NOTE: THE CASE STUDY PROPOSAL (ATTACHMENT F) HAS BEEN WITHDRAWN BY THE APPLICANT PURSUANT TO CORRESPONDENCE FROM IPOP, LLC's COUNSEL (JAMES BUCHAL) ON 4.30.2024. THIS ATTACHMENT IS BEING PROVIDED BY THE DEPARTMENT OF NATURAL RESOURCES FOR CONTINUALITY OF THE ATTACHMENT NAMING CONVENTION.

Attachment F

Case Study Amendment to the Narrative and Plan of Operations for Bonanza Channel Placer Project, Alaska
IPOP, LLC

DETAILED PLAN OF OPERATIONS FOR SUMMER 2021: A PROPOSAL TO AMEND THE 2020 NARRATIVE AND PLAN OF OPERATIONS TO PROVIDE A BONANZA CHANNEL CASE STUDY (BCCS)

Public comments received from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), the Environmental Protection Agency (EPA) and the public about the Individual Permit Application highlighted the need for additional information for the services to authorize full scale mining in the project area. Agency reviews also highlighted deficiencies in scientific data and literature available for reference to support the IPOP's position that the proposed project will result in minimal impact to the resource values of the Bonanza Channel Lagoon; specifically, that there is little to no scientific data or literature to reference that directly addresses the ecosystem of a northern latitude estuary or lagoon, and that there has been no prior dredging operations like the proposed project in intertidal areas in Alaska that could be used as a case study.

To generate additional real case-study data (in the absence of available literature or comparable operations) IPOP is proposing this amendment to the existing Individual Application to modify access channel construction into a site specific, controlled, full-scale mining and reclamation study. This study is designed to provide necessary data and to address agency questions and/or concerns relating to several topics, including:

1) Turbidity developed by a full-scale mining operation of all substrates down to 28 ft. total dredging depth.
2) Quantify impacts of a full-scale mining operation to fish and wildlife.
3) Confirmation of the submarine slope angle of the typical dredge channel in this specific operational setting.
4) Confirmation of the bulking factor estimates in the plan of operations for the larger 5-year mining proposal.
5) Refinement and proof of concept of operational reclamation methods including restoring bathymetry profiles in shallow water.
6) Assessing the need, method, and effectiveness of harvesting organic-rich bottom soil for habitat restoration efforts.
7) Proof of concept data relating to the effectiveness of reclamation to successfully restore and improve estuarine functions once mining has ceased including a) submerged aquatic vegetation (SAV) re-growth and recovery time; b) recovery of benthic species/communities disturbed by the mining process and timeline; and c) improvement of fish and migratory bird habitat through the reclamation process.
8) Documentation of low equipment sounds using dosimeters above water and hydrophones below water (sound source verification study).
9) Demonstrate that a project such as this can coexist with subsistence harvest and other activities (such as commercial bird watching) in the Bonanza Channel.

The volume and utility of the additional scientific information to be gathered suggests that the proposed application amendment amounts to what one might call a Bonanza Channel Case Study (BCCS), of which the project purpose is gathering additional scientific information and can only occur in the special aquatic site represented by Bonanza Channel Proposed Project area. The scientific aspect is important because IPOP believes it can demonstrate that dredging of sediment (derived in-part from prior mining operations on the Solomon River) and reclamation in these intertidal waters can improve fish and migratory bird habitat and maintain existing estuarine ecosystem services in Bonanza Channel.

5.8 [Proposed] Dredge Area Access Channel and Bonanza Channel Case Study[1]

IPOP proposes to modify § 5.8 of the 2020 Narrative and Plan of Operations to include significant new study components identified as the Bonanza Channel Case Study (BCCS) phase of proposed five-year operations. As detailed below, IPOP proposes to a simple, low impact mining and habitat restoration operation that will dredge accumulated sediments from the Bonanza Channel, process the material for gold (the proceeds of which will be used to fund the operation), deepen areas within the Bonanza Channel making the habitat more suitable for fish, reclaim and re-establish the disrupted SAV and benthic colonies, and redistribute excess material near shore to create additional productive shore bird habitat. The proposed test phase of the Individual Application will: 1) demonstrate by proof of concept that successful habitat improvements can be made to the Bonanza Channel Lagoon while also providing a substantial multi-million-dollar economic benefit to the community of Nome and Alaska, 2) have no significant negative environmental impact, 3) pose no substantive risk to fish, marine mammals, or wildlife, 4) co-exist peacefully with subsistence activities in the area 5) and most importantly leave no persistent visible footprint.

The camp site and equipment will be the same as described in the 2020 Narrative and Plan of Operations, except that IPOP proposes to bring in one to two gravel pump dredges to allow more precise bottom sculpting for reclamation. These additional pumps will enable IPOP to test an alternative of harvesting upper-level sediments rich in organic material (Charged Organic Veneer) and distributing a layer on mined areas to see if the recovery of SAV can be appreciably enhanced.

The proposed changes may be summarized as follows:

- BCCS project operating life of one season.
- Phase 1 would dredge and backfill approximately 160,000 cubic yards of silt, sand and gravel from a 5.9-acre test area. If successful and time allows Phase 2 would expand the test area by dredging and backfilling up to 135,000 additional cubic yards of material from a 4.6-acre test area.

[1] Existing § 5.8.1 in the 2020 Narrative Statement would be replaced with this material; maintenance would continue as proposed in existing § 5.8.2.

- Dredging depth of 28 feet.
- Reclamation concurrent with dredging, with temporary dredge material disposal sites reclaimed by the end of the case study.
- Study area located close to shore, near the entry point for easy access and quick response time.
- Study area outside of fish migration corridors.
- Study area is planned in shallow water with SAV mapped in the area as sparse, patchy, and continuous offering a great opportunity to demonstrate the reclamation effectiveness.
- Study area uniquely positioned between two large islands offering isolation from the greater Bonanza Channel; especially when closed off with turbidity curtains.
- Case study designed to demonstrate the long-term effectiveness of the curtain containment over a wider range of weather conditions, while minimizing the consequence of any failures.

5.8.1 BCCS PLAN OF OPERATIONS

This Plan of Operations for the Bonanza Channel Case Study (BCCS) covers a period of one summer/fall season, starting June 2021 through October 15, 2021. The BCCS area is located entirely on State of Alaska mining claims in waters over which the U.S. Army Corps of Engineers asserts jurisdiction.

5.8.1 General Operational Plans

Figures 5-8-20, 5-8-21 and 5-8-22 show the overview stages of the BCCS. The case study operation will dredge/mine the sands located in Bonanza Channel using a high-capacity cutterhead dredge and recover gold with a self-contained gravity recovery processing platform that is connected to the dredge by a 300-600' long floating pipe. The project will incorporate adaptive management practices utilizing the additional smaller equipment to ensure more controlled soil/organic substrate harvesting and restoration, more controlled and precise placement of bulked materials in shallow water dredge material disposal sites (DMDS), more precise bottom sculpting during the reclamation phase, and for use in developing the initial start-up area to the appropriate depth to allow the launching of the cutterhead dredge and the processing barge.

5.8.2 Base Camp Operations, Waste Disposal, Fuel and Staging

See section 5.2 of the 2020 Narrative and Plan of Operations for the Bonanza Channel Placer Project, Nome, Alaska.

5.8.3 Details of Equipment

See section 5.3 of the 2020 Narrative and Plan of Operations for the Bonanza Channel Placer Project, Nome, Alaska.

