigation for Losses of Aquatic Resources, 230.92 Definitions.

> "*Enhancement* means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area."

Rationale:

- Compensatory mitigation through the use of an approved mitigation bank or an in-lieu-fee provider is not practicable for this project because neither method is currently available on the North Slope. There are no approved mitigation banks in Alaska with a service area that includes the North Slope. In addition, the only potential mitigation bank that may be approved in the reasonably foreseeable future for the North Slope is the ASRC Bank (POA-2012-90), which is not yet approved.

- These enhancement methods using wetland conversion have been previously used within the Phase 1 and Phase 2 areas of the ASRC Colville gravel pit. Field reports by ABR and annual reports by the applicant between 2004 and 2016 document the success.

- These features are conversions that will create habitat that is not presently available in the area as shown on aerial photography and satellite imagery.

- The enhancement will result in increased subsistence use: The waterfowl island and shallow littoral habitat that was constructed in the Phase 1 area is currently used by the Alaska Native residents of Nuiqsut for the subsistence hunting of non-threatened waterfowl. Such subsistence use was not known at this location prior to gravel mining and subsequent enhancements. Thus, enhancement by conversion to improve subsistence opportunities for waterfowl is an objective of this mitigation plan.

See the summary tables below adapted from the 2013 ABR Report for a comparison of the functional performance, categories and rankings of the existing wetlands, as compared to the permittee responsible conversions.

POA-1996-869-M11, Arctic Slope Regional Corporation, Consolidated Use Gravel Material Site, Colville River. Performance, Categories and Rankings for Existing and Converted Wetlands				
Existing Wetland Conditions Phase 3 Area:				
	Wetland Functions, Services & Rankings			
Wetland Category & Functional Class	Flood Flow Regulation	Sediment Nutrient & Toxicant Removal	Habitat Diversity (General Waterfowl Habitat)	Subsistence Use
Category II Semi-Permanently Flooded Sedge Meadow (PEM1F, PEM/SS1F)	MODERATE	MODERATE	MODERATE	MODERATE
Category II Permanently Flooded Shallow Water Pond (PUBH)	MODERATE	MODERATE	LOW	MODERATE
Planned Wetland Conversions Phase 3 Area:				
	Wetland Functions, Services & Rankings			
Wetland Category & Functional Class	Flood Flow Regulation	Sediment Nutrient & Toxicant Removal	Habitat Diversity (Eider Nesting)	Subsistence Use
Category I * Excavated Pond & Unconsolidated Shore (Waterfowl Islands and Shallow Littoral Waters). (PUSCx,/ PUBHx)	HIGH	HIGH	HIGH	HIGH
Category II * Excavated Permanently Flooded Deep Water Lake (Gravel Pit Lake) (PUBHx)	MODERATE	MODERATE	HIGH	MODERATE

* Note: See Part 5 Determination of Credits.

2 Site Selection

All Permittee Responsible Mitigation will be done on-site.

The use of Permittee Responsible Mitigation is appropriate based solely on the values and functions of the aquatic resource that will be impacted. The goals are ecologically suitable with existing site conditions and hydrologic functions. The plan has a low risk of failure, and a high probability of being self-sustaining due to the location on the active floodplain of the Colville River.

The plan is practicable. "*Practicable*" is defined at Section 230.3(q) of the Guidelines, which states that the term *practicable* means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

- Cost efficient because the enhancement activities are a part of the gravel mining operations workflow.
- Existing technology, because the operations are using standard gravel mining practices.
- Logistics, because all gravel mining and enhancement work is done during the same winter operating season.

In summary, this is the same method in which all of the gravel mining and enhancement work that has been successfully done since the first gravel pit was opened in the Phase 1 area in 1998.

3 Site Protection Instruments

Site Protection Instrument.

All gravel mining and the resulting enhancement work is located entirely on private ANCSA Native lands. Once mined the permittee responsible mitigation enhancements will not be at risk of disturbance from future gravel mining because at the end of the mining the gravel will be depleted, and there will be no reason or risk for further disturbance.

Even with the absence of risk, the mitigation enhancements for each gravel mining cell will be preserved under a deed restriction. The deed restriction will consist of a written notice describing the limitations on the property, and the legal land description of the location of the enhancements. The written notice will describe the restriction on future gravel mining, including other subsurface resource access activities that may adversely affect the aquatic resources within the enhancement mitigation areas of constructed waterfowl islands, shallow littoral areas and a wetland-upland complex. The written notice will be recorded by ASRC in the Alaska Department of Natural Resources Recorder's Office, Barrow Recording District. The locations of the mitigation enhancements in the recorded notice will be based on the post-mining as-built survey. The post-mining as-built survey is described in Performance Standards, below.

4 Baseline Information. Wetlands and other Waters of the U.S.

For more detail on baseline wetlands information, see the *"Functional Assessment and Wildlife Habitat Evaluation, April 2013"*, described by the 2013 ABR Report.

The pre-project conditions in the Phase 3 area are predominantly semi-permanently flooded sedge meadow (PEM/SS1F, PEM1F), Category II wetlands. The ABR report describes these wetlands as:

> A combination of semi-permanently flooded low center low relief polygons and low center-high relief polygons. Low centers are dominated by persistent emergent vegetation including *Carex aquatilis*, *C. misandra* and *Eriophorum angustifolium*. Polygon rims support dwarf ericaceous shrubs and willow species.

Additional baseline information is contained in the following reports:

Progress Report by ABR, Inc. December 2004.
Progress Report by ABR, Inc. October 2006.
Annual Report to the Corps by Permittee. October 2004.
Annual Report to the Corps by Permittee. December 2006
Annual Report to the Corps by Permittee. January 2008
Annual Report to the Corps by Permittee. December 2014
Annual Report to the Corps by Permittee. January 2016

5 Determination of Credits

Debit-Credit Methodology

The calculation of Debits and Credits as units of functional loss or gain is based on the "*Alaska District: Credit Debit Methodology, Version 1.0*", SPN-2016-187, dated September 21, 2016. This debit / credit methodology was developed by the U.S. Army Corps of Engineers, Alaska District in Consultation with the Alaska Statewide Interagency Review Team.

Definitions.

Debits.

One debit is equal to the total loss of function from one acre of optimum functioning aquatic resource as measured by an appropriate function or condition assessment. Debit calculations reflect the difference between the baseline (Current Condition) of the assessment area and the anticipated condition (with impact) of the assessment area after the authorized discharge has occurred.

Credits

One credit is equal to one acre of optimum functioning aquatic resource as measured by an appropriate function or condition assessment. A credit or functional gain calculation may be based on the anticipated condition of the compensatory mitigation assessment site after full achievement of ecological performance standards.

Time Lag (Temporal Loss)

Time lag means the period of time (in years) between when the functions are lost at an impact site and when the compensatory mitigation site has achieved the outcome that was scored using the

functional assessment methodology. A 5-year time lag is chosen because it is the maximum length of time observed for restoration of hydrology after mining.

TIME LAG TABLE

Year	Time Lag
< or =1	1.0000
2	1.0170
3	1.0341
4	1.0518
5	1.0696

Risk.

Mitigation risk is evaluated to account for the degree of uncertainty that the proposed conditions will be achieved, resulting in a reduction in aquatic resource function of the mitigation assessment area. In general, mitigation projects which require longer periods of time to replace lost functions or to recover from potential perturbations will be considered to have higher risk than those which require shorter periods of time. The assessment area is scored on a scale from 1 (for no or de minimis risk) to 3 (high risk), on quarter-point (0.25) increments.

RISK ASSESSMENT SCALE

1.0	**1**.25	1.50	1.75	**2.0**	**2**.25	2.50	2.75	**3.0**
No/ De Minimis				Moderate				High

A score of 1.0 would be applied to mitigation conducted in an ecologically suitable landscape and deemed successful, whereas a score of 3.0 would indicate an extremely low likelihood of success based on the ecological factors below.

Calculating Current Conditions.

The current conditions in the Phase 3 area as described in the 2013 ABR Report include;

Semi-permanently Flooded Sedge Meadow (PEM/SS1F, PEM1F), Category II Wetlands.

A combination of semi-permanently flooded low-center low-relief polygons and low-center high-relief polygons. Low centers are dominated by persistent emergent vegetation including *Carex aquatilis*, *C. misandra* and *Eriophorum angustifolium*. Polygon rims support dwarf ericaceous shrubs and willow species.

Permanently Flooded Pond (PUBH) Category II Wetlands

Shallow (< 1.5m) thaw ponds (< 20 acres) form by thawing ice rich permafrost within areas of inundated low-center polygons. Not connected to the Colville River via a direct surface connection except during periodic overbank flooding events.

The 2016 Alaska District Credit Debit Methodology expresses Current Condition as an indexed score that ranges between values of 0 and 1. This plan adapts information used in the Phase 1 and 2 authorizations, the 2013 ABR Report, and Appendix A of Regulatory Guidance Letter (RGL) 09-01, to be compatible with the index score provided by the 2016 Alaska District Credit Debit Methodology.

These sources use a simple scale of Categories for wetland quality.

- **Category I: High functioning wetlands** — Uncommon wetlands that: 1) provide a documented life support function for threatened or endangered species; 2) represent a high quality example of a rare wetland type; 3) are rare within a given region; or, 4) are undisturbed and contain ecological attributes that are impossible or difficult to replace within a generation, if at all.

- **Category II: High to moderate functioning wetlands** — Wetlands that: 1) provide habitat for very sensitive or important wildlife or plants; 2) are difficult to replace (such as bogs); or 3) provide very high functions, particularly for wildlife habitat.

- **Category III: Moderate to low functioning wetlands** —Wetlands that are important for a variety of wildlife species and can provide watershed protection functions depending on where they are located. Generally these wetlands will be smaller and/or less diverse in the landscape than Category II wetlands. These wetlands may have experienced some form of degradation, but to a lesser degree than Category IV wetlands.

- **Category IV: Degraded or low functioning wetlands** —The smallest, most isolated and least diverse wetlands, which likely have been degraded by human activities.

The following are the categories to the index used for the 2016 Alaska District Credit Debit Methodology:

- **Category I** aquatic resources are assigned a functional value of 1.0.

  The applicant designates Category I to include constructed waterfowl islands and associated shallow littoral areas. The waterfowl islands would create potential nesting areas for Endangered Species Act (ESA) listed Spectacled and Steller's eiders, and do so in a location that has no natural islands in lakes. This potential use by not one, but two threatened species supports the characterization of Excavated Pond and Unconsolidated Shore (PUSCx, PUBHx) areas as a Category I wetlands. There are two types of constructed waterfowl islands and shallow littoral areas. One type is constructed on overburden located in a deep water gravel pit lake. The second type is constructed by excavation of shallow channels around a tundra island, including

the creation of uplands by side-casting organic rich soils and the living tundra vegetation mat that would be excavated from the channels.

