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BONDING

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REV. NUMBER	REVISION DESCRIPTION	DATE APPROVED

SECTION 50 BONDING

50.1 Bond Scheme

The determination of the reclamation bond is an estimate of the maximum foreseeable reclamation cost that the Regulatory Authority would incur in the event of bond forfeiture by BHP Navajo Coal Company (BNCC) during the permit term ending in 2021. Areas bonded under this Pinabete Mine Plan permit area (permit area) bond include those areas which will be disturbed in the process of recovering coal from the permit area and those areas required to construct facilities or infrastructure that support the production activities. The reclamation costs detailed in this section and the reclamation procedures detailed in Part 5 (Reclamation Plan) apply only for determining the bond amount at year 2021 and are not necessarily meant to represent current or future operational practices. Direct costs are calculated in Worksheets 2 through 15 and are totaled in Worksheet 16 in Appendix 50.A. Indirect costs are applied as percentages of the direct cost in Worksheet 16 to determine a total bond cost.

50.1.1 Maximum Reclamation Liability during the Permit Term

During the permit term ending 2021, the reclamation liabilities will be greatest at the end of the five-year term. BNCC will progress pit development throughout the permit term while not yet disturbing sufficient acreage to facilitate significant reclamation activities, the cumulative disturbance will reach the maximum late in the permit term. Throughout the five-year term, strip progression results in an increase in disturbed land, increased pit depths, and slight increases in pit lengths.

The amount of mining (stripping) disturbance to occur during the permit term is related to strip progression and timing, which is presented on Exhibit 50.1-1. The bond scenario presented here does not necessarily match the strip progression timing shown in the permit term disturbance exhibits. This is due to the remaining uncertainty regarding actual start dates for the mining (stripping) operations, which are ultimately a function of the timing of the coal requirements from the customer. In order to address this uncertainty and ensure that BNCC will be sufficiently bonded over the first permit term, the maximum likely amount of mining (stripping) disturbance has been considered for the bond scenario. In other words, this is a conservative bond scenario and BNCC is unlikely to disturb more than the acreage indicated in the bond scenario. The regraded area of disturbance (bond final surface configuration) is also shown on Exhibit 50.1-2.

50.2 Extended-Liability Bond Areas

BNCC does not have any extended liability bond areas associated with the permit area; therefore, this section is not applicable.

50.3 Bonding of Facilities Used in Common

Facilities and infrastructure (e.g., powerlines, ancillary roads, etc.) within the permit area in Area 4 North which are currently considered in BNCC Navajo Mine's bond amount (Office of Surface Mining Reclamation and Enforcement (OSM) Permit No. NM-0003F) (BNCC 2009) will be separated from the Navajo Mine bond and incorporated into the Pinabete Mine Plan permit area bond by minor revision after the approval of this permit application package.

50.4 Reclamation Cost Estimate

50.4.1 Reclamation Costs

Reclamation costs are calculated as shown in Appendix 50.A, Worksheets 1 through 16. The methods and format used in this calculation are consistent with the guidance contained in the OSM *Handbook for Calculation of Reclamation Bond Amounts* (OSM 2000). A summary of the reclamation bond amount is presented in Table 50.4-1.

Reclamation liabilities attributable to the Pinabete Mine Plan during the first permit term (2016 to 2021) will occur in Area 4 North (pit development in Area 4 South will occur after the first permit term). It is assumed that the final bond pit will progress as shown in Exhibit 50.1-1 and will be stripped to the lowest economically recoverable coal seam. Reclamation activities will consist of the following:

1) Facility demolition and removal,
2) Earthmoving – primary and secondary regrade, topdressing, mitigation,
3) Revegetation, and
4) Miscellaneous

50.4.1.1 Facility Demolition and Removal

Facility demolition and removal of all existing permit structures on the mine site includes electric power lines; explosive stores; coal facilities; water control ponds; transportation facilities; and miscellaneous structures. A majority of these facilities are included with the Navajo Mine Area 4 North Bond update which is located in the Navajo Mine Permit Application Package (OSM permit No. NM-0003F, Appendix 12-B) (BNCC 2009). New facilities associated with the Pinabete Mine Plan permit area that are constructed during the first permit term are two sedimentation ponds (Pond 415 and Pond 416). Removal of these ponds is included in earthmoving costs. As a result, there are no facility demolition and removal costs.