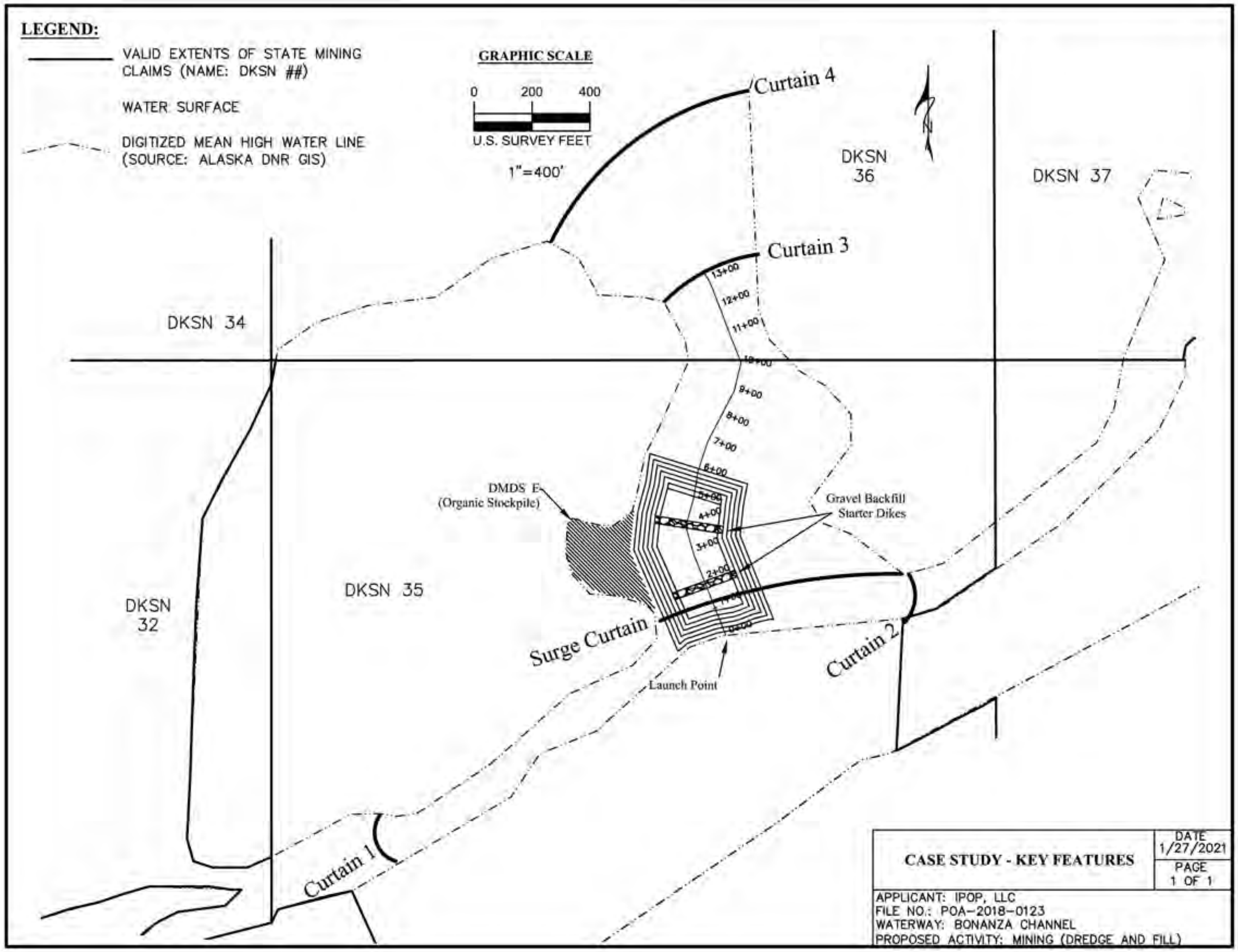

Figure 5-8-20. Overview map of the BCCS showing general centerline of dredging channel, turbidity curtain locations, launch point for dredge, and general contours of a dredged pit with conceptual gravel backfill control dikes.

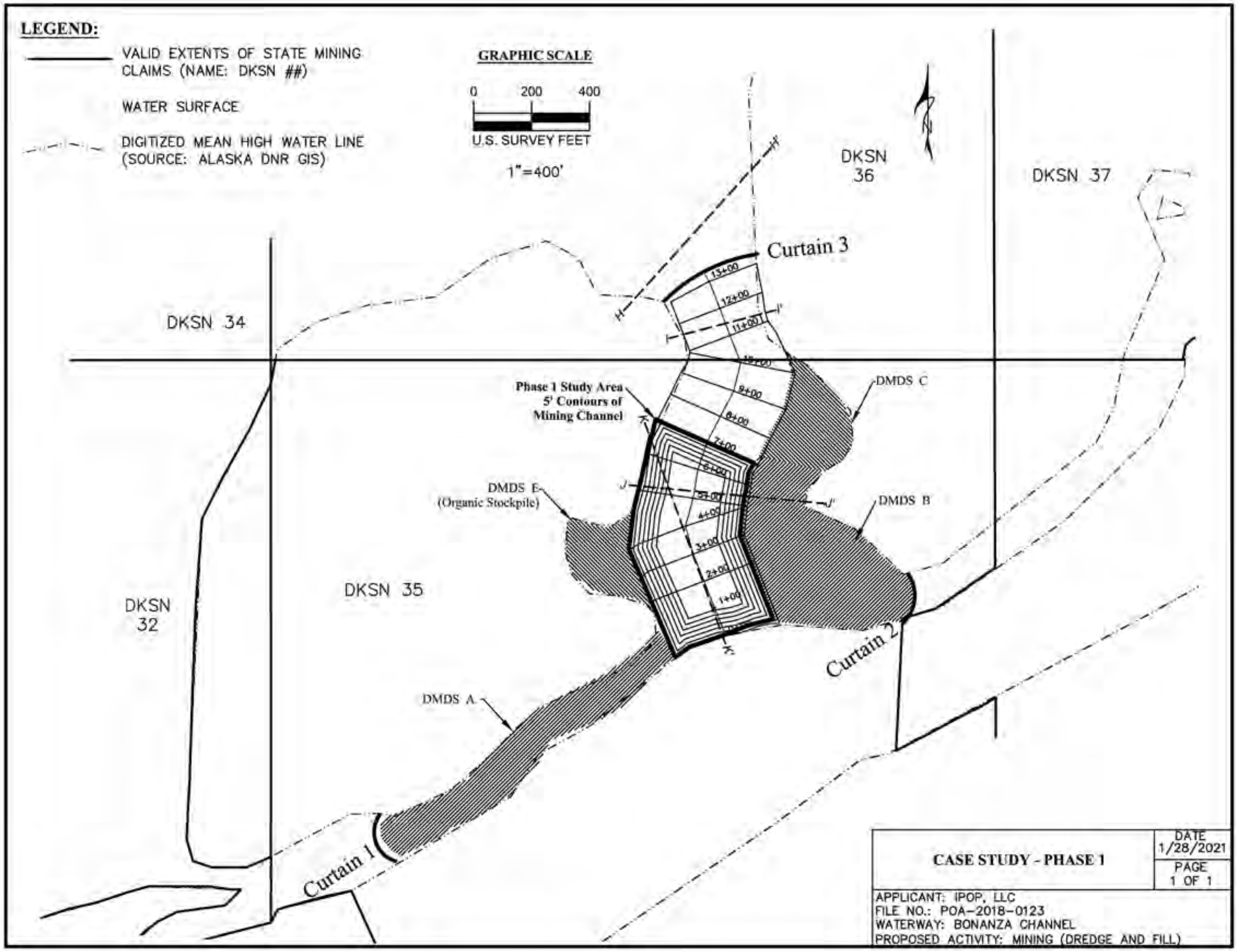

Figure 5-8-21. Map of the BCCS showing phase 1 general outline of dredging channel, turbidity curtain locations, cross section lines, dredge material disposal sites and general contours of the phase 1 dredged pit (illustrated as not backfilled).