Waterfowl islands located within deep water lakes are known to be a preferred type of nesting location for both the Spectacled and Steller's eiders (ADF&G). Both species of eider are listed as threatened under the ESA. This type of habitat does not currently exist at the proposed project site, which is a single wetland type of Semi-Permanently Flooded Sedge Meadow (PEM/SS1F, PEM1F) ranked as moderate habitat for waterfowl. All waterfowl nesting islands will have a minimum of a 50 foot wide water filled channel separating the island from the surrounding tundra in order to discourage fox predation of waterfowl and nests.

Publicly available satellite imagery acquired on 8/22/2014 (Google Earth) shows there is only one natural island of comparable size to the planned constructed islands (about 1 acre) located in a natural lake within a 4-mile radius (east of the Colville River) of the center of the permit area. For a comparison, this one natural island is located within 16,000 acres of tundra and lakes within 4 miles of the permit area. Thus, construction of islands with shallow littoral areas would increase the potential for waterfowl nesting opportunities in the project area, including the nesting opportunities for the two species of threatened eiders, Spectacled and Steller's.

Subsistence use of waterfowl island and shallow littoral habitat constructed in the Phase 1 area is currently used by the Alaska Native residents of Nuiqsut for subsistence hunting of non-threatened waterfowl. Such subsistence use was not known at this location prior to gravel mining and the enhancements of constructed waterfowl habitat. A similar improvement of ecosystem services will occur as a result of habitat improvements conducted in association with POA-1996-869-M11.

- **Category II** aquatic resources are assigned a functional value of 0.75

The Category II Wetlands included in the 2013 ABR Report are;

Permanently Flooded Lake (L2UBH).
Permanently Flooded Pond (PUBH).
Excavated Pond and Unconsolidated Shore (PUSCx, PUBHx).
Permanently Flooded Sedge Meadow (PEM1F, PEM/SS1F).

The deep water lakes resulting from the filling of the gravel pits are considered Category II. This is because the deep water lakes are adjacent to and hydrologically connected to both types of the Category I waterfowl islands and associated shallow littoral areas, as described above. The waterfowl islands would create potential nesting areas for ESA listed Spectacled and Steller's eiders, and do so in a location that has no natural islands in lakes.

In addition, the deep water lakes are known to be preferred for nesting and brood-rearing by Yellow-billed Loons. Deep water lakes are not present in pre-project conditions. Nesting Yellow-billed Loons have been documented in a large lake adjacent to the eastern boundary of the permit area (2013 ABR Report). In October 2014 the USFWS announced that it was implementing conservation measures with a variety of Native, State and Federal partners in order to protect the Yellow-billed Loon in northern Alaska.

The provision of suitable habitat for Yellow-billed Loons provides additional rationale for characterizing deep water lakes as Category II waters.

The deep water lakes will be adjacent to and hydrologically connected to both types of Category I waterfowl islands and associated shallow littoral areas as described above.

The presence of a deep water lake will maintain flood flow regulation function in the vicinity. There is an increased likelihood of a seasonal connection with the Colville River in those portions of the Phase 3 area that are topographically lower than the surface elevations in the Phase 1 and Phase 2 areas, with a resulting higher potential for river flooding in the lower areas.

- There are no **Category III** or **Category IV** wetlands.

Summary of Typical Functional Gains and Losses. "Rule-of-Thumb".

A typical gravel pit 10 acres in area will be used as a "rule of thumb" example. Based on the past experience of gravel mining operations in the Phase 1 and Phase 2 areas, backfilled overburden will occupy about 30% of the pit area, plus or minus about 10%. Thus, after mining and backfill is completed, a typical 10 acre pit will result in a 7 acre deep water lake, and a 3 acre area of waterfowl islands and shallow littoral area. This results in the following debits and credits:

Typical 10-Acre Gravel Pit (Rule-of-Thumb)
Credits / Debits

Deep-Water Lake

Acres	Debit	Credit
7	0.5	0.0

Waterfowl Islands / Shallow Littoral

Acres	Debit	Credit	
3	0.0	0.7	Net Gain
			0.2

The debits and credits are explained as follows;

Gravel Pit, Refilled to become a Deep Water Lake.

Based on the 2016 Alaska District Credit Debit Methodology in Section 7.1 (Debit) the net function of a 7 acre deep water lake (Category II) excavated in a former Category II wetland area will represent a loss of 0.5 functional units.

Acres	Time Lag, 5 Years *	Risk Factor **	Debit (due to Time Lag)
7	1.0696	1.0	0.5

* Note on assigned Time Lag value of 5 years (1.0696).
The debit of 0.5 units is the result of applying a Time Lag (temporal loss) of 5 years (1.0696) and a Risk Factor of 1.0. The 5-year Time Lag factor is conservative. Based on past experience it takes about 5 years for an excavated gravel pit to fill from snowmelt. However, the Phase 3 area is located within the active floodplain of the Colville River, and it is possible that river flooding can fill an excavated gravel pit in one day. The 2005 gravel pit located in the eastern part of the Phase 2 area was completely filled with Colville River floodwaters in May 2006. The 2014-15 gravel pit located in the western part of the Phase 2 area was completely filled with Colville River floodwaters in June 2015.

** Note on assigned Risk Factor of 1.
The filling of the excavated gravel pit with water from snowmelt and/or Colville River floodwaters is a natural event that cannot be prevented. Therefore, the risk of not attaining favorable site hydrology is assigned a 1.0, correlating to no or de minimis risk.

Waterfowl Islands and Shallow Littoral Areas.

Based on the methodology in Section 7.2 (Credit) the net function of a 3 acre area of shallow littoral waters and waterfowl islands (Category I) constructed in a former Category II wetland area will be a gain of 0.7 functional units.

Acres	Time Lag, 5 Years *	Risk Factor **	Credit
3	1.0696	1.0	0.7

* Note on assigned Time Lag value of 5 years (1.0696).
The credit of 0.7 units is the result of applying a Time Lag of 5 years (1.0696) and a Risk Factor of 1.0. The 5-year Time Lag factor is conservative. The 5-year time lag is based on the length of time for the adjacent and hydrologically connected gravel pit to fill with water and connect with the inter-island channel areas. As described above, based on past experience it takes about 5 years for an excavated gravel pit to fill from snowmelt. Due to the fact that the Phase 3 area is within the active floodplain of the Colville River, river flooding can fill an excavated gravel pit in less time than 5 years. The 2005 gravel pit located in the eastern part of the Phase 2 area was completely filled with Colville River floodwaters in May 2006. The 2014-15 gravel pit

located in the western part of the Phase 2 area was completely filled with Colville River floodwaters in June 2015.

** Note on assigned Risk Factor of 1.
The waterfowl islands and shallow littoral areas are created on backfilled overburden. Due to the fact that the placement of all overburden into the excavated gravel pit is an integral part of the gravel mining operation, the risk of this action not occurring is de minimis.

Constructed Wetland / Upland Habitat Complex: Shallow Waters, Tundra Island and Upland Shrub.

This type of habitat was constructed in the Phase 1 area during 2005. Now, 12 years after construction, the tundra islands have maintained stable horizontal surfaces. The shorelines of the tundra islands have become more irregular over time, and upland areas show presence of shrub vegetation.

Islands of tundra would be constructed by leaving one half acre to one acre islands within excavated permanently flooded shallow water channels. The rationale would be to provide additional nesting islands and shallow water areas at the site. As referenced above, this type of habitat is not found in the vicinity of the ASRC site. This wetland conversion would improve waterfowl nesting habitat to be suitable as Category I wetlands to support ESA listed Spectacled and Steller's eiders.

The excavated tundra material will be sidecast on the shoreline of the excavated shallow water area to create upland areas that support shrubs.

The 2004 Progress Report done by ABR for the Phase 1 area documented the re-vegetation success and the expected use by birds and mammals of uplands (5 to 10 feet tall) in a constructed upland / wetland complex. The ABR report documented that within five years 24 vascular plant species had been established on backfilled overburden of the uplands. The report concluded that on the constructed uplands; *"the rapid increase in the number of species established in the area indicates that conditions are favorable for plant growth, and vegetation cover is likely to continue to increase."*

The ABR report identified 24 species of birds that would potentially use the uplands, including the threatened Spectacled Eider.

The ABR report identified 4 species of mammals that would potentially use the uplands; caribou, arctic fox (den), red fox (den), and the arctic ground squirrel. The report stated that the use of the constructed uplands by ground squirrels and foxes is dependent on adequate drainage and sufficient stability for creating dens and burrows. Use by caribou for insect relief is enhanced by elevated terrain (compared to the surrounding tundra).

The dimensions of the excavated channel and tundra island and wetland-upland complex are shown in the permit drawings that show typical examples of gravel mining and enhancements. The dimensions of the typical excavated channels and tundra islands is also shown on Sheet 9 of the June 6, 2012 Public Notice of Application for Permit, POA-1996-869-M4.

Credits, Based on 1 Acre of Typical Excavated Channels and Constructed Tundra Islands.

Based on the Alaska District Credit Debit Methodology in Section 7.2 (Credit) the net function of an enhanced 1 acre area of shallow littoral waters and tundra islands (Category I) constructed in a former Category II wetland area will be a gain of either 0.234 functional units or a gain of 0.25 functional units resulting from different Time Lags. The two different Time Lags are;

Acres	Time Lag 5 Years *	Risk Factor **	Credit (Conversion of Cat II to Cat I)
1	1.0696	1.0	0.234

Acres	Time Lag 0 Years ***	Risk Factor	Credit (Conversion of Cat II to Cat I)
1	1.0	1.0	0.25

* Note on assigned Time Lag value of 5 years (1.0696).
The gain of 0.234 credits per acre is based on a Time Lag of 5-years (1.0696) and a Risk of 1.0. The 5-year Time Lag would be applicable with the excavated shallow tundra island channels hydrologically connected to an adjacent gravel pit. In this case the 5-year Time Lag is dependent on the maximum expected time it would take to fill the connected gravel pit and the connected shallow excavated channels with water.

** Note on assigned Risk Factor of 1.0.
The filling of the hydrologically connected excavated gravel pit with water from snowmelt and/or Colville River floodwaters is a natural event that cannot be prevented. Therefore, the risk of not attaining favorable site hydrology is assigned a 1.0, correlating to no or de minimis risk.