50.4.1.2 Earthmoving

A post-mining "snapshot" of the mine area was projected for year 2021, as shown in the bond post-mining configuration (PMC) map, Exhibit 50.1-1.

The bond final surface configuration (BSC) selected for the initial permit term is to return the disturbed area as close as possible to the pre-mining topography. To achieve BSC (Exhibit 50.1-2), PMC topography in these areas was altered to create reclaimed surfaces falling as close as practical to the pre-mining topography. The BSC surfaces maintain 6.5 horizontal:1 vertical (6.5h:1v) maximum final interior slopes, 4h:1v maximum outslopes, balance cut and fill volumes, and ensure positive drainage.

The next design step was to subtract a computerized grid of the PMC from the BSC. The result is a cut-fill contours map (Exhibit 50.4-1) with the cut areas shown as red contours, and the fill areas shown as green contours. The cut and fill areas are then subdivided into polygons and the cut and fills are balanced by taking extra cut to polygons that require fill. The result is the cut-fill blocks map (Exhibit 50.4-2).

The CAD software gives the volume and centroid of each block. The centroids are used to calculate haulage distances and grades, except in the case of deep pits and ramps where haulage is assumed to be to the crest where the material can be pushed over the edge. The haulage profiles and grades are weight averaged by volume to give an average distance and grade for each equipment type.

All bond earthmoving activities are tabulated in Worksheet 3 as follows:

Worksheet 5	Dozers
Worksheet 8	Loaders
Worksheet 9	Trucks
Worksheet 11	Scrapers
Worksheet 12	Graders
Worksheet 15	Drilling and Blasting of Highwalls

Quantities from these worksheets are used as input to Worksheets 5 through 12, where equipment hours are calculated. Worksheet 13 uses these hours to calculate earthmoving costs. The earthmoving costs are totaled in Worksheet 16, Item 2. In addition to regrade activities, earthmoving includes spoil mitigation, topdressing placement, and concrete disposal.

Once regrading and/or facilities removal activities have been completed in an area, required suitable root zone mitigation and/or topdressing material is placed on these areas (Exhibit 50.4-3).

Suitable spoil and regolith/topdressing material (either stockpiled or in situ) are used to complete the 4-feet suitable root zone material requirements on spoil surfaces. Stockpiled and/or in-situ regolith/topdressing material is used to complete the topdressing material depth requirement on all reclaimed surfaces. Refer to Section 36 (Post-Reclamation Soil) for additional information regarding root zone material and topdressing replacement requirements.

50.4.1.2.1 Equipment Selection

Large earthmoving equipment was selected assuming that a competent, qualified contractor will be doing the reclamation work using their own equipment.

50.4.1.2.2 Equipment Productivity and Costs

Reclamation activities will take place with a 15-shift-per-week schedule. Equipment ownership and operating costs are tabulated in Appendix Table 50-A-23 (Appendix 50.A) taken from *Cost Reference Guide for Construction Equipment* (CRG-PRIMEDIA Equipment Watch 2011). Equipment operator wage rates are listed in Appendix Table 50-A-24 (Appendix 50.A) and were taken from the ACME Inc. Navajo Mine reclamation contract in force for 2011.

For haul routes greater than 600 feet, scrapers are more economical than dozers. For haul routes greater than 3,000 feet, dump trucks are more economical than scrapers. Dozers are assumed to work alone with no support equipment other than a lowboy for transport. Truck and scraper fleets both require load and dump dozers, and half-time water truck and grader for haul road maintenance. All fleets are assigned light plants for night work. Fuel and lube trucks are included in the fuel costs (Appendix Table 50-A-23 in Appendix 50.A).

Productivities for each particular activity are calculated in Worksheets 5 through 12 (Appendix 50.A), using the material properties and haulage profile pertaining to the task.

50.4.1.3 Revegetation

After regrading, the bonded areas will be graded with graders and then these areas and facilities areas will be topdressed as noted in previously. After topdressing, revegetation activities will commence. This involves seeding, crimping, mulching, and irrigation as described in Section 37 (Post-Reclamation Vegetation). Costs are noted in Appendix 50.A, Worksheet 14.