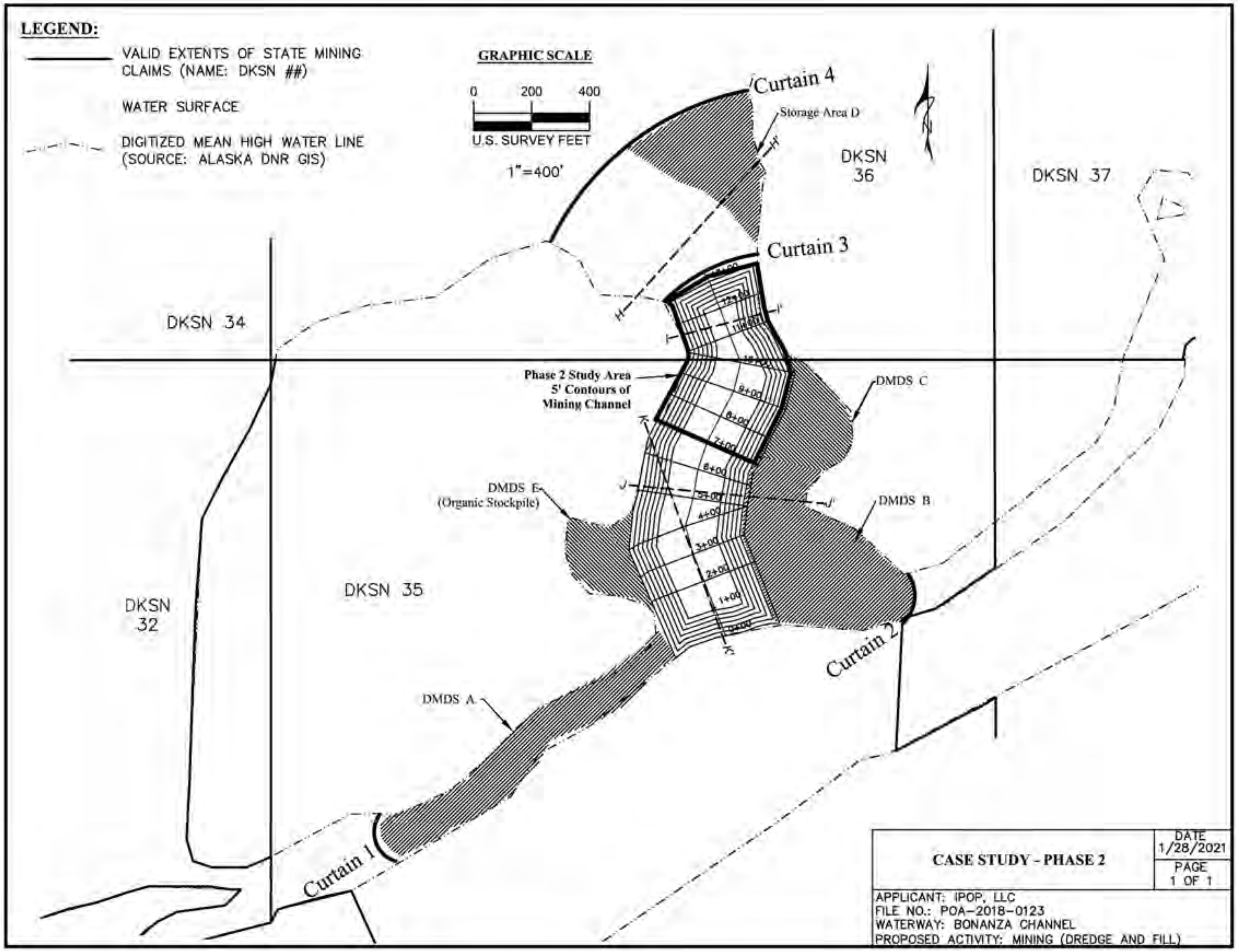

Figure 5-8-22. Map of the BCCS showing phase 2 general outline of dredging channel, turbidity curtain locations, cross section lines, dredge material disposal sites and general contours of phase 2 dredged pit (illustrated as not backfilled).

5.8.4 Gravel Pumping Dredge Details

Figure 5-8-23 is a schematic of the gravel suction dredge mounted on a shallow draft barge. The operation may utilize up to 2 gravel suction dredges into the equipment fleet if needed. The gravel suction dredge is moved by either barge tender/push boats or by winches. The dredge's gravel pump is an 8" pump designed for moving high concentrations of solids (<50% by weight) without grinding or physical impacts to soils or vegetation. The pump is powered by an onboard 75-80 hp Deutz engine that meets U.S. EPA Tier 4 emission standards (typical: 4-cylinder, 4-stroke prechamber diesel engine with a power rating at 2,300 rpm of 58 kW (77.8 hp). The engine/pump unit is the loudest part of this dredge (without sound dampening mufflers or engine enclosure 104 +/- 2 dB(A) re 20 uPa) and will be equipped with sound dampening exhaust and fully enclosed to attenuate normal running noise, resulting in maximum sound levels approximately 75 +/- 3 dB(A) [re 20uPa] equivalent to a human speaking in a normal volume. The underwater suction nozzle will make no noise.

The gravel suction dredge can excavate approximately 35-100 cubic yards of material per hour while moving unconsolidated soils, and larger capacities when conveying material dredged by the larger cutterhead dredge. This production estimate is based upon an engineering analysis provided by Keene Engineering but is highly dependent upon the type of material being dredged.

This dredge will be a multi-function piece of equipment used for soil harvesting, reclamation, bottom sculpting, entry site prep/deepening for the cutterhead dredge and the processing barge and conveying sand and gravel to dredge material disposal sites and shore-line habitat restoration areas. For soil harvesting, reclamation, and bottom sculpting operations the suction nozzle for this dredge will be fitted with a manually operated wide mouthed 6" or 8" suction nozzle with a safety suction break that will be suspended from floats that will be manually operated by a worker in the water.

For conveying gravel and sand away (from bulking or deepening of the channel) the dredge will be fitted with a standard suction hose fixed to the base of a cone-shaped chute mounted on a stationary float (Figure 5-8-24) berthed to the processing barge beneath one of the three outfalls depending upon size fractions and volumes of material to convey. For this purpose, the unit will essentially be used as a pumping system for excess material and will require no diver for the operation.

The discharge end of the pump will be attached to a 300-800 ft floating discharge line with a discharge end mounted to floats designed to decrease velocity and evenly distribute the material in a controlled fashion.

During the BCCS, IPOP will improve existing and develop new BMPs for full-scale operations in the main mining channel.

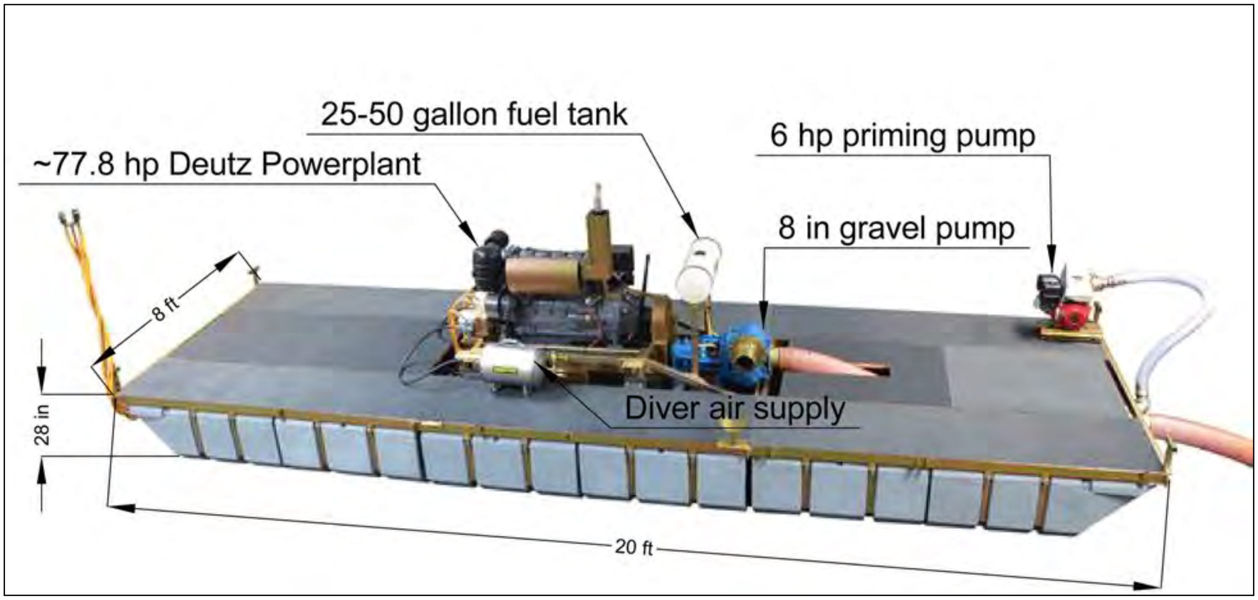

Figure 5-8-23. Gravel suction dredge (noise suppression engine cowling not shown).