*** Note on assigned Time Lag value of 0 years (1.0).
The gain of 0.25 credits is based on a Time Lag of 0-years (1.0) and a Risk of 1.0.
In this case the 0-year Time Lag is due to there being no hydrological connection between the tundra island channels and a not-yet-full gravel pit lake. The shallow excavated channels would not be connected to an outlet, and would therefore fill with drifted snowmelt water after the first winter season.

6 Mitigation Work Plan

The enhancement work to be accomplished will be self-sustaining. Because of the anticipated continuation and presence of the current hydrologic conditions of the Phase 3 area located in the Colville River floodplain, the methods were developed and successfully used during the gravel mining operations in the Phase 1 and Phase 2 areas completed between 1998 and 2015.

Use of proven enhancement methods is both appropriate and practicable. These methods are appropriate because they are ecologically suitable for existing site conditions and hydrology. These methods are practicable because they have been tested by time, and may be accomplished within the course of normal gravel mining operations.

Use of these proven methods will create functioning high value wetlands with attributes that do not currently exist in the vicinity of the ASRC project.

Enhancement work will be accomplished as follows: A small area will be used to mechanically harvest tundra rhizomes from the semi-permanently flooded sedge meadow tundra present in the pre-mining area. After harvesting, this organic topsoil material containing rhizomes will be temporarily stockpiled on an ice pad separately from the other organic rich overburden material.

The top 12-18 inches of primarily organic overburden with tundra rhizomes will be stockpiled separately from other overburden and used as the top layer (tundra rhizome rich "seed" layer) for mine site revegetation at the end of the winter operating season. This tundra rhizome material will be stockpiled on an ice pad, and be stockpiled separately from the temporarily stockpiled deeper organic-rich overburden layers. The tundra rhizome material will be used on the constructed waterfowl island and shallow littoral enhancement sites that require a vegetative community. The primary organic overburden obtained from the top 12-18 inches of the tundra surface will be from an area that will be later excavated for gravel during the same winter operating season. No expansion of the footprint of disturbance in tundra wetlands will occur from this action. The primary organic overburden that is obtained from the top 12-18 inches of tundra will be spread as a "seed" layer of 1 inch to 4 inches thick as the top layer in mine site revegetation, excluding areas of steep slopes.

At the start of gravel mining operations the organic rich overburden will be first removed and temporarily stockpiled on ice pads. After gravel mining, the stockpiled overburden material will be backfilled into the excavated mine pit in order to construct the proposed shallow littoral habitat and waterfowl islands. This will occur prior to the end of the winter operating season. Revegetation will be achieved by the distribution of stockpiled tundra rhizomes on the surface of the organic rich overburden used to construct the islands and shallow littoral areas. The 2004 Progress Report by ABR for Phase 1 documented that 24 vascular plant species and graminoid vegetation, including *arctophila fulva,* had been established on backfilled overburden within 5 years. ABR concluded that most of the plant species likely originated from the distribution of tundra rhizomes, as described above and below.

The location, size and orientation of the enhancement work of waterfowl islands, shallow littoral areas, perimeter berms constructed using backfilled overburden materials, and the construction of a tundra island and shallow littoral area and a wetland-upland complex may be varied, provided that the final structures meet the basic requirements that have been described and shown on the permit drawings of typical examples of gravel mining and enhancements. The ratio of constructed islands and shallows to deep-water areas of the gravel pit lake is dependent on the variable volumes of available overburden to useable gravel that is excavated from each new gravel pit. Island dimensions may be adjustable as needed, provided the ratios of shallow littoral areas to waterfowl islands remain essentially the same, and with the top of the backfilled overburden elevations as shown on the permit drawings of typical examples of gravel mining and enhancements. The perimeter berm of backfilled overburden placed around the constructed shallows is intended to increase the soil moisture of the backfill and encourage revegetation by catching and holding snowmelt and rainwater until such time that the former gravel pit naturally fills with water.

Summary of the Typical Gravel Pit Enhancement (+/-10%).

Total area of mined gravel pits = 100%.

Of this total area:

70%	Unfilled gravel pit areas will be left to naturally fill with water.
30%	Backfilled overburden area, at the grade of the undisturbed tundra.

Of this 30% backfilled overburden area:

70% (+/-)	Will be constructed as shallow to very shallow littoral areas. Will include an encircling berm in order to trap snowmelt and impound water in this area during the first growing season.
30% (+/-)	Will be constructed as waterfowl nesting islands.
100% (+/-)	Of the backfilled area (waterfowl islands and littoral areas) will be revegetated with harvested tundra mat rhizomes.

An Example of the Permittee Responsible Mitigation for a typical 45-acre Gravel Pit in the Phase 3 Area.

The following description is an example of a typical gravel pit in the Phase 3 area, 44 acres in area and expected to provide about 1.5 million cubic yards of mineable sand and gravel material. This example includes the wetland debits, and the wetland credits that would be gained from the enhancements. In this example the debits from excavating the gravel pit are not entirely offset by the anticipated credits to be gained from the waterfowl island and shallow littoral enhancements constructed on backfilled overburden. Therefore, in order to gain the needed credits in order to offset the debits, a 1 acre area of waterfowl islands and shallow littoral – uplands complex is constructed by the excavation of tundra.

Anticipated Change in Functions Between Pre- and Post- Project Conditions.
The Pre-Project Conditions are:

- 45.0 acres of semi-permanently flooded sedge meadow (PEM/SS1F, PEM1F) Category II wetlands.

The post-project enhancement conditions for the 44 acre gravel pit.

- 34.6 acres Excavated Permanently Flooded Pond (deep water gravel pit) (PUBHx) Category II waters, and

- 9.4 acres of waterfowl islands and shallow littoral water in the gravel pit. Category I Wetlands.

The post-project enhancement conditions for 1 acre of semi-permanently flooded sedge meadow tundra, not within the gravel pit footprint.

- 1.0 acres of shrub upland, wetland and waterfowl island complex. Category I Wetlands.

44-Acre Gravel Pit
Deep-Water Lake. Category II.

Acres	Debit	Credit
34.6	2.2	0.0

9.4 Acres of Waterfowl Islands / Shallow Littoral, Constructed on Overburden in Gravel Pit Lake, and,

1.0 Acre of Waterfowl Islands / Shallow Littoral / Uplands Complex, Constructed by Excavation of Tundra. Not within the gravel pit footprint. Category I.

Acres	Debit	Credit
10.4	0.0	2.43

Summary of Debits and Credits.

Deep-Water Lake	Waterfowl Islands / Shallow Littoral
Debit	Credit
2.2	2.43

Net Gain: 0.23 Credits

7 Maintenance Plan

See Long-Term Management Plan, below.

8 Performance Standards

Success of the gravel mining operation will be determined from the as-built survey done showing the locations, size and surface elevations of the gravel pit, of the backfilled waterfowl islands, of the shallow littoral areas, of the tundra island and shallow littoral areas constructed by excavation of the tundra to construct a wetland-upland complex area. The as-built survey will also show the locations of placement of tundra rhizomes for revegetation. The as-built survey will provide information that the enhancement work was done according to plan in regards to the size and surface elevation of the enhancement work. The shallow littoral waters and waterfowl island enhancements are shown on the permit drawings of typical examples of gravel mining and enhancements

The size of the backfilled area within the mined gravel pit will be dependent on the volume of the available organic rich overburden that is produced by the gravel mining. The final location of the enhancement work may deviate from the plan due to requirements at the time of the mining operation as described in the Mitigation Work Plan.

From the documented experience at the site, the shallow littoral water areas become inundated and will begin to revegetate within 2 to 3 years once the gravel pit has filled with water. Past experience shows a low risk of failure, and a high probability that enhancement will be self-sustaining due to the site capabilities on the Colville River floodplain to maintain hydrologic patterns.

Performance information is contained in the following reports:

Progress Report by ABR, Inc. December 2004.
Progress Report by ABR, Inc. October 2006.
Annual Report to the Corps by Permittee. October 2004.
Annual Report to the Corps by Permittee. December 2006
Annual Report to the Corps by Permittee. January 2008
Annual Report to the Corps by Permittee. December 2014
Annual Report to the Corps by Permittee. January 2016

9 Monitoring Requirements

An annual report will be submitted for the term of the permit to the Corps Regulatory Division that describes the gravel mining operation and reclamation activities conducted between September 1 to August 31, and those activities proposed or planned for the following period. The annual report shall delineate: the locations of past, current and projected (next year) mining operations; enhancement activities completed, on-going, and proposed; and, an assessment of enhancement activities implemented. Supportive documentation will be submitted by January 15th of the following year, including photographs, summary data tables, etc., in sufficient detail to determine permit compliance.

10 Long-Term Management Plan

The enhancement work is anticipated to be hydrologically self-sustaining. The project will be built and left to function on its own.

The Arctic Slope Regional Corporation (ASRC) is the owner of the subsurface sand and gravel resource at the project site. ASRC has a use agreement to mine their gravel with the surface owner, the Kuukpik Corporation. The Kuukpik Corporation is the ANCSA village corporation of Nuiqsut. The permittee will be the party responsible for the long-term surface management related to subsurface resource activities. If modifications to enhancements are required, they will be accomplished during either current or subsequent gravel mining operations. Once mining is complete in the Phase 3 area enhancement requirements will cease. Nature will prevail.

Emergency Over-Summer Storage of Overburden.

All past and future gravel mining operations have been done during the winter operating season. The plan for all past and future gravel mining operations is to place the organic rich overburden material on ice pads, and then to backfill the overburden into the mined gravel pit prior to the spring break up. During the 2014 winter operating season the spring break up occurred unseasonably early. As a result the Alaska Department of Natural Resources (DNR) closed all ice road travel early, and with limited notice. The result was that all heavy equipment, supplies and personnel doing the gravel

mining were required to demobilize and exit the operating gravel pit before the overburden could be backfilled into the 2014 pit in Phase 2. In order for the overburden to be authorized to remain on the ice pads over the summer of 2014 a hasty modification was required to the DA permit. The needed permit modification was acquired for the over-summer storage of the overburden on the ice pads.

It is requested that the DA permit be conditioned to authorize activities in response to such an unexpected event. If needed, the DA permit would need to authorize the over-summer storage of overburden on ice pads, with the backfilling of the overburden into the pit during the next winter operation season.