50.4.1.4 Miscellaneous

No miscellaneous costs were required for the initial permit term bond scenario.

50.4.3 Indirect Reclamation Costs

Mobilization and demobilization costs are assumed to be 1% of the direct costs, since the reclamation project would be very large. Contingencies are 5% of the direct costs; the engineering redesign fee, the contractor profit and overhead, and the reclamation fee are set at 1.8%, 15.0%, and 3.9% of direct costs respectively, per agreement with OSM staff.

50.4.2 Total Performance Bond Cost

The total performance bond cost is the sum of the direct and indirect costs and is shown in Worksheet 16, Appendix 50.A.

Personnel

Persons or organizations responsible for data collection, analysis, and preparation of this permit application package section:

Ron Van Valkenburg	Norwest Corporation
Kent Applegate	Salt Lake City, UT
Matt Owens	
BHP Navajo Coal Company	

References

Baker, T. and C. Babbitt (Editors). 2007 Heavy Construction Cost Data: 2008. 22nd Edition. RS Means Company, Inc. Kingston, Massachusetts.

BHP Navajo Coal Company (BNCC). 2009. Navajo Mine Permit Application Package. OSM Permit No. NM-0003F. On file at Office of Surface Mining Reclamation and Enforcement- Western Region Technical Office. Denver, Colorado.

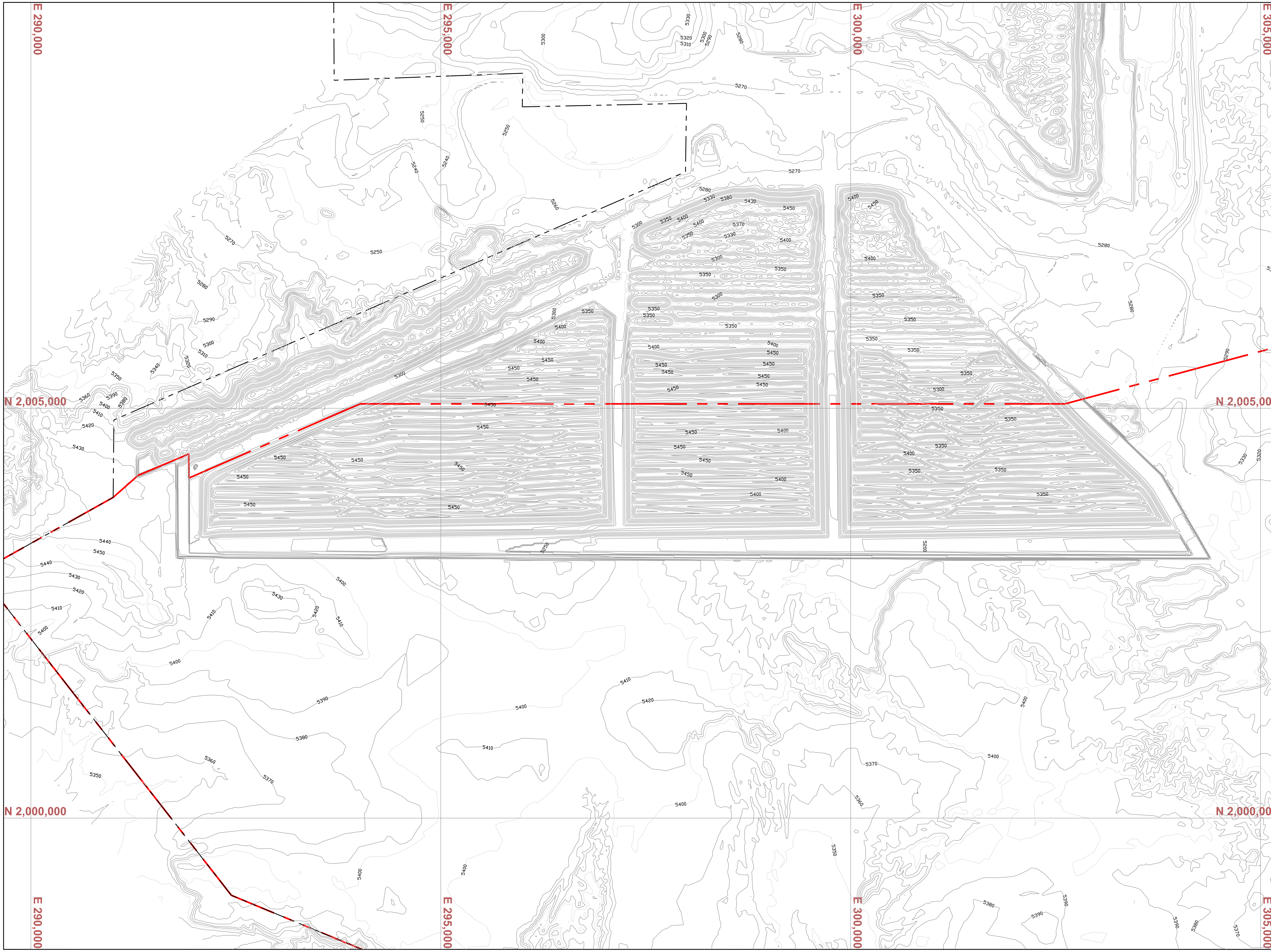
CRG-PRIMEDIA Equipment Watch, Cost Reference Guide for Construction Equipment. 2011. 1st Half Edition.