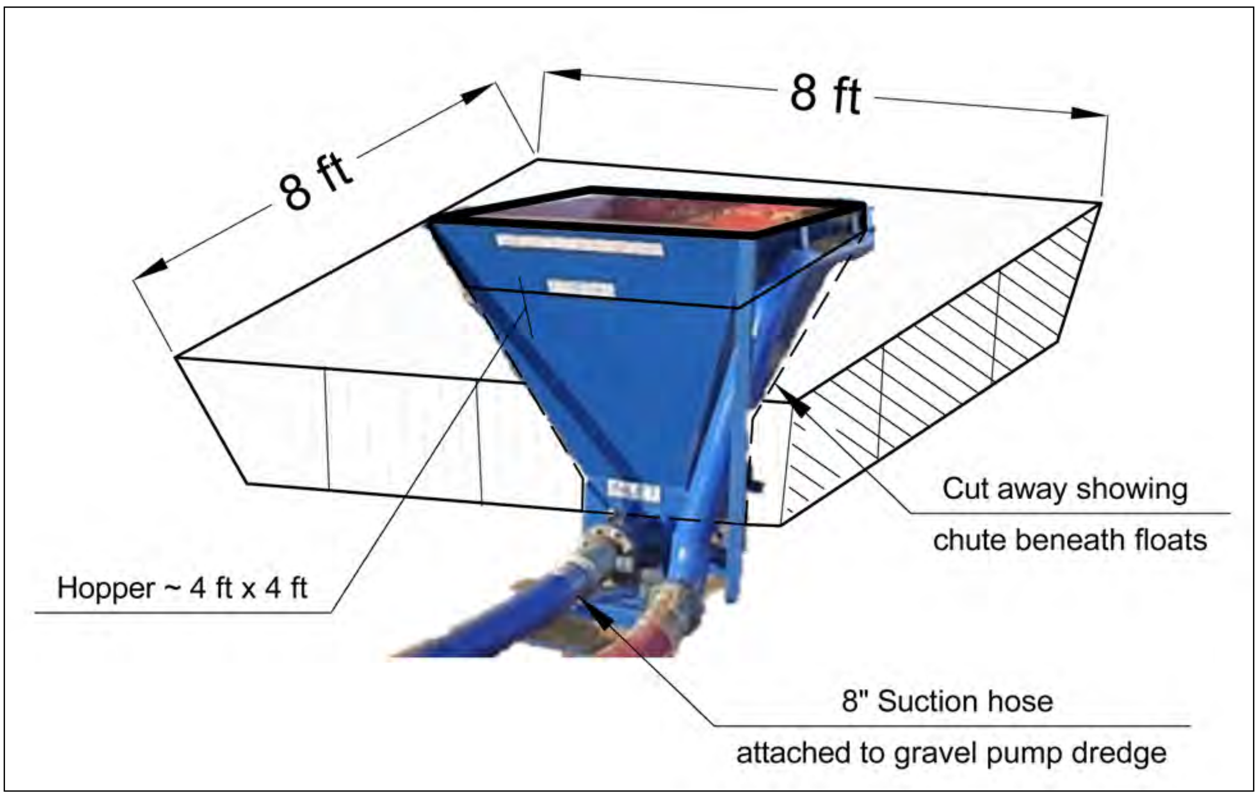

Figure 5-8-24. Generalized conceptual drawing of outfall chute/hopper that would be used to convey material away from the processing barge to DMDS.

5.8.5 Amphibious Excavator Details

As an additional contingency an amphibious excavator may also be incorporated into the equipment fleet if required for the operation. Figure 5-8-25 is a photo showing this piece of equipment. They are used on many U.S. Corps of Engineers dredging projects as support equipment. There are many manufactures of these types of modifications, however IPOP has been working with FROGCO Amphibious Equipment, Inc. who has provide machinery for the U.S. Army Corps of Engineers projects operated by Mason Dredging/Construction, Coastal Dredging, Weeks Marine, and Magnolia Dredging (to name a few).

The excavator will be a 312D class Cat or equivalent excavator with a gross vehicle weight of 65,000 lbs. (fueled with 150-gallon on-board standard fuel tank). As with the cutterhead dredge, the excavator will use vegetable based, environmentally friendly hydraulic oil (10W Rotella or Chevron Clarity) to mitigate any harm to the waterway caused by leaks. It will be equipped with a pontoon undercarriage (4 ft high x 4 ft wide x 27 ft long) for operations in water allowing the excavator to float in water approximately 3 ft deep. The excavator track is wider than a stock track reducing the overall ground pressure 2 psi on solid ground, reducing in water as the pontoons allow floatation (decreasing psi with increasing water depth). Dimensions of the machine with the floating undercarriage are 14 ft – 7 in-wide x 27 ft-long.

This piece of machinery will include a standard boom with a reach of approximately 30 ft., equipped with a 1 or 1.8 yd³ bucket capable of moving 200 yd³ per hour with an experienced operator. If incorporated into the fleet, the excavator will be a multi-function piece of equipment used for setting dredge anchors, moving dredge pipe, management of dredge spoil piles, dike construction, reclamation, bottom sculpting, entry site prep/deepening for the cutterhead dredge and the processing barge and conveying sand and gravel to dredge material disposal sites and shore-line habitat restoration areas if equipped with a submersible pump attachment on the boom in subsequent years (a 6" submersible Dragflow hydraulic slurry HY35B pump [or equivalent] powered by the excavator).

The proposed BCCS is designed to offer more detail on the description of dredged or filled solids by monitoring, evaluating, and documenting of geochemistry, soil size fractions, slope stability and the bulking factor for the material that will be dredged in further phases of operations.

5.8.5 Description of Water

See section 5.5 of the 2020 Narrative and Plan of Operations for the Bonanza Channel Placer Project, Nome, Alaska.

The proposed BCPP Case Study is designed to conduct ongoing environmental data collection to include details in support of the BCPP 5-year plan of operations conclusions and descriptions of the water. This includes monitoring, evaluation, and documentation of turbidity from the

Figure 5-8-25. FROGCO amphibious excavator.

5.8.5 Description of Dredged or Filled Solids

See section 5.4 of the 2020 Narrative and Plan of Operations for the Bonanza Channel Placer Project, Nome, Alaska.

operation as well as water chemistry, dissolved oxygen, conductivity, water current and tidal dynamics.

5.8.6 Bathymetric Profile

IPOP engaged an independent consulting biologist, David Eilers, to map the bathymetry and seagrass in the study area during the summer of 2020. Detailed mapping of the BCCS area is shown in Figure 5-8-26 and shows that the proposed case study area is nominally 2 ft deep, with local areas between 2 and 3ft deep. The case study is expected to change the bottom profile by establishing an access channel of less than 1200' length with a nominal depth of 7 ft BMHW. Additionally, the case study would create 10-14 acres of mudflats.

5.8.7 Gold Resource

Additional information concerning gold availability in the BCCS area should be available from winter 2021 coring, but the purpose of the BCCS of gathering data to refine and develop best management practices for full scale operations and reclamation will be vindicated irrespective of the amounts of gold.

5.8.8 Delineation Drilling Plan

Figure 5-8-27 shows the delineation drill plan for the area of the BCCS. Applicant designed this drill plan to define the gold distribution across the test area both laterally and vertically. The drill results will be reconciled to the actual gold recovered from the case study to evaluate the effectiveness of the drill sampling for this and the larger proposed 5-year BCPP.

See also section 5.7.3 and 5.7.4 of the 2020 Narrative and Plan of Operations for the Bonanza Channel Placer Project, Nome, Alaska.

5.8.9 BCCS Details

Figure 5-8-20, 5-8-21 and 5-8-22 are overviews of the BCCS showing the dredging location, dredge material disposal sites, and the access channel inside the general project area. The access channel (or trench) for the operation is also depicted in Figure 5-8-28 with corresponding cross sections shown in Figure 5-8-29 and Figure 5-8-30.

The access channel is designed to be 50’ wide at the bottom with a maximum water depth of 7 ft. BMHW. The dimensions and depth of the access channel may be adjusted shallower or narrower as operational experience and limitations dictate. The access channel slopes are expected to be an overall slope of 3:1 or steeper; therefore, the channel will average 80 ft. wide over most of its length.

5.8.9.1 BCCS Dredging Operations

The nominal activity window is expected to be between June 1 and October 15 in one summer. Dredging is expected to occur 24 hours per day with a maximum production rate of 267 yd^3/hr for the work window of 140 days. The project is divided into two phases. Phase 1 will excavate and place 158,319 yd^3 from a 5.9-acre area. Assuming Phase 1 is a success, Applicant will proceed with Phase 2 that is planned to excavate an additional 135,642 yd^3 from a 4.6-acre area.