11 Adaptive Management Plan

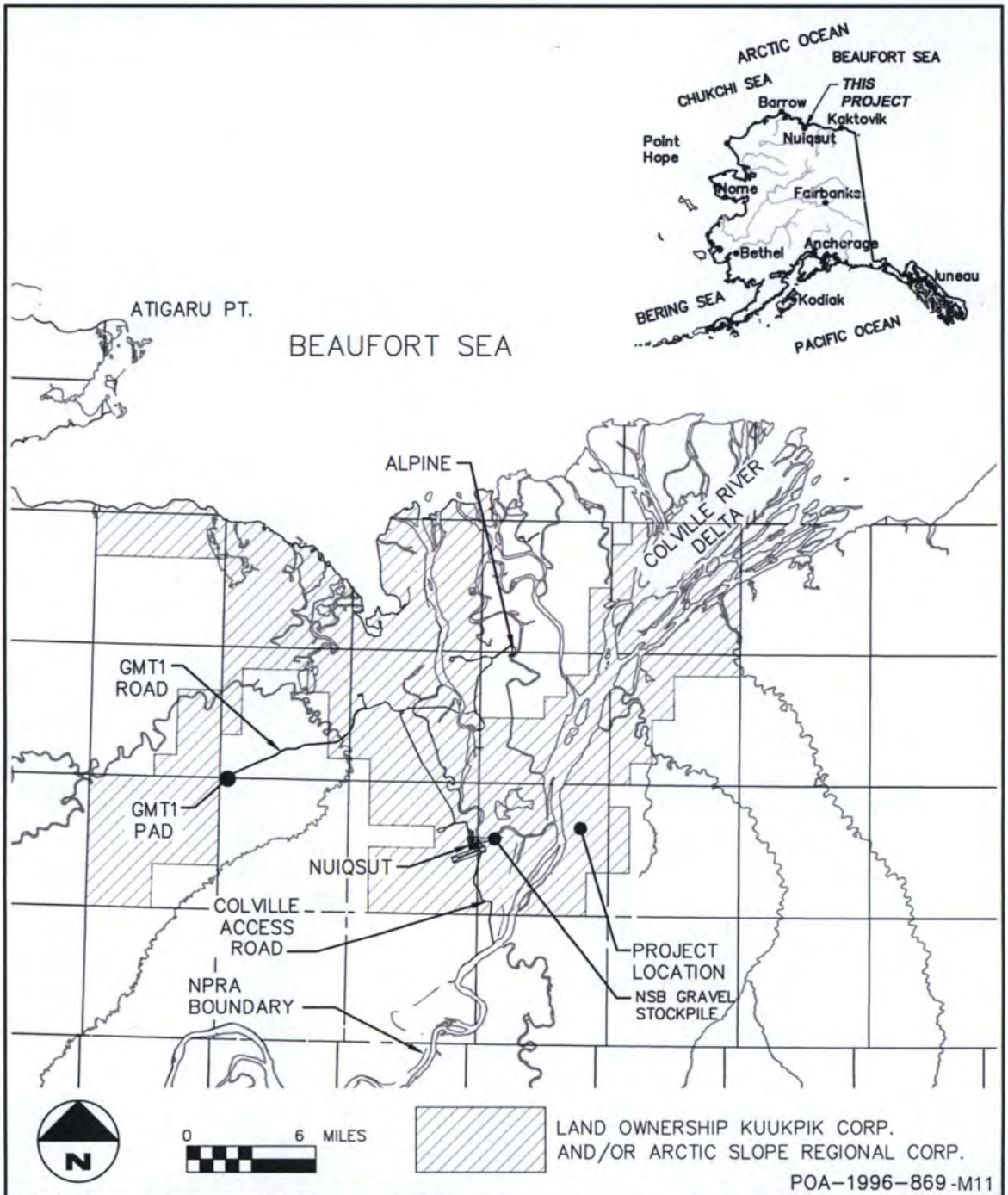
If changes are deemed necessary to enhancement activities for new gravel mining operations, then such potential changes will be addressed in consultation with the Corps of Engineers Regulatory Division. In addition, opinions regarding changes may be sought from the Alaska Department of Fish and Game, Habitat Division, and the U.S. Fish and Wildlife Service.

If modifications are required, they will be accomplished during gravel mining. Once mining is complete, enhancement requirements will cease. Nature will prevail.

12 Financial Assurances

The work planned is anticipated to be self-sustaining due to the floodplain location, with a high probability that site hydrology will be maintained. This is supported by the track record of identical enhancement activities that occurred between 1998 and 2015. Additionally, once the gravel resource is depleted, future development activities are not likely to occur. These two factors contribute to a low risk of failure. Therefore, no financial assurances are proposed.

Permit Drawings, Sheets 1 – 6.
Typical Examples of Gravel Mining and Enhancements.



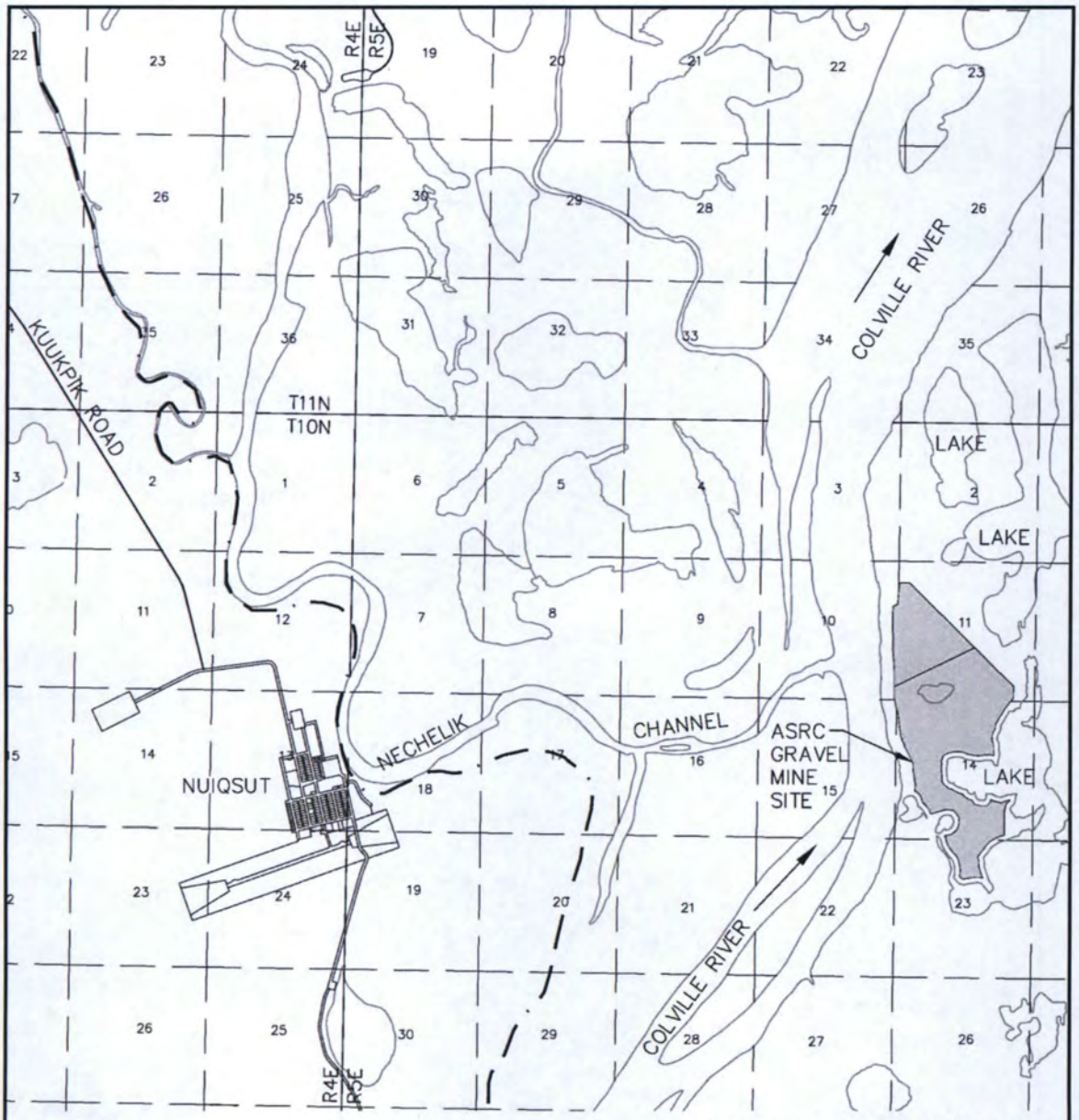
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE
VICINITY MAP – COLVILLE RIVER DELTA
NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 1 of 6
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16-04-04-1