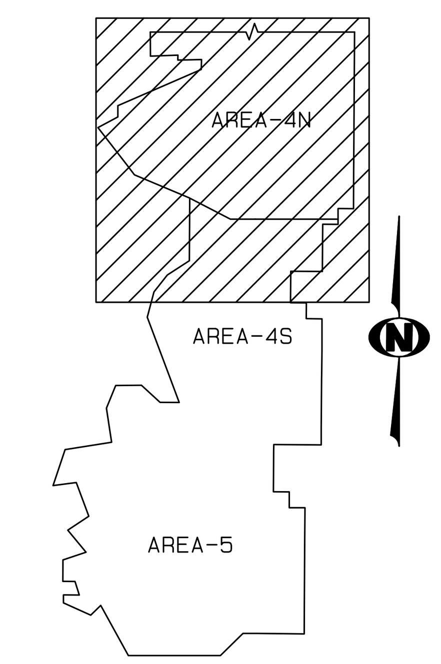
Office of Surface Mining Reclamation and Enforcement (OSM). 2000. Handbook for Calculation of Reclamation Bond Amount. U.S. Department of Interior. Washington, D.C.

Table 50.4-1 Summary of Pinabete Permit Area Reclamation Bond Amount

				2012 Estimate	
1	Total facility and structure removal costs	$	0		
2	Total earthmoving costs	$	23,039,465		
3	Total revegetation costs	$	2,488,535		
4	Total other reclamation activities costs	$	265,011		
5	Subtotal: Total Direct Costs			$	25,793,011
6	Mobilization and demobilization (at 1.0% of Item 5)		1.0%	$	257,930
7	Contingencies (at 5.0% of item 5)		5.0%	$	1,289,651
8	Engineering redesign fee (at 1.8 of Item 5)		1.8%	$	464,274
9	Contractor profit and overhead (at 15.0% of Item 5)		15.0%	$	3,868,952
10	Reclamation management fee (at 3.9% of Item 5)		3.9%	$	1,005,927
	Total Bond Amount				**32,679,745**
	LESS Navajo Mine Area 4 North Bond Amount[1]			**$**	**16,459,152**
	Total Pinabete Permit Area Bond Amount				**16,220,593**

[1] Reclamation bond amount to reclaim portions of Area 4 North included within the Navajo Mine permit area (OSM Permit No. NM-0003F).





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SCALE 1":500'
SCALE INDICATED BASED ON A 24"x36" PLOT CONFIGURATION

LEGEND

- PERMIT BOUNDARY
- LEASE BOUNDARY
- 5320 TOPOGRAPHY CONTOUR

Original certified exhibits are maintained at the mine site and at OSM.