The mining channel is designed around the capabilities of the dredge but for the purpose of the case study the dredging will only be 28 ft. deep from the surface of the water, stopping above a thick clay layer identified in previous drilling that is believed to be continuous throughout the project area, and the bottom width will be between 190 and 200 ft. By stopping at the clay, the project will reduce the impacts of turbidity and material bulking and instability from the clay. Dredged trench slope angles are dependent upon the types of material being dredged and the depth of the trench and consideration of the most common instability mechanism for slopes, shear failure (Raaijmakers, 2005). Wave load was not considered in the design of the slope angles because of the shallowness of the estuary and the fact that wave effect rapidly peters out with depth. The trench slope is assumed to be an overall listric shape, standing at 2.7:1 (H:V) or 20 degrees near the top, and 3.7:1 at the bottom of the trench, for an overall average design slope average of 3:1 similar to breaching test results during suction dredging (Maertens, Van Alboom, Haelterman, & Couck, 2014). Consideration of the 3:1 (H:V) trench slope makes the overall mining trench width at the top 350’ wide at its maximum (see Figures 5-8-29 and 5-8-30).

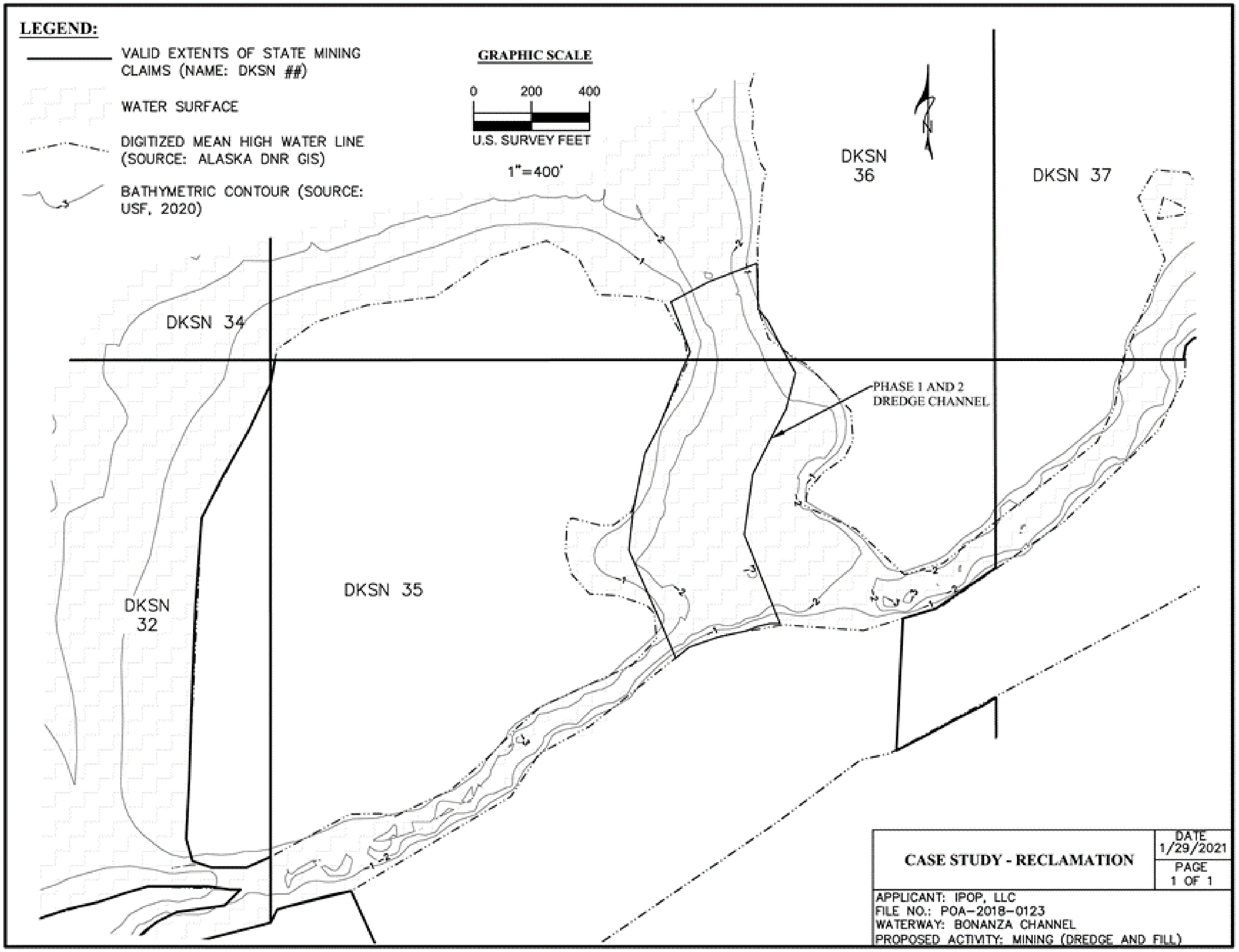

Figure 5-8-26. Bathymetric map after Eilers, 2020. Phases 1 and 2 of the BCCS outlined.

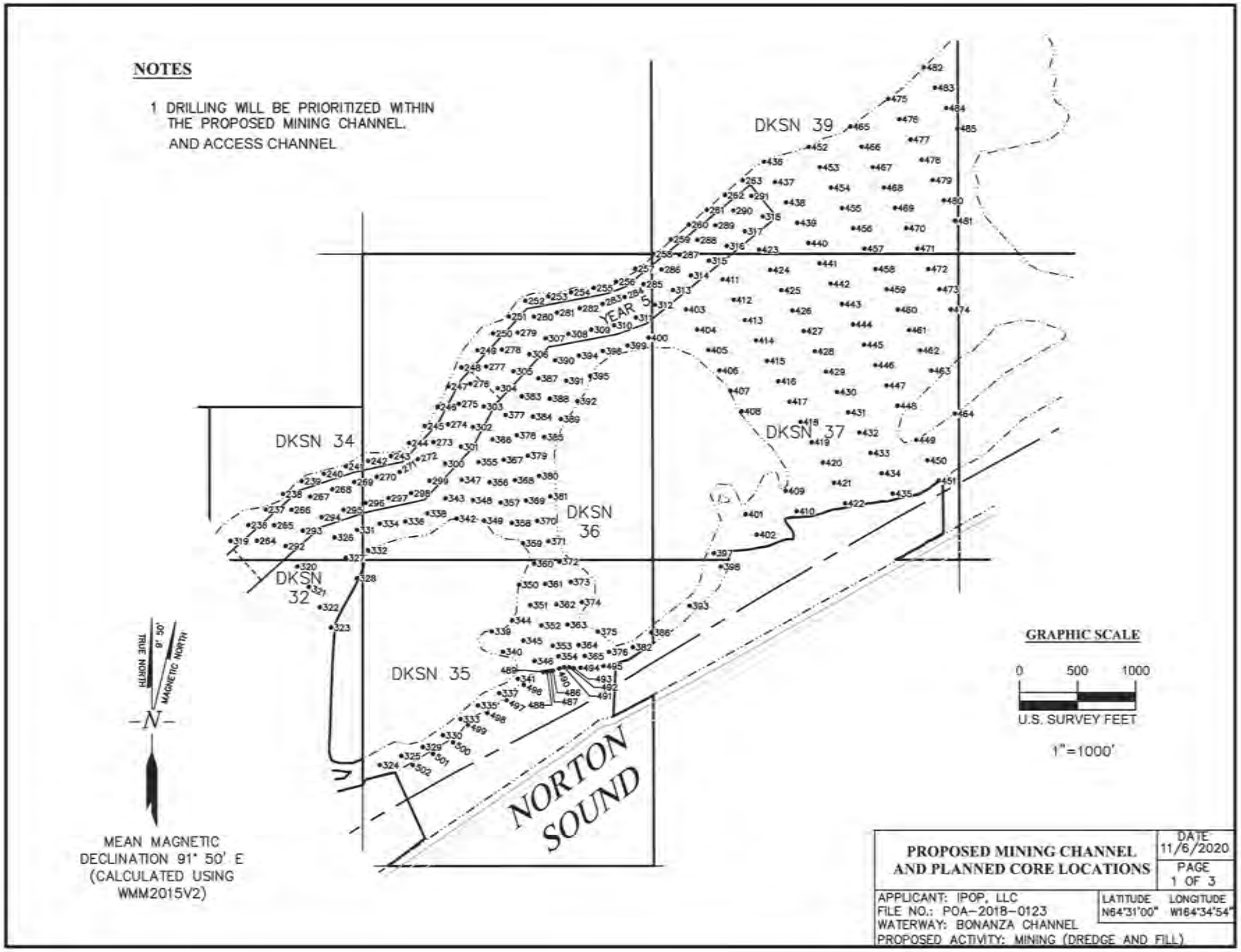

Figure 5-8-27. Map of the BCCS showing planned exploration drilling.

