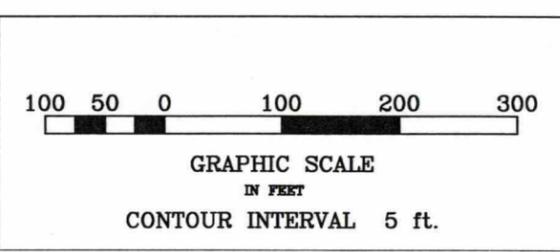


Old Boundary Pit Cross Section Location Map

DENALI NATIONAL PARK AND PRESERVE

SURVEYED BY: GPS/AIRBORNE GPS BY AEROMAP	REVISIONS AND CHECKS :	BY	DATE
DATE: 1996			
FLOWN BY: AEROMAP			
DATE: 1996			

HORIZONTAL AND VERTICAL DATUM :
 This map was compiled to meet Horizontal & Vertical accuracy in accordance with ASPRS Class I Standards.
 This map projection is based upon ASP Coordinate System of 1983, zone 4 as expressed in U.S. Survey feet.
 Vertical data is referenced to NAVD 29.



UNITED STATES DEPARTMENT OF THE INTERIOR
 NATIONAL PARK SERVICE
 ALASKA SYSTEMS SUPPORT OFFICE
 PHYSICAL RESOURCES

DRAWING NO.
 AUTOCAD FILE NAME



Chronological Description of Mining & Reclamation Operations Moose Creek Terrace Pit

(all descriptions tied to MCT map *****)

Phase I – Year 1 - Extraction Unit 1 and Operational Area

Step 1 - Site Survey: In early to late June, the site should be visited to groundtruth the operational design. Specified areas of phase I should be inspected and preferably staked to provide visual and operational limits to boundaries for clearing and excavation as per design. Details on silt fencing, berming, or other runoff and dust control considerations should be made on this visit. Operational coordinates (especially elevations) should be determined (surveyed if necessary) to maximize operational space, to control surface drainage, and to provide any other resource protection or surface preparation needs.

Step 2 -Operational Site Clearing: In late June or early July (dependent on seasonal frost), construct a 300' long, 18' wide access road (using a dozer) from the existing Moose Creek road (~1880' elevation) to the 2nd terrace (~1850' elevation). Side cast from the road cut will be used for a partial cut & fill to the north side and onto the 2nd terrace. The dozer(s) will then begin to clear the vegetation mat and silt overburden in the primary crusher-stockpile space in the Operations Area (approx. 2.22 acres) and placing the overburden in Topsoil/Overburden Stockpile area #1. This clearing activity will provide a working surface for the crusher/screenplant (0.46 ac), stockpile/reject area (0.66 ac), and loading – turn-around operational areas remaining between the crusher and stockpile areas and the toe of the 1st or uppermost terrace (approximately 1.1 ac). In clearing the crusher-stockpile-operations area, we are assuming a 6" thick vegetation mat (combination of vegetation and "A" layer) and a 10" thick silt layer. The total volume for the 16" thick surface of operations area is estimated at 5900 lcys, and can be placed in Topsoil/Overburden Area #1, which will contain about 4000 cubic yards (assuming a pile 20 feet high at the apex, with 1:1 angle of repose), and the remaining can also be stored in Storage Area #2 which will contain about 4200 lcys. The time requirements for this clearing are assumed to be 4 days (32 hours) using a single D8 Cat.

If portions of the vegetation mat are cohesive enough, they should be transplanted to an area in need of re-vegetation as soon as possible. If re-veg areas are unavailable, the cohesive mat should be stored in a protected area of the T/OB areas, and in minimal thickness to maximize the living plant material.

Step 3 – Operational Site & Extraction Unit 1 Clearing: Extraction Area #1 is next cleared (1.1 acres of surface) with the overburden placed in Topsoil/Overburden Areas #2 and #3. Extraction Area #1 is estimated to contain 2800 lcys of overburden, of which 2200 lcys will go into T/OB Area #2, and the remaining 600 lcys can go into Topsoil/Overburden Area #3. The time requirements for this clearing are estimated at 2 days with a single D8 Cat. After clearing and leveling of the site(s) are completed, the crusher/screenplant can be brought in and set up, and other support requirements (tool crib, fuel station, office trailer, etc) as appropriate.

Step 4 – Mining Extraction Unit 1: After the ground is thawed to full seasonal depth (late July?) mining can begin on Extraction Unit 1. Excavation can be initiated at any point along the northern face of Unit 1, with the progression advancing from north to south to extract the full 17,500 bcy, or 21,000 lcy. An irregular bedrock surface (pit floor) is anticipated, with potential for bedrock protrusions at shallow depths. This may complicate extraction progress and limit the usable volume of material in this extraction unit. If pit closure is anticipated after extraction is nearly completed in unit 1, the final east-west line of vertical extraction should be about 40 feet short (further north) of the southern boundary of the unit as shown on the plan map.