CONTOUR INTERVAL: 10'

REV. No.	DATE	DRAFT. BY	REVISION DESCRIPTION	ENG.	E.Q.	P.E.	
12-A	Mar 2012	NL	PREPARED FOR OSM SUBMITTAL			OSE	

APPROVALS

CERTIFICATION STATEMENT

I, Sean Ennis, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SEAN ENNIS NEW MEXICO 16838 LICENSED PROFESSIONAL ENGINEER

Mar. 30, 2012

EXHIBIT 50.1-1

bhpbilliton

BHP Navajo Coal Company

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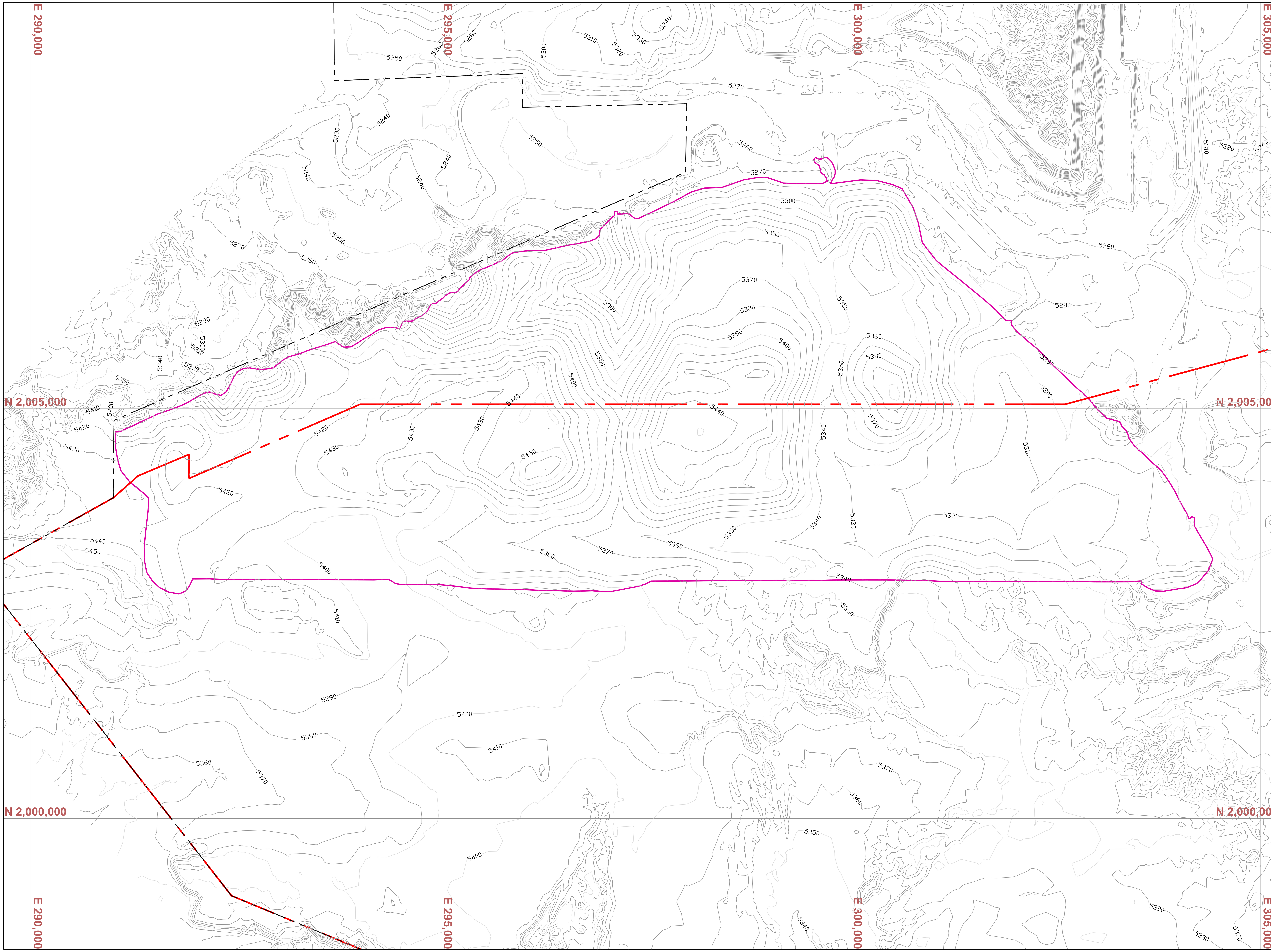
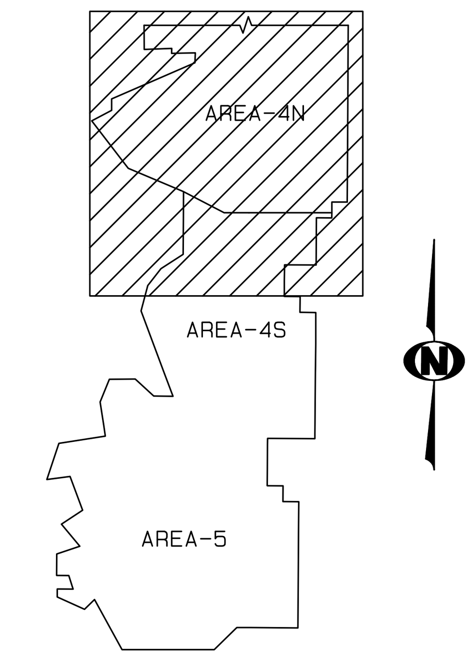
Fruitland,New Mexico,87416