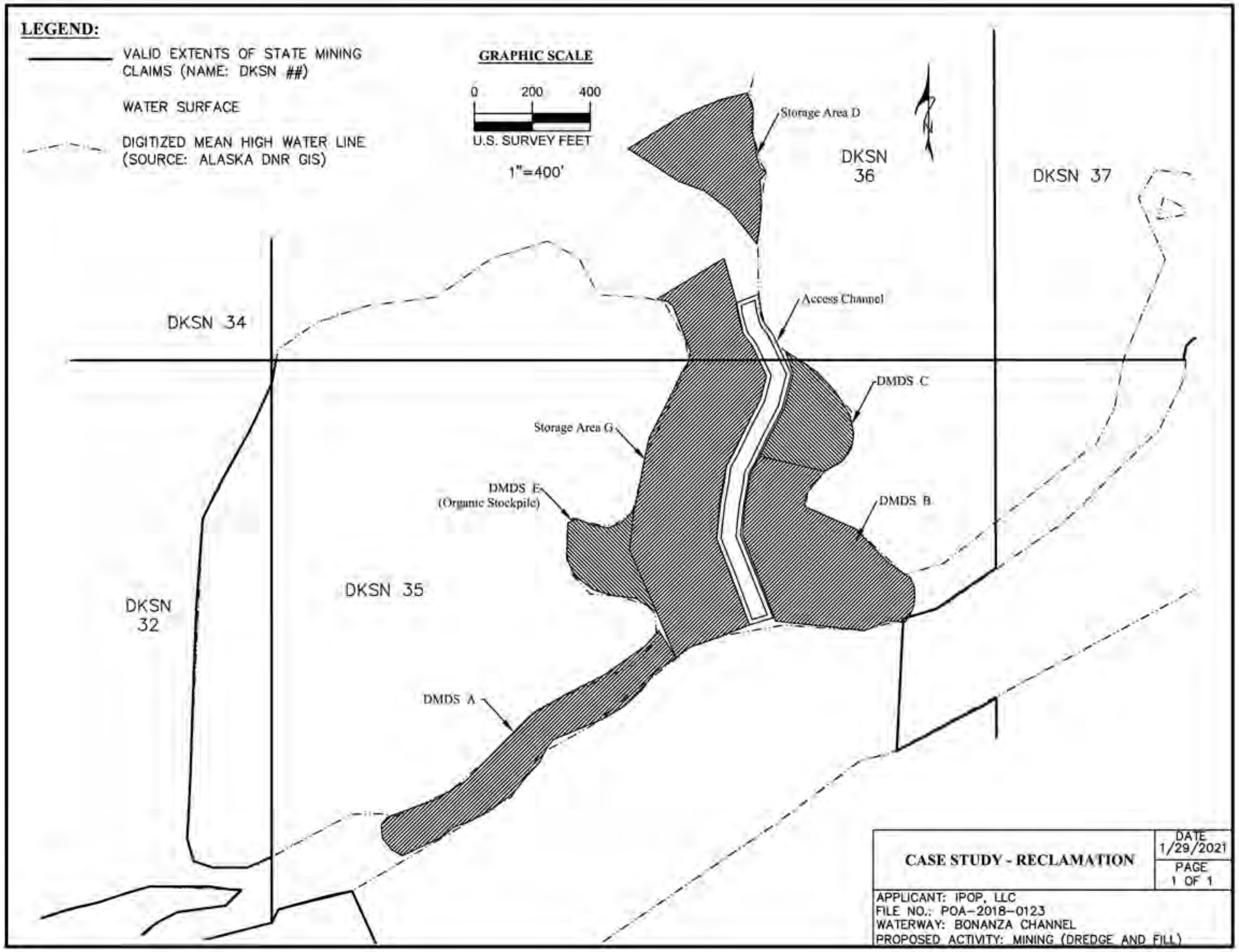

Figure 5-8-28. Map of the BCCS showing dredge material disposal sites and access channel. Storage Area G represents the backfilled dredge channel.

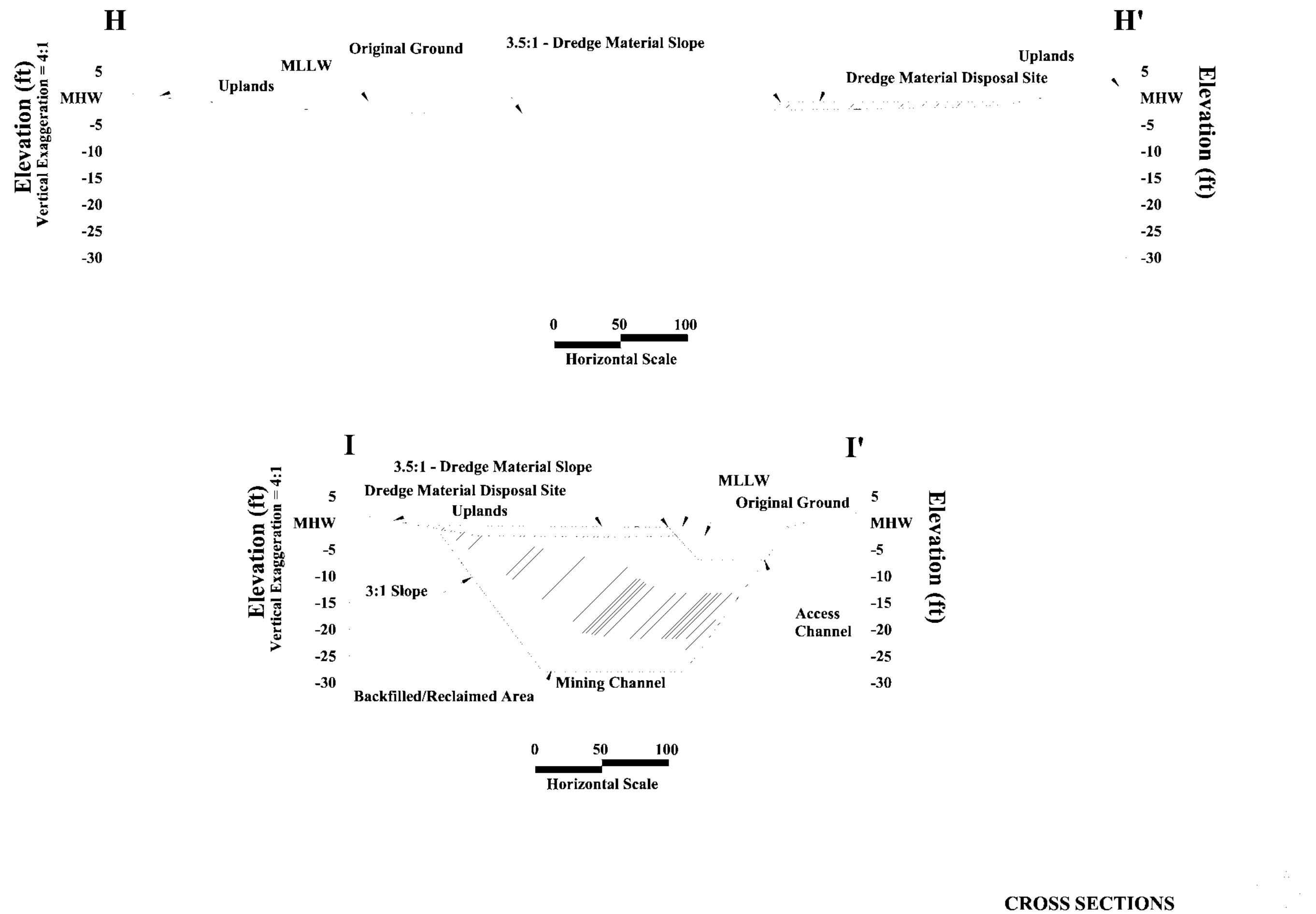

Figure 5-8-29. Typical cross sections of BCCS dredge and fill: H-H' and I-I'.