Phase II – Year ? – Preparation and Mining of Extraction Unit 2:

Step 1 - Extraction Unit 2 Clearing: Begin clearing Extraction Area #2 is cleared (2.5 acres of surface) with the overburden placed in Topsoil/Overburden Areas #2 and #3. Extraction Area #2 is estimated to contain 6523 lcys of overburden, of which will go into T/OB Area #2, and Topsoil/Overburden Area #3, with additional storage space (overflow) now being available in extraction unit #1.

Step 2 – Optional Reclamation: If adequate operational space is available (an excess of space), extraction unit #1 can be backfilled and reclaimed as appropriate. Oversize and other reject materials should be moved and graded over the surface of the unneeded portions of Extraction Unit #1 and other operational surfaces.

Step 3 Mining Extraction Unit 2: Mining cuts made to Extraction unit #2 can begin on the north or east sides, again depending on available space and rehab intentions. Extraction Unit 2 should be excavated to the south only to the catch or expected to of the backslope to maintain the final 1½:1 backslope angle. Extraction could occur from the east to the west, thus providing new, potentially unneeded surface for immediate reclamation...(or see Phase II below).

Phase III – Rehabilitation and Reclamation of Units 1 & 2 and Option Extraction Unit 3:

Upon exhausting the available gravel in extraction units 1 & 2, three options are available; 1) Close down the pit, and complete full reclamation, 2) extract from unit 3, or 3) continue cutting into the exposed terrace face due south of extraction unit 2. If option 1 is chosen (close down pit), the entire pit floor (operations and extraction areas) are to be cleared of equipment, stockpiles are to be removed, and reject material should be spread over the entire surface. Excessive reject material can be used to create undulating mounds or to backfill at the backwall, thus easing the backwall grade. The backwall should be blended with the existing terrace configuration on each (east and west) end. The remaining overburden/topsoil should be spread last, with remaining veg mats placed on the surface as appropriate.

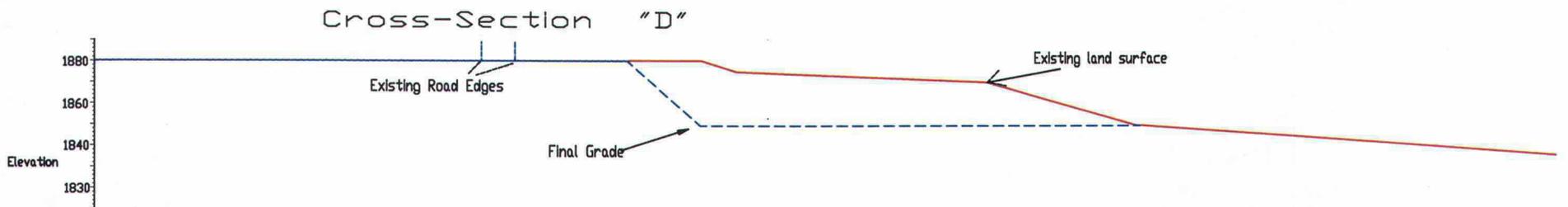
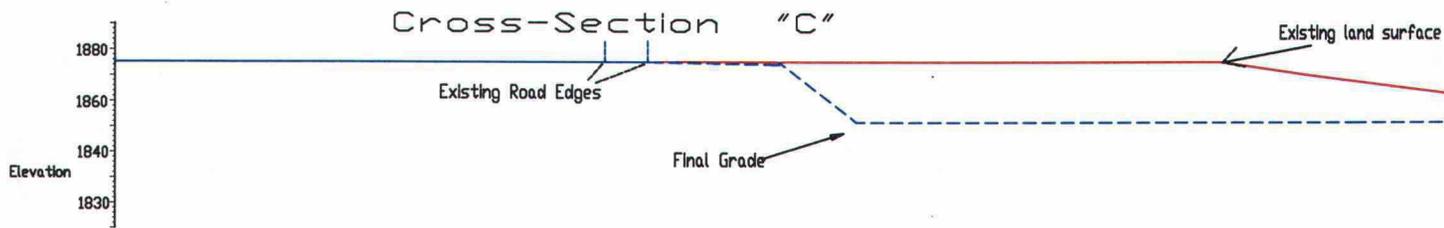
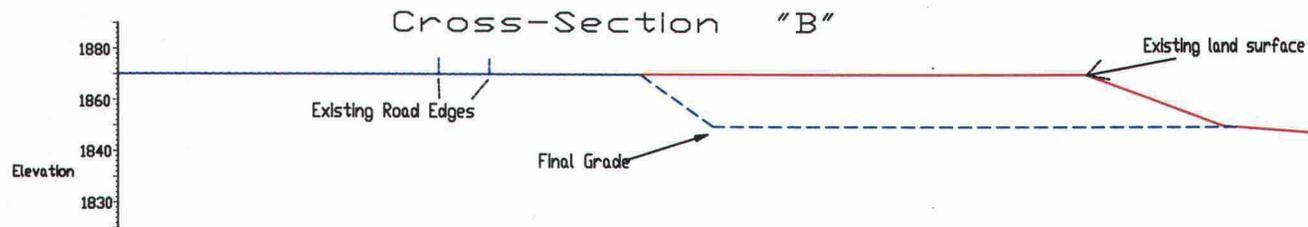
MOOSE CREEK TERRACE (#3) EARTHWORK