Phone: 505-598-4200
Fax: 505-568-3361

PINABETE PERMIT POST MINING CONFIGURATION FOR BOND TERM

PREPARED BY NL	DRAWN BY NL	SCALE 1"= 500'
APPROVED BY	DATE 03-19-2012	





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SCALE 1":500'

SCALE INDICATED BASED ON A 24"x36" PLOT CONFIGURATION

LEGEND

- PERMIT BOUNDARY
- LEASE BOUNDARY
- 5320 TOPOGRAPHY CONTOUR
- GRADING LIMIT

Original certified exhibits are maintained at the mine site and at OSM.

CONTOUR INTERVAL: 10'

REV. No.	DATE	DRAFT. BY	REVISION DESCRIPTION	ENG.	E.Q.	P.E.	
12-A	Mar 2012	NL	PREPARED FOR OSM SUBMITTAL			OSE	

APPROVALS

CERTIFICATION STATEMENT

I, Sean Ennis, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SEAN ENNIS NEW MEXICO 16688 LICENSED PROFESSIONAL

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EXHIBIT 50.1-2

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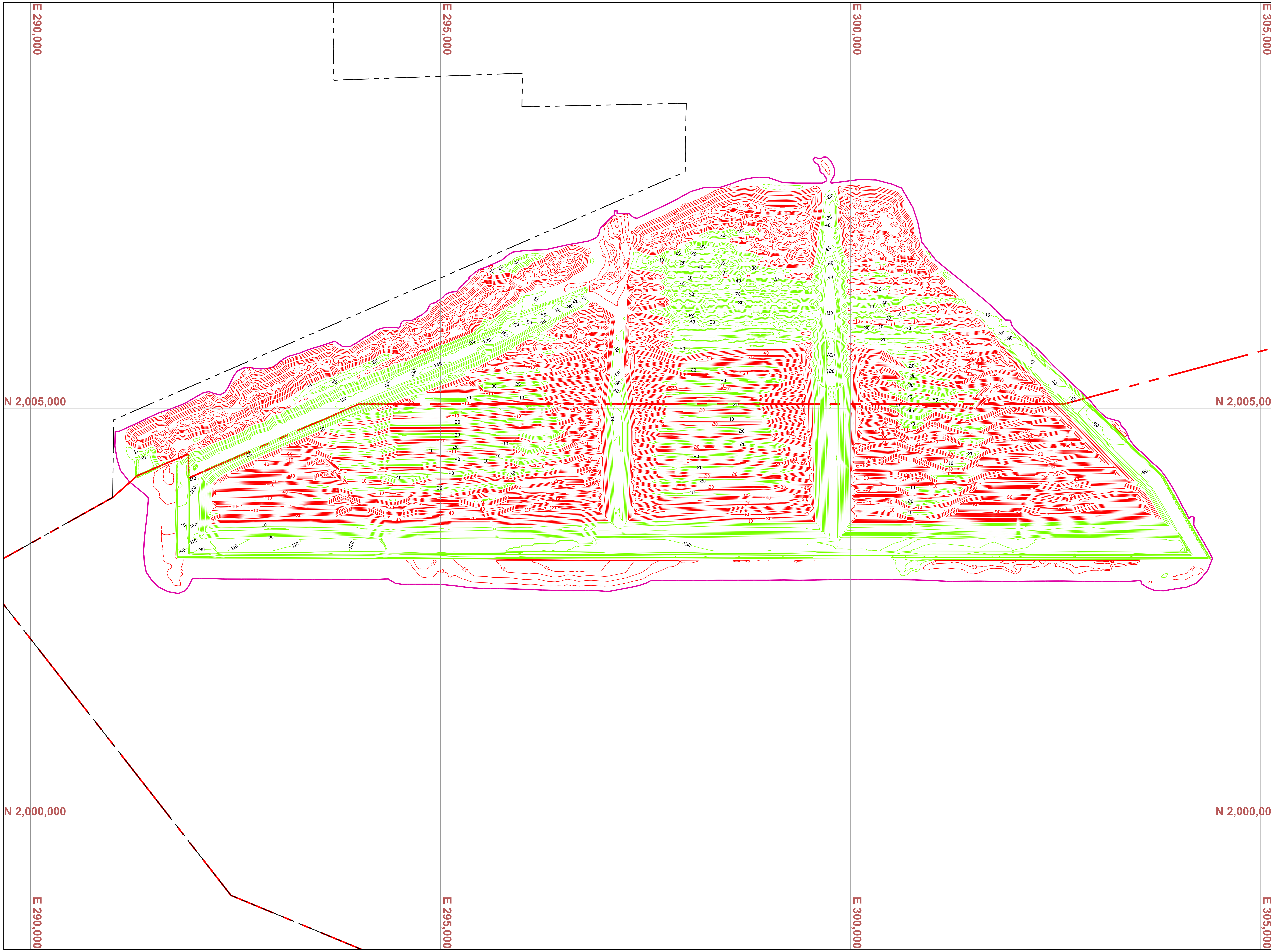
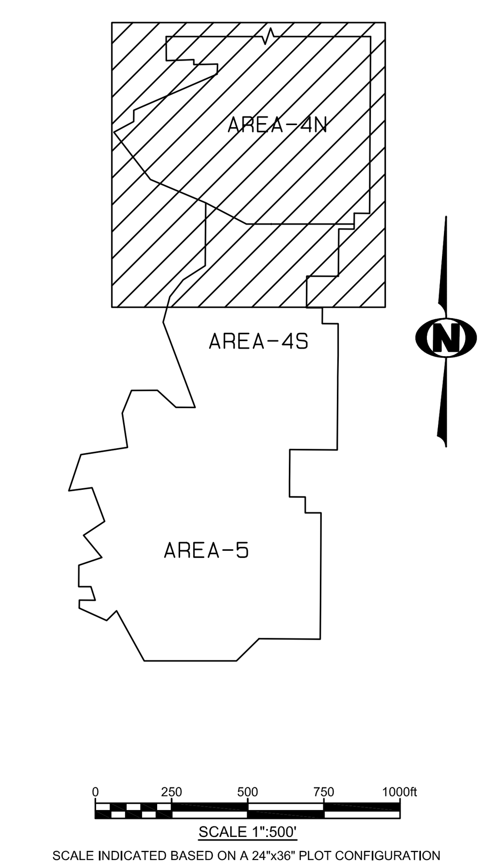
PINABETE PERMIT BOND SURFACE CONFIGURATION

PREPARED BY NL	DRAWN BY NL	SCALE 1"= 500'
APPROVED BY	DATE 03-19-2012	





LEGEND

- PERMIT BOUNDARY
- LEASE BOUNDARY
- GRADING LIMIT
- -10 CUT CONTOUR
- 10 FILL CONTOUR

Original certified exhibits are maintained at the mine site and at OSM.