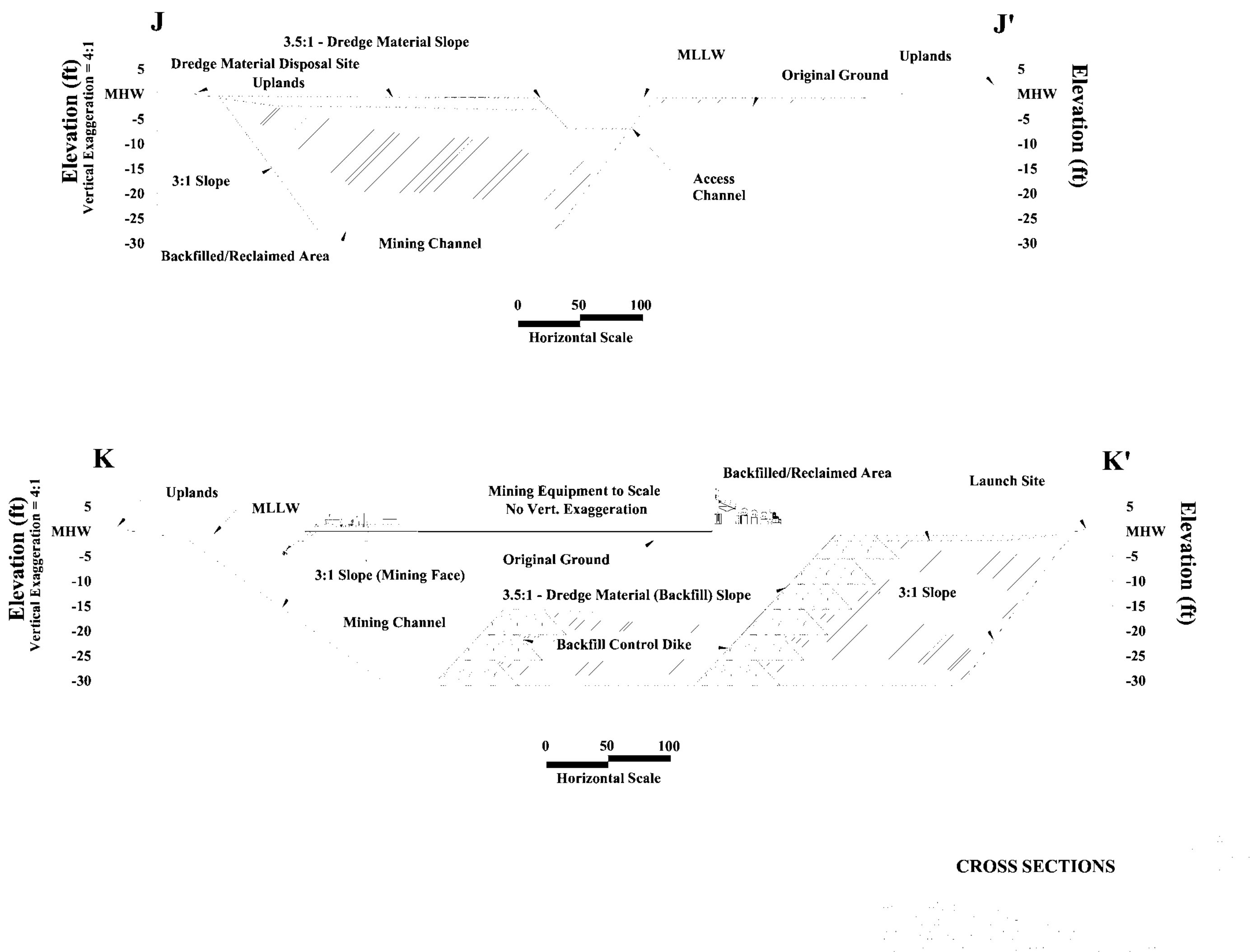

Figure 5-8-30. Typical cross sections of BCCS dredge and fill: J-J' and K-K'.

5.8.9.2 BCCS Dredged Material Disposal Sites

Dredge Material Disposal Sites (DMDS) for the case study are all located on both sides of the dredge and access channels, between the channels and the islands. These DMDS for the case study are planned as areas for initial deposition of dredged material from the dredge starting hole (described in Section 5.9.2, *Stage 1,* and illustrated in Figures 5-8-20, 5-8-21, and 5-8-27), for storage of harvested organic rich substrate (within a storage area diked by either a silt curtain or geotextile tubes filled with sand) and for storage of excess (or bulked) dredged soils from the dredge channel.

The operation expects there to be enough storage capacity for these purposes at or below MLLW. However, Applicant will also temporarily deposit a portion of the material AMHW if material bulking exceeds expectations in *special circumstances* (see section 5.8.9.4). Any such material will be reclaimed to BMHW at the end of the summer.

Considering an estimated overall bulking factor of 1.16, and a consolidation of 7.5% of the bulked material with time and self-weight consolidation (reducing the average bulking factor to 1.075), the DMDS are expected to have enough volume to accommodate all bulking expected from this operation. Table 5-8-7 details the disposal areas, calculated storage capacities, and estimated dredge and fill volumes within special aquatic sites for the purpose of the case study. Adaptive management plans include provisions for utilizing sections of turbidity curtains, or segregated coarser material constructed berms for stabilization of spoils to keep them from spilling into the dredge channel during operations.

5.8.9.3 BCCS Stages of Dredging Operations

The typical stages of the dredging operation are shown in Figure 5-8-20 and Figure 5-8-21. Corresponding cross sections are shown in Figures 5-8-29 and 5-8-30. The stages, phases and figures are described in detail below. When necessary, dredging will temporarily shut down to allow for reclamation activities, monitoring, and surveying. Regular surveying will be required to: 1) Measure the slope profile of the dredging trench, 2) Maintain accurate volume measurements of both original dredged volumes, and 3) Measure placed material for bulking factor measurements.

<u>Stage 1, Phase 1.</u> As with all the dredge stages, the silt curtain is installed before any dredging takes place (see Section 5.10.1). Once the silt curtains are established 2000-3500 yards of organic rich soil (Charged Organic Veneer) will be harvested with the smaller specialized gravel pump dredge and stored in DMDS E. Additionally, the launch area will be deepened by 1-2 feet prior to launching the dredge using the smaller gravel pump dredge. As the larger cutterhead dredge is preparing to mine, its computer system is mapping the bottom of the channel, creating a 3D point cloud from sonar and on-board differential GPS. Tall survey lath will be placed in the water approximately 10 feet from the adjacent island as markers to indicate any sloughing off the dredge channel at a flatter angle than expected during dredging. If this occurs, the dredge

Table 5-8-7. Estimated dredge and fill volumes and area acreage for case study.

ESTIMATED DREDGE AND FILL VOLUMES (CASE STUDY)

Item Description	Acres By Area	Reclaimed		Storage Capacity (CY)	Dredged Volume (CY)	Bulked Dredged Volume* (CY)	Fill Type and Volume Soils		Fill Volume Summary		
		Yes	No				Wetlands (CY)	Uplands (CY)	Wetlands (CY)	Uplands (CY)	Total (CY)
Access trench		2.4		15,504			*Restored to 7' BMHW*				
Phase 1 Test Area	5.9	4.8		151,204	158,319	170,034	151,204	0	151,204	-	151,204
Phase 2 Test Area	4.6	3.4		127,253	135,642	145,680	127,253	0	127,253	-	127,253
DMDS A	3.4	3.4		11,120			4,277	0	4,277	-	4,277
DMDS B	4.9	4.9		15,801			15,801	0	15,801	-	15,801
DMDS C	1.7	1.7		5,568			5,568	0	5,568	-	5,568
DMDS D	2.6	2.6		8,512			8,512	0	8,512	-	8,512
DMDS E	1.3	1.3		3,099			3,099	0	3,099	-	3,099
DMDS G	*Restored Bathymetry Except for Access Channel*										
Totals	24.6	24.6		322,557	293,961	315,714	315,714	-	315,714	-	315,714

channel centerline will be adjusted away from the island to avoid further sloughing of the island buffer zone.

Stage 2, Phase 1. The dredge will begin to excavate its initial hole at the start of the dredge trench. During this process, the side slopes on the island side of the dredging trench will be continuously monitored. All slopes of the dredge trench are assumed to be approximately 3:1 as described above. The dredged material is processed for gold recovery and deposited within the DMDS location adjacent to the dredging area.

Due to the shallow nature of the lagoon at the test location, the processing barge will be positioned on a timber platform just off the shore in DMDS A or B, connected to the barge by a 10" floating pipeline. The dredge tailings will be deposited from the processing barge outfalls. Gravel and rock (1" minus) from Outfall 1 will be segregated and stored in a stockpile for backfill control dikes. The sands and silts from Outfalls 2 and 3 will be re-distributed away from the processing barge by periodically knocking down piles or capturing the material in floating chutes or hoppers for removal with the gravel pump dredge or excavator to convey the material at 40-50% solids up to 1,000 ft away in the DMDS as space is needed.