STORAGE AREAS	SQ FT	SQ Yds	ACRES	TOPSOIL-OVERBURDEN VOL.			SURFACE CAPACITY VOLUMES			
				Thckns yds	V - BCY	V- LCY	Lngh FT	Width FT	Height FT	V- BCY
Topsoil OB Area 1	12,063	1,340	0.3		0	0	230	46	20	3,919
Topsoil OB Area 2	11,843	1,316	0.3				316	36	20	4,213
Topsoil OB Area 3	15,167	1,685	0.3		0	0	310	50	25	7,176

CLEARING AREAS	SQ FT	SQ Yds	ACRES	TOPSOIL-OVERBURDEN VOL.			PIT RUN VOLUMES		
				Thckns yds	V - BCY	V- LCY	Thckns yds	V - BCY	V- LCY
Operations Area 1	67,399	7,489	1.5	0.44	3,295	3,954			
Operations Area 2	33,564	3,729	0.8	0.44	1,641	1,969			
Extraction Area 1	47,832	5,315	1.1	0.44	2,338	2,806	3	17,538	21,046
Extraction Area 2	111,195	12,355	2.6	0.44	5,436	6,523	7	81,543	97,852
Extraction Area 3	58,348	6,483	1.3	0.44	2,853	3,423	10	64,831	77,797
Overall Impact Area	400,084	44,454	9.2						

Moose Creek Terrace Pit (MP 88.2)

Cross-Sections for Extraction / Reclamation

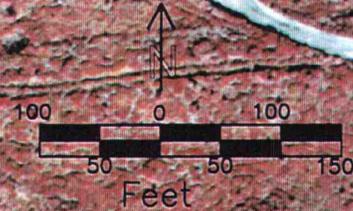


Approximate Wetland Boundary



Moose Creek Terrace Extraction Plan

- 1 = 1st mining cut (17,500 bcy - 1.1 acres)
 - 2 = 2nd mining cut (81,500 bcy - 2.5 acres)
 - 3 = Optional 3rd mining cut (64,000 bcy - 1.3 acres) in blue.
- Yellow Line = Overall extraction/operations area - (9.2 acres)
(Lettered yellow lines are Cross-Section Locations)



**Volume Calculations
North Face Corner Pit
Denali National Park**

Phase 1

X-Section	Average Cross Section Depth (ft)	Estimated Overburden Depth (ft)	Estimated Gravel Depth (ft)	Area of Influence (sq ft)	Overburden Volume (cu.ft.)	Overburden Volume (cu.yds.)	Gravel Volume (cu.ft.)	Gravel Volume (cu.yds.)
1	30.1	2.0	28.1	29,388	58,776	2,177	825,803	30,585
2	34.2	2.0	32.2	22,599	45,198	1,674	727,688	26,951
3	34.4	2.0	32.4	21,890	43,780	1,621	709,236	26,268
4	34.3	2.0	32.3	21,432	42,864	1,588	692,254	25,639
5	36.3	2.0	34.3	21,955	43,910	1,626	753,057	27,891
6	34.4	2.0	32.4	46,801	93,602	3,467	1,516,352	56,161
TOTAL OVERBURDEN CUT =		12,153	Cubic yards	TOTAL PIT AREA =		164,065	Square feet	
TOTAL GRAVEL CUT =		193,496	Cubic yards			3.8	Acres	
TOTAL CUT =		205,649	Cubic yards					

**Volume Calculations
North Face Corner Pit
Denali National Park**

Phase 2

X-Section	Average Cross Section Depth (ft)	Estimated Overburden Depth (ft)	Estimated Gravel Depth (ft)	Area of Influence (sq ft)	Overburden Volume (cu.ft.)	Overburden Volume (cu.yds.)	Gravel Volume (cu.ft.)	Gravel Volume (cu.yds.)
1	48.8	2.0	46.8	15,256	30,512	1,130	713,981	26,444
2	49.4	2.0	47.4	10,111	20,222	749	479,261	17,750
3	50.7	2.0	48.7	10,033	20,066	743	488,607	18,097
4	54.0	2.0	52.0	10,002	20,004	741	520,104	19,263
5	52.7	2.0	50.7	10,020	20,040	742	508,014	18,815
6	47.8	2.0	45.8	12,179	24,358	902	557,798	20,659
TOTAL OVERBURDEN CUT =		5,007	Cubic yards	TOTAL PIT AREA =		67,601	Square feet	
TOTAL GRAVEL CUT =		121,028	Cubic yards			1.6	Acres	
TOTAL CUT =		126,036	Cubic yards					