POA-1996-869-M11

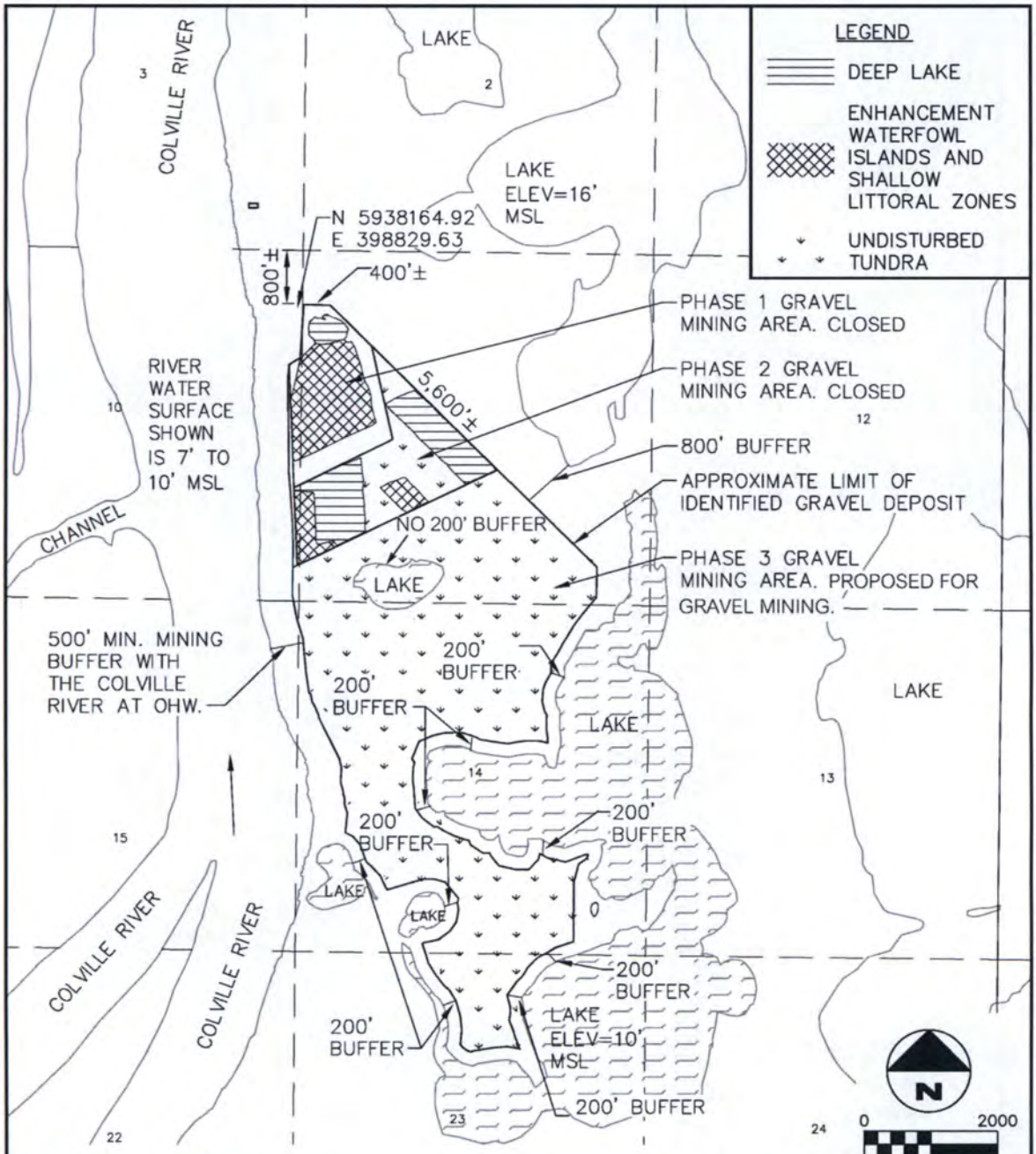
Applicant:	Arctic Slope Regional Corporation
Project:	Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.
Purpose:	Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

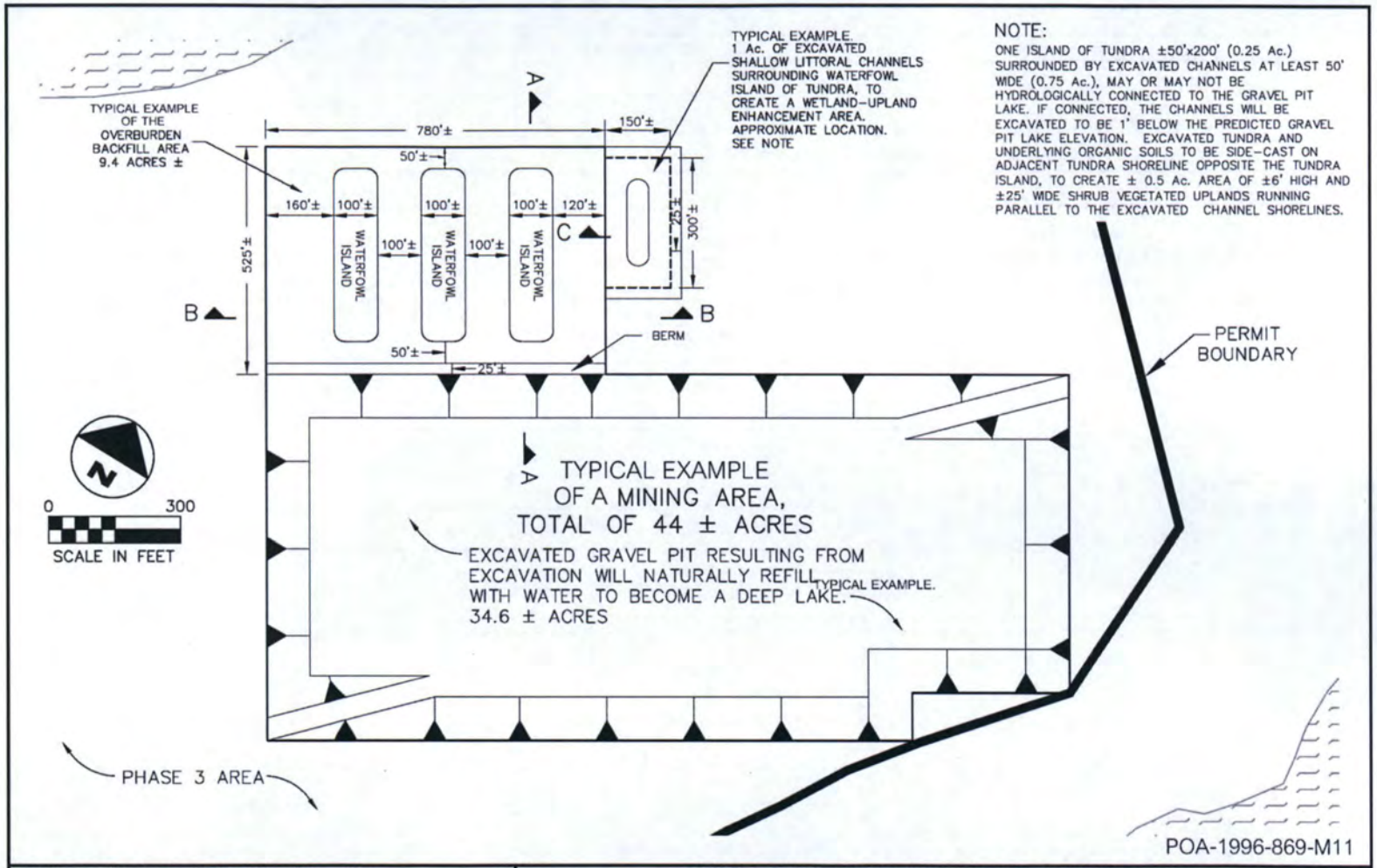
ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE

JANUARY 2017 VICINITY MAP 2

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 2 of 6
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16-04-04-1


LEGEND
DEEP LAKE
ENHANCEMENT WATERFOWL ISLANDS AND SHALLOW LITTORAL ZONES
UNDISTURBED TUNDRA
COLVILLE RIVER
LAKE
LAKE ELEV=16' MSL
N 5938164.92
E 398829.63
800'±
400'±
5,600'±
PHASE 1 GRAVEL MINING AREA. CLOSED
PHASE 2 GRAVEL MINING AREA. CLOSED
800' BUFFER
APPROXIMATE LIMIT OF IDENTIFIED GRAVEL DEPOSIT
PHASE 3 GRAVEL MINING AREA. PROPOSED FOR GRAVEL MINING.
RIVER WATER SURFACE SHOWN IS 7' TO 10' MSL
CHANNEL
NO 200' BUFFER
500' MIN. MINING BUFFER WITH THE COLVILLE RIVER AT OHW.
200' BUFFER
LAKE ELEV=10' MSL
N
0
2000
SCALE IN FEET
IN CASE OF DISCREPANCY ON THIS SHEET 3, WRITTEN MEASUREMENTS ARE SUPERIOR TO SCALED MEASUREMENTS.
USGS MAP, HARRISON BAY A-2
POA-1996-869-M11
Applicant: Arctic Slope Regional Corporation
Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.
Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.
ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE.
LOCATION OF EXISTING AND
PROPOSED PHASE 3 MATERIAL SITE
NORTH SLOPE, ALASKA
DATE: JANUARY 2017
DRAWN BY: CZ
SHEET: 3 of 6
SCALE: 1" = 2000'
CHECKED BY: GD
W.O. No: 16-04-04-1



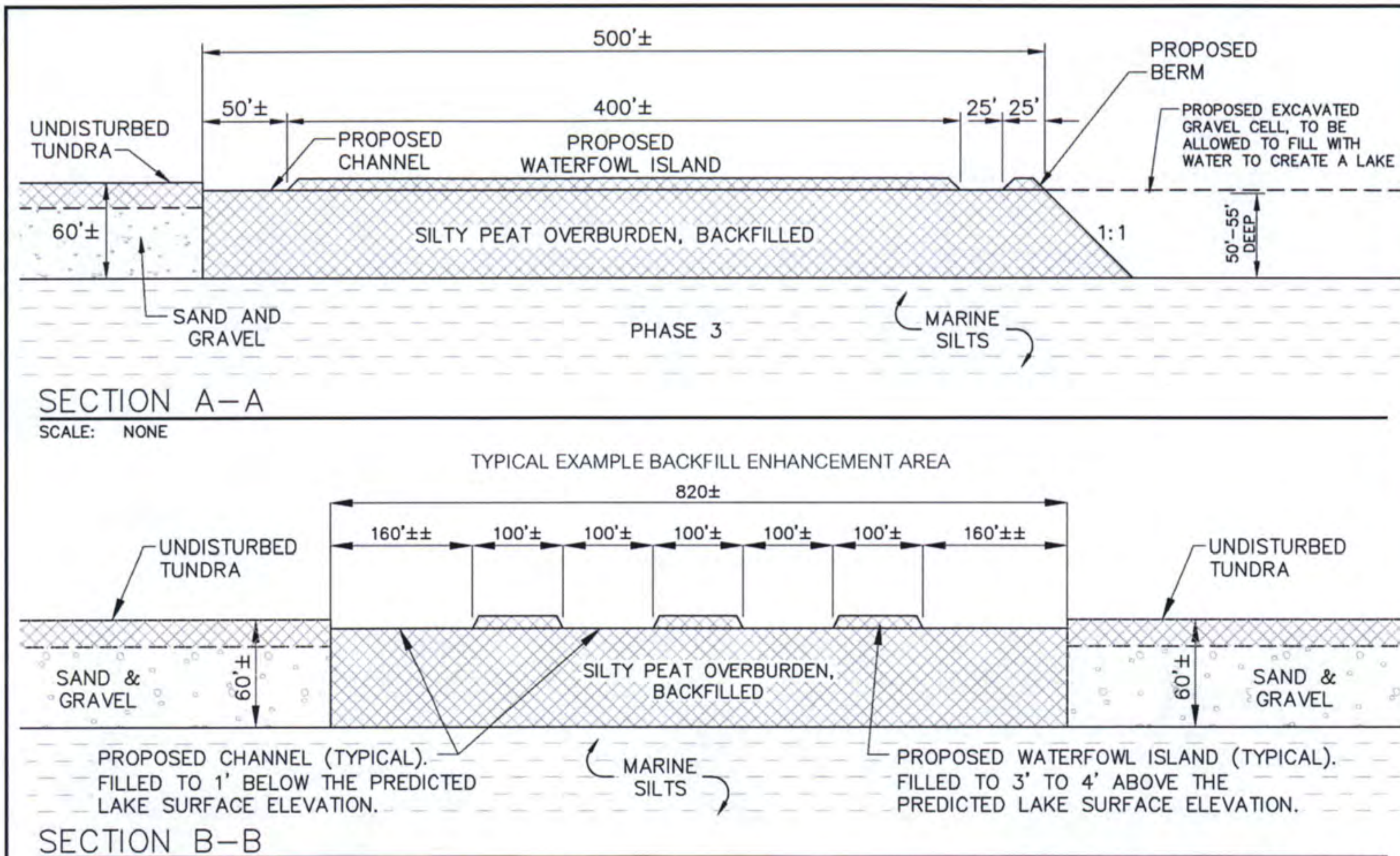
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE.
PHASE 3 AREA. PROPOSED GRAVEL EXCAVATION CELL AND OVERBURDEN BACKFILL AREA AND ENHANCEMENT PLAN. TYPICAL ISLAND AND LITTORAL AREA POST EXCAVATION CONDITION AND WETLAND – UPLAND ENHANCEMENT AREA. PLAN VIEW, DETAILS.