Dredging of the initial hole will continue to station 2+00 and the dredging will temporarily shut down to allow for monitoring and surveying of the slope profiles of the dredged trench and examination of the slopes of the discharged sand and gravel to determine how large the dredge hole needs to be prior to backfilling. This process will continue every 200 ft. down the mining channel until the initial hole is large enough for the backfilling operation.

Stage 3, Phase 1. Once the initial dredge hole is established for backfill the processing barge will be relocated to the dredge hole to backfill the mined-out trench with processed tailings, filling the trench to restore bottom to approximate pre-dredging bathymetry in accordance with how much bulking the operation is experiencing. If material bulking is substantially higher than expected, backfilling will continue up to MLLW. If necessary, the stockpiled gravel will be used to create a series of 5' tall backfill dikes to steepen up the slope of the backfilled tailings as to not interfere with the forward dredging activity (see Figure 5-8-20 and cross section K-K', Figure 5-8-30). The dikes will be spaced as along the mining channel as experience dictates (Figure 5-8-20). The access channel will be left unfilled from 7 ft depth BMHW (Figure 5-8-30, section J-J').

Dredging and backfilling will continue down the mining channel until the crest reaches station 7+00 completing the dredging of Phase 1 of the Case Study. Additionally, as much backfilled material as possible will be removed from DMDS-A and backfilled in the dredge trench.

Phase 2. Once Phase 1 is complete a decision will be made to either stop the test or continue with Phase 2. The determining factor will be the project's success at: 1) Effectively maintaining the turbidity curtains, 2) Effectively managing its spoil piles and backfilling operations and 3) Confirming stability and dredging behavior of the walls of the dredge trench.

If the project decides to continue with Phase 2, a fourth curtain (Curtain 4) will be located as shown in Figure 5-8-20 and 5-8-22, and temporary dredge spoil disposal of excess bulked sediments will occur in DMDS D between curtains 3 and 4 (Figures 5-8-22 and 5-8-29, cross section H-H').

Dredging will then advance (stopping for surveys and monitoring every 200 ft.) until the crest of the dredge channel reaches the approximate station of 13+00, all the while backfilling the trench behind the dredge (Figure 5-8-29, cross section I-I'). Once the dredge has reached the end of the mining channel, it will turn around in the access channel and remove material from the dredge material disposal sites to backfill any remaining hole.

Final material re-distribution and sculpting of the DMDS will be done with the smaller gravel pump suction dredges and/or the excavator mounted gravel pump. And the dredge and processing barge will be removed from the water as reclamation wraps up.

5.8.9.4 Description of Discharge and Reclamation

As described, no chemicals will be used in the processing of the ore. All the discharge will be clean tailings from the dredging operation only, re-deposited into the bottom of the estuary to distribute material evenly at or below MLLW. *Special circumstances* where this may not occur include cases where the operation does not have enough adjacent DMDS to accommodate excess material from bulking or from establishing an initial dredge hole (*Stage 1*, Section 5.9.2).

Reclamation will be concurrent with mining. If no bulking occurs, the operation will redeposit the material to establish the bottom to its pre-mining elevations as the processing barge passes over the excavated mining channel with the exception of the access channel which will be left at its designed depth 7' BMHW (Figure 5-8-28, 5-8-29 and 5-8-30). Precision placement of material is possible by convective descent of the material in the water column at a rate of 3.3 ft/s.

The processing barge is moved and positioned by four on-board electric winches w/anchors, located at each corner of the barge. As the processing barge follows the path of the dredge, the push boats will use depth sonar and GPS location mapping, to move it over the excavated site. The excavated area will then be filled in, leaving the bottom as close to where it was originally if there is no significant material bulking.

Because of the draft of the processing barge, discharge directly from the processing platform will only be possible in waters deeper than 2’ 9”. In all shallower areas the discharge will be from a single pipe up to 1,000’ long (transporting a pumped tailings slurry to the shallow areas of the DMDS), or from a combination of processing platform outfalls in deeper waters (*Outfall 1*) and a pumped slurry that concurrently moves sand to the shallow areas of the DMDS.

IPOP expects that the filled material will compact back down to its pre-mining state within 2-3 years; the detailed surveys maintained by IPOP will permit assessment of progress.

5.8.10 Best Management Practices

In addition to those specified in the 2020 Narrative and Plan of Operations (e.g., three mph speed limit), best management practices will be applied where applicable to this operation as follows:

1) All surface water in the Bonanza Channel will essentially be allowed to flow around the operation area unimpeded.
2) Geotextile sand filled tubes or turbidity curtains may be used as berms or dikes for this operation as a temporary stabilization measure and if used will be removed at the end of the study.
3) No pollutant materials will be added to the process water and no statutory pollutants will be discharged from the operation.
4) The operation will be within a secondary containment, described in the following sections. The process water used for the operation will be from its secondary containment only; no new water will be needed as make-up water.
5) The secondary containment will act as a turbidity/suspended solids retention structure. This feature will be maintained to continue its effectiveness as described in section 5.10.3. Additionally, the secondary containment will be monitored and maintained to protect it from unexpected or catastrophic failure.
6) All operations will cease during storm events that threaten to raise the water levels in the mining area or to destabilize the silt curtain.
7) A contingent plan for a storm surge curtain (shown in Figure 5-8-20) is in place if project conditions deem it necessary.

5.8.11 Turbidity Control

The BCCS site involves generally shallower depths and lower currents than the main Bonanza Channel, and the layout of the islands permits turbidity to be contained with shorter curtain lengths subject to less environmental stresses. This should substantially lower the risk of any turbidity releases from the BCCS.

As the operation moves north along the proposed access channel length, the silt curtain will become longer, and IPOP will have more experience in anchoring it. Based on the prior test dredging, improved "corkscrew" anchors will be used and additional techniques for managing the curtains may be devised. Details of the curtains remain as stated in the 2020 Narrative Statement.

5.8.12 BCCS Monitoring Plan

The BCCS will conduct more detailed monitoring towards the overall objective of this scientific study in addition to those monitoring plan items described for the BCPP 5-year operation (Section 5.11 of the "2020 Narrative and Plan of Operations for the Bonanza Channel Placer Project, Nome, Alaska". This additional monitoring includes:

1) Periodic surveying and monitoring of the submarine slope angle of the typical dredge channel in this specific operational setting.
2) Monitoring of material bulking and settling rates.
3) Monitoring of material deposition, and slopes of submarine spoils/tailings deposition.
4) Long-term, post-test monitoring of reclamation and habitat restoration successes to include: a) submerged aquatic vegetation (SAV) re-growth and recovery time; b) recovery of benthic species/communities disturbed by the mining process and timeline; and c) improvement of fish and migratory bird habitat through the reclamation process.
5) And monitoring of equipment sounds using dosimeters above water and hydrophones below water.

5.8.13 BCCS Seasonal Start-up and Shut-down Procedures

The BCCS is a single season operation, operating within the activity window June 1 through October 15. Dredging operations will commence as soon as winter ice is gone and any time after June 1, or once the test program is permitted. IPOP will transport the camp, containers, barges, and other equipment to the access parcel (staging location) and assemble and stage the system in the water as described in section 5.2. Once the dredge barge and processing barge are floating in the access channel, the flexible hose will connect them, and the units will proceed northward between the two islands on a path for the Initial Operational Area.

At the end of the operation activity window (October 15) or when ice begins to form (whichever comes first) the dredge and processing barge will be shut down and de-mobilization activities will commence. Before the dredge and processing barges are moved, the turbidity and suspended solids will be allowed settle out and the turbidity curtain and monitoring devices will be pulled from the water. The equipment will return to the staging area in Nome. During the winter, the dredges will be removed from the water, and all fuel will be removed from the equipment. Some equipment will be stored in the staging area/base camp on land for the winter, and the rest will be transported for dry storage in Nome.

5.8.14 BCCS Reclamation

A conceptual Reclamation Plan describing the geomorphic and biological principles to be applied during all stages of the project will be ready soon. The Reclamation Plan identifies the intrinsic habitat potential of the claim area to include significant opportunities for improving connectivity between Safety Sound and the Bonanza/Solomon River complex to provide reliable fish passage, thermal refugia and rearing habitat for anadromous and resident fishes. The plan also discusses the biological principles and reclamation potential for salvage and application of SAV donor material, nesting and mudflat bird habitat and the possible beneficial use of dredged material for creating sand dune habitat.