CONTOUR INTERVAL: 10'

REV. No.	DATE	DRAFT. BY	REVISION DESCRIPTION	ENG.	E.Q.	P.E.
12-A	Mar 2012	NL	PREPARED FOR OSM SUBMITTAL			OSE

APPROVALS

CERTIFICATION STATEMENT

I, Sean Ennis, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

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EXHIBIT 50.4-1

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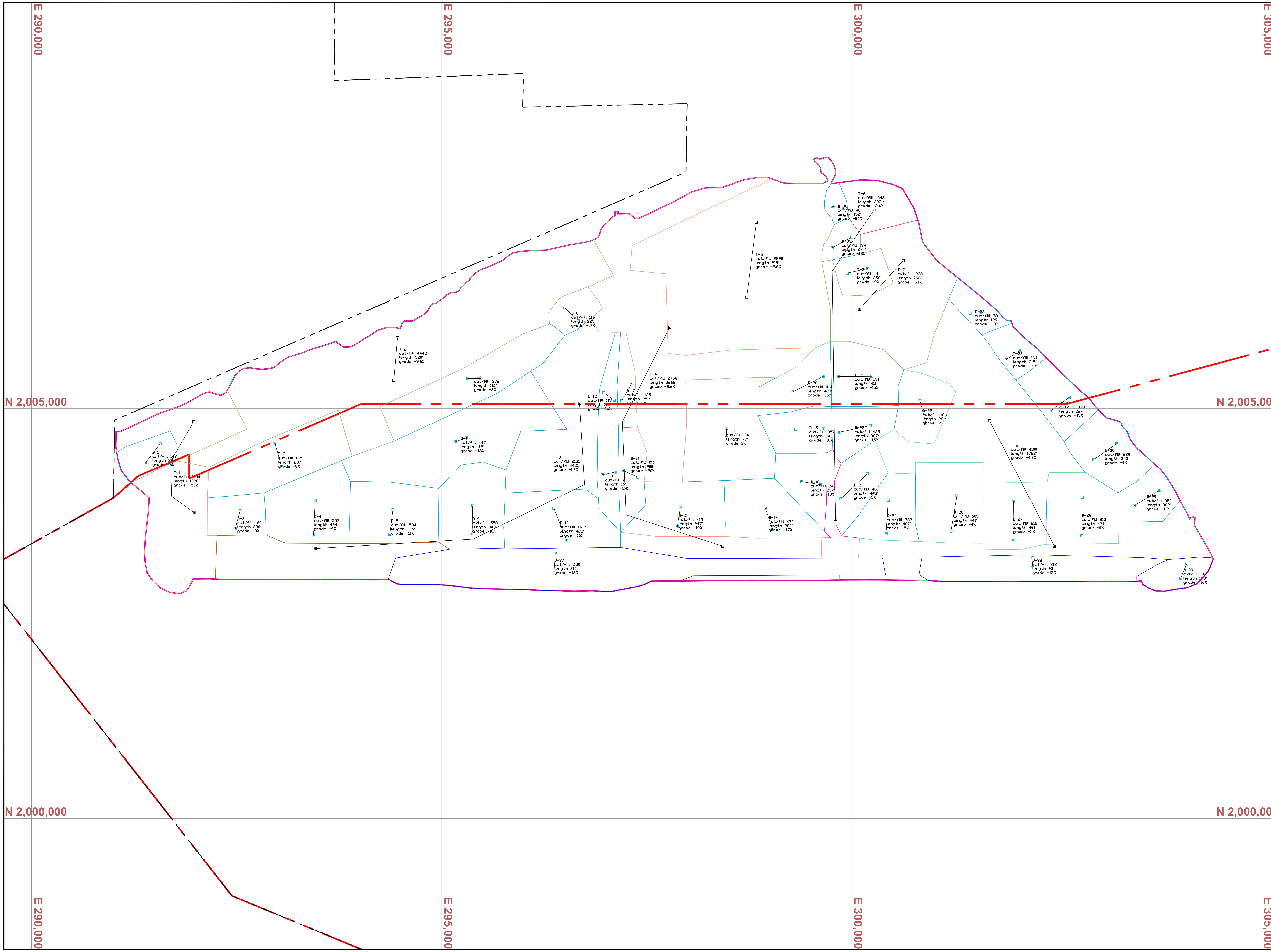