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 4 of 6
SCALE: 1" = 300'	CHECKED BY: GD	W.O. No: 16–04–04–1



POA-1996-869-M11

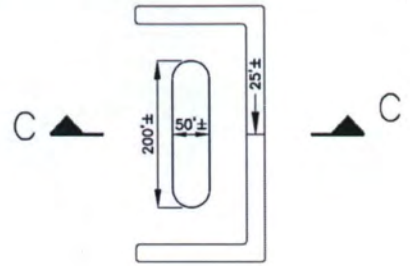
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

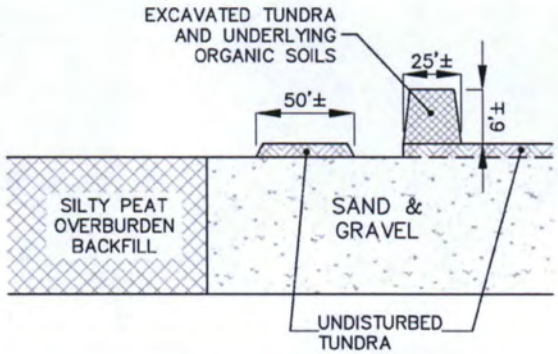
TYPICAL EXAMPLES. ASRC CONSOLIDATED GRAVEL
PHASE 3 WATERFOWL ISLANDS ENHANCEMENT SECTION VIEWS.
A-A AND B-B
NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 5 of 6
SCALE: NONE	CHECKED BY: GD	W.O. No: 16-04-04-1



PLAN VIEW: WETLAND–UPLAND ENHANCEMENT AREA

SCALE: 1" = 200'



NOTE:
See the Note on Sheet 4 of 6 regarding the construction of this Wetland - Upland Enhancement Area

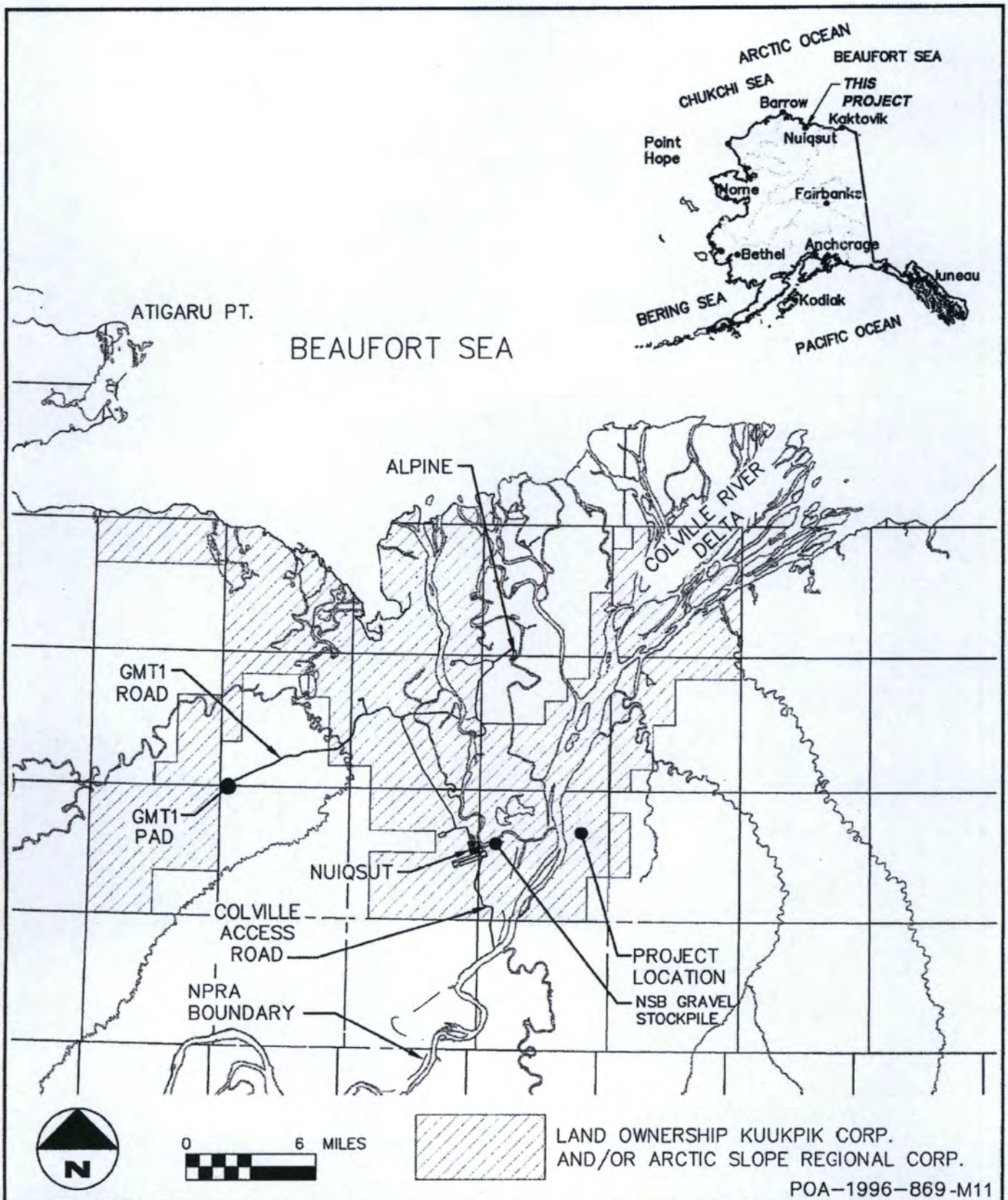
SECTION C–C

SCALE: NONE

POA-1996-869-M11

Applicant: Arctic Slope Regional Corporation	TYPICAL EXAMPLES. ASRC CONSOLIDATED GRAVEL SITE. PHASE 3 WATERFOWL ISLANDS ENHANCEMENT PLAN SECTIONS VIEWS. C–C. NORTH SLOPE, ALASKA
Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.	
Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.	

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 6 of 6
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16–04–04–1



POA–1996–869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

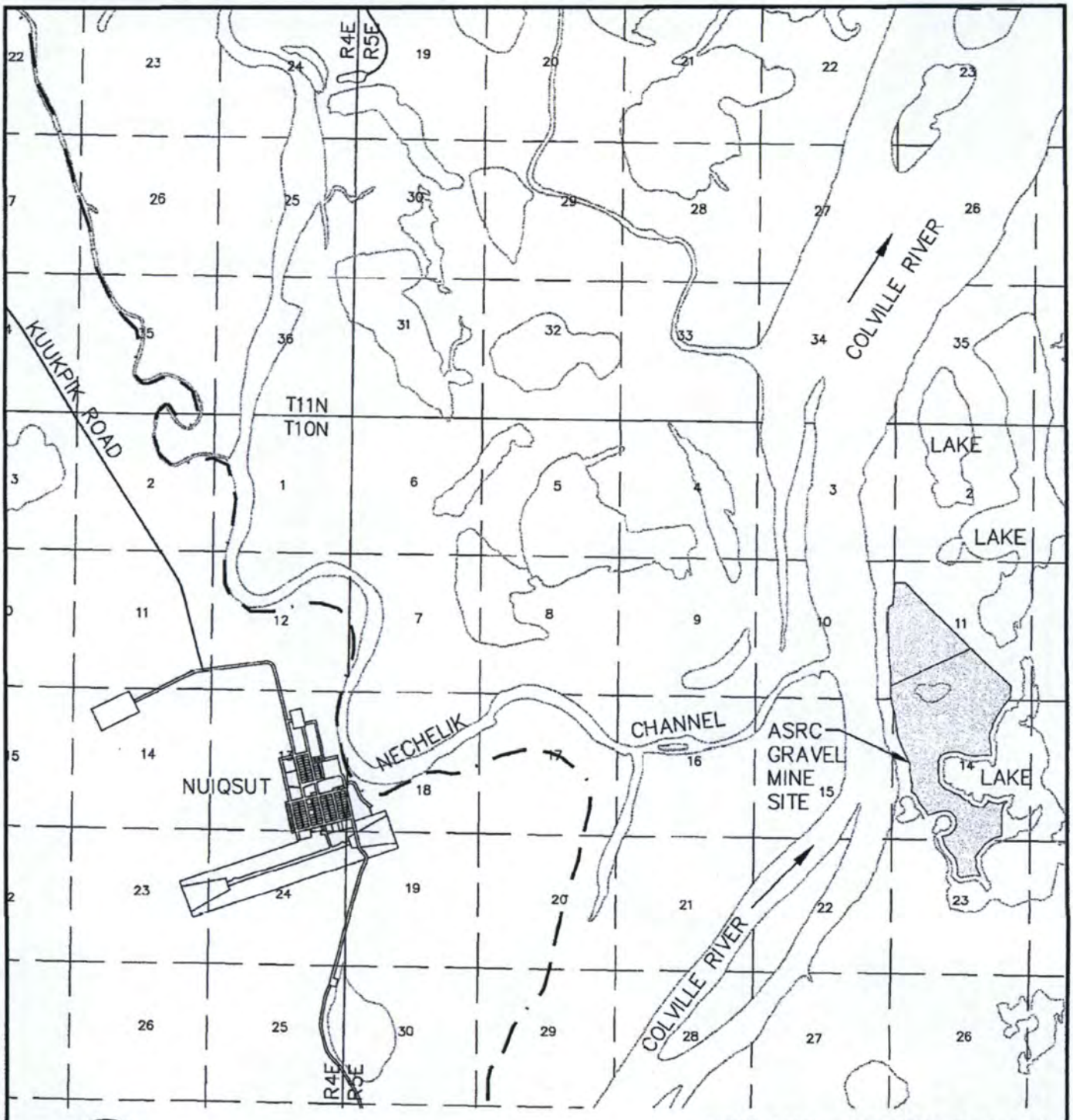
Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE

VICINITY MAP – COLVILLE RIVER DELTA

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 1 of 7
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16-04-04-1



USGS MAP, HARRISON BAY A–2

POA–1996–869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

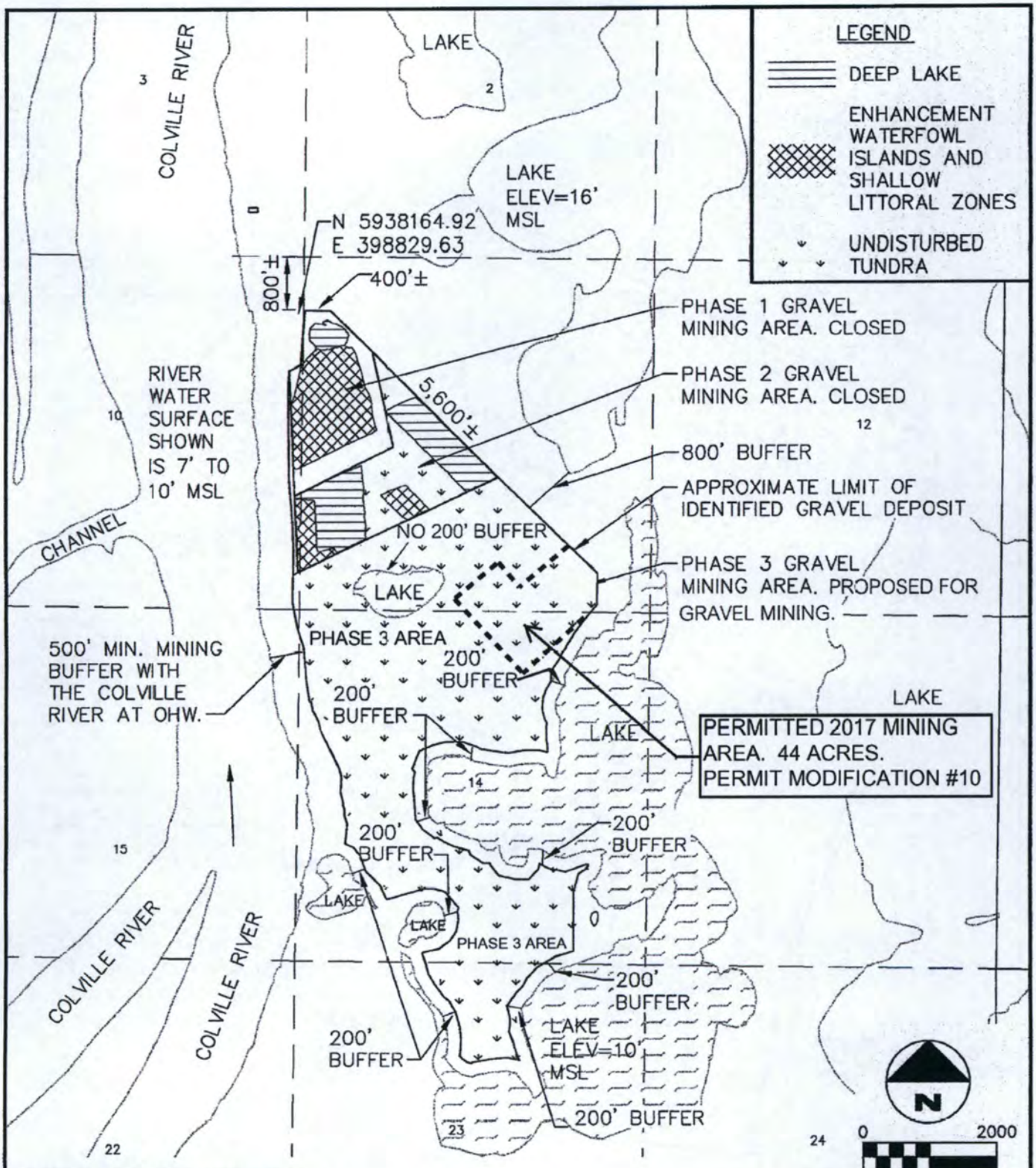
Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE

VICINITY MAP 2

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 2 of 7
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16–04–04–1



IN CASE OF DISCREPANCY ON THIS SHEET 3, WRITTEN MEASUREMENTS ARE SUPERIOR TO SCALED MEASUREMENTS.

USGS MAP, HARRISON BAY A–2
POA–1996–869-M11

Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

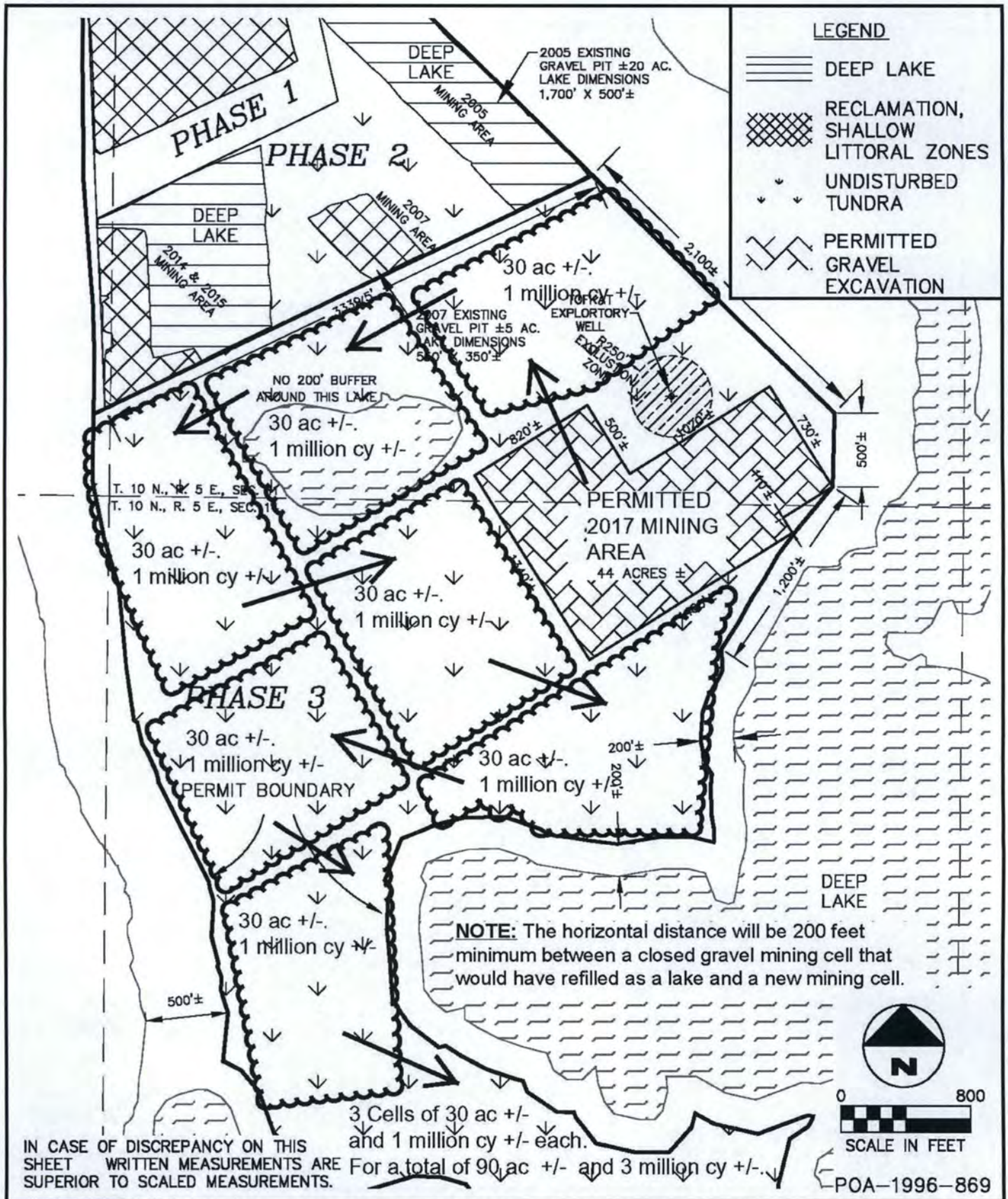
ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE.

LOCATION OF EXISTING AND

PROPOSED PHASE 3 MATERIAL SITE

NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 3 of 7
SCALE: 1" = 2000'	CHECKED BY: GD	W.O. No: 16–04–04–1



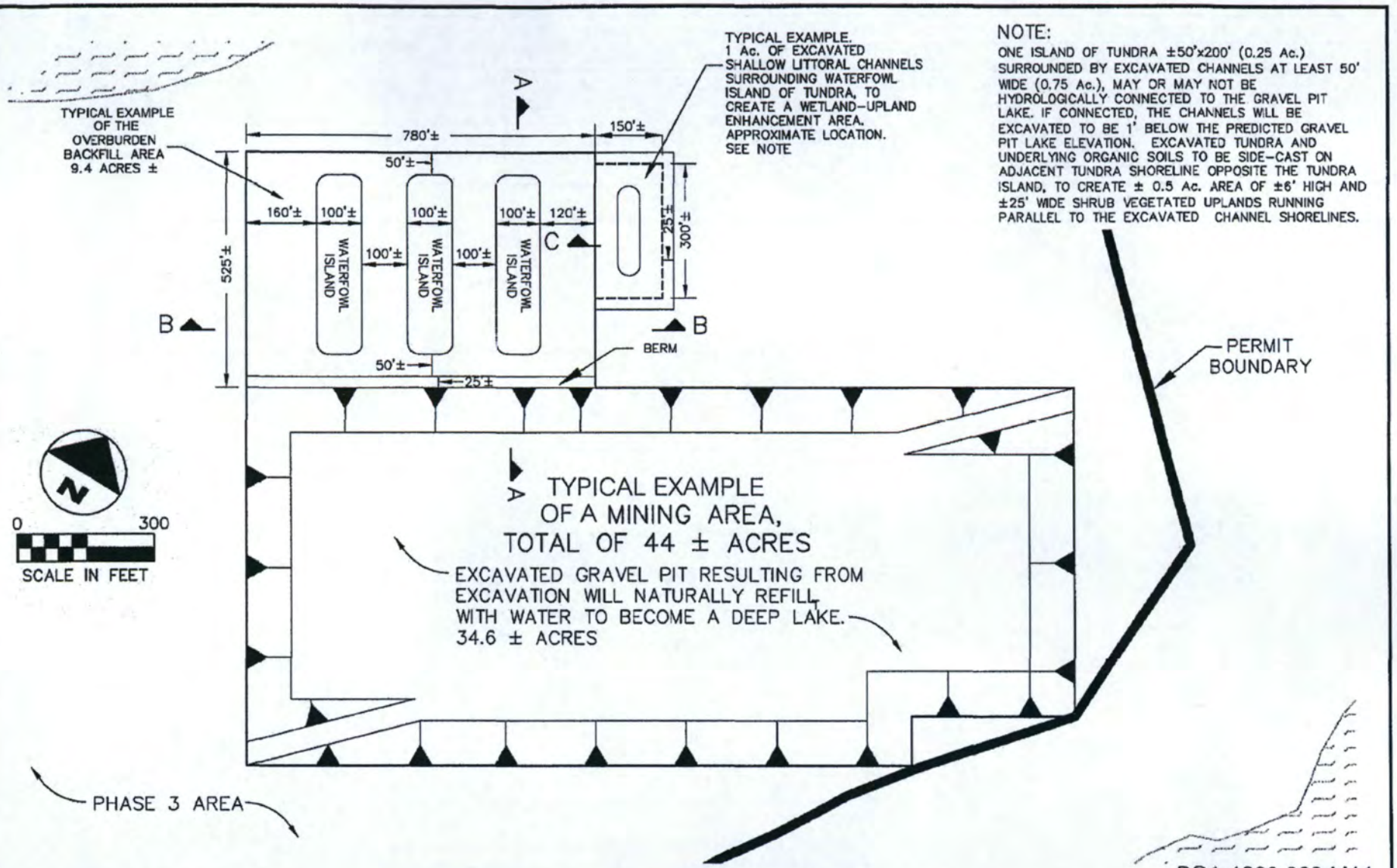
Applicant: Arctic Slope Regional Corporation

Project: Consolidated Use Gravel Material Site Colville River Delta, North Slope, Alaska Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, reclamation and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE. MINING PLAN, POTENTIAL FUTURE GRAVEL MINING CELLS. PHASE 3 AREA.

DATE: JANUARY 2017	DRAWN BY: TM	SHEET: 4 of 7
SCALE: 1" = 800'	CHECKED BY: TM	W.O. No: 16–04–04–1



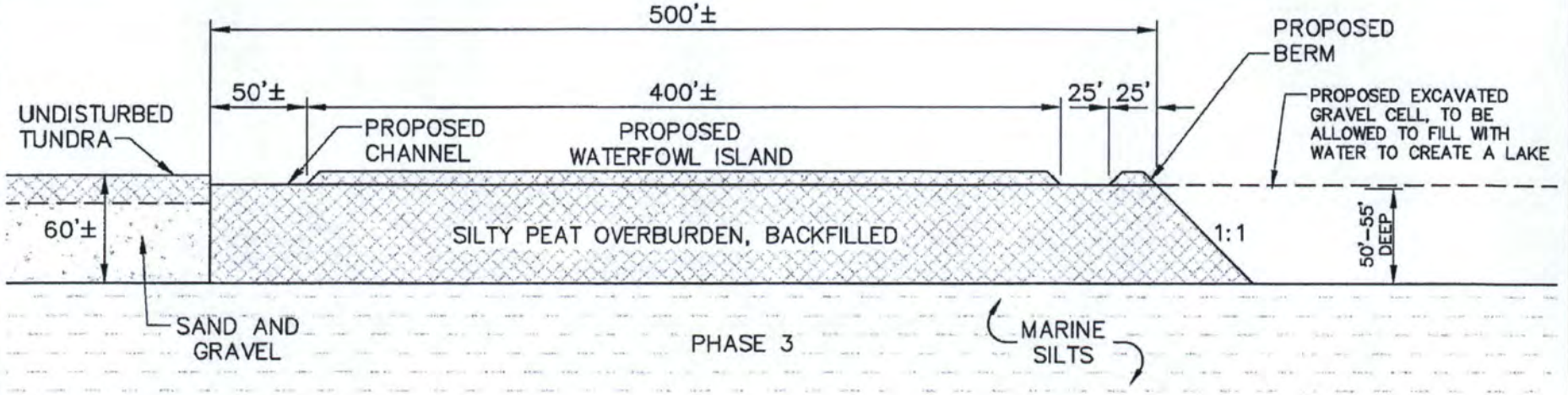
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

ASRC CONSOLIDATED USE GRAVEL MATERIAL SITE.
PHASE 3 AREA. PROPOSED GRAVEL EXCAVATION CELL AND OVERBURDEN BACKFILL AREA AND ENHANCEMENT PLAN. TYPICAL ISLAND AND LITTORAL AREA POST EXCAVATION CONDITION AND WETLAND – UPLAND ENHANCEMENT AREA. PLAN VIEW, DETAILS.

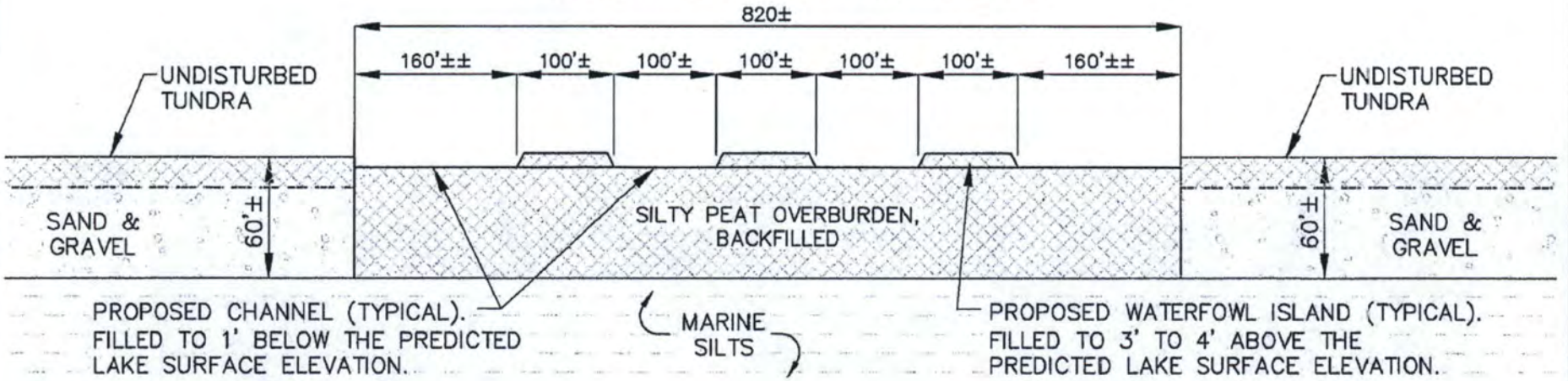
DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 5 of 7
SCALE: 1" = 300'	CHECKED BY: GD	W.O. No: 16–04–04–1



SECTION A–A

SCALE: NONE

TYPICAL EXAMPLE BACKFILL ENHANCEMENT AREA



SECTION B–B

SCALE: NONE

POA-1996-869-M11

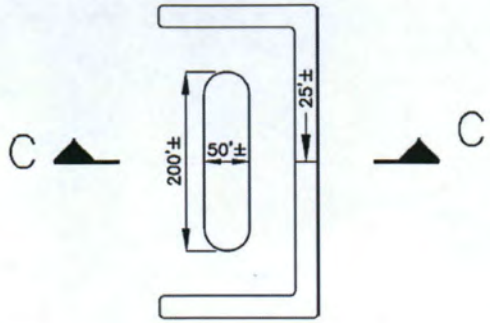
Applicant: Arctic Slope Regional Corporation

Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian.

Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.

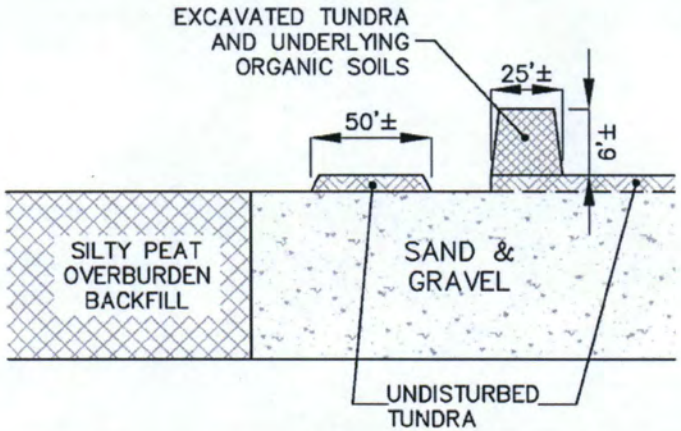
TYPICAL EXAMPLES. ASRC CONSOLIDATED GRAVEL
PHASE 3 WATERFOWL ISLANDS ENHANCEMENT SECTION VIEWS.
A-A AND B-B
NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 6 of 7
SCALE: NONE	CHECKED BY: GD	W.O. No: 16–04–04–1



PLAN VIEW: WETLAND–UPLAND ENHANCEMENT AREA

SCALE: 1" = 200'



NOTE:
See the Note on Sheet 5 of 7 regarding the construction of this Wetland - Upland Enhancement Area

SECTION C–C

SCALE: NONE

POA-1996-869-M11

Applicant: Arctic Slope Regional Corporation Project: Located within sections 10, 11, 14, 15, 23, T10N R5E, Umiat Meridian. Purpose: Continued development, enhancement and expansion of the existing ASRC Colville consolidated use gravel material site.	TYPICAL EXAMPLES. ASRC CONSOLIDATED GRAVEL SITE. PHASE 3 WATERFOWL ISLANDS ENHANCEMENT PLAN SECTIONS VIEWS. C–C. NORTH SLOPE, ALASKA

DATE: JANUARY 2017	DRAWN BY: CZ	SHEET: 7 of 7
SCALE: AS SHOWN	CHECKED BY: GD	W.O. No: 16–04–04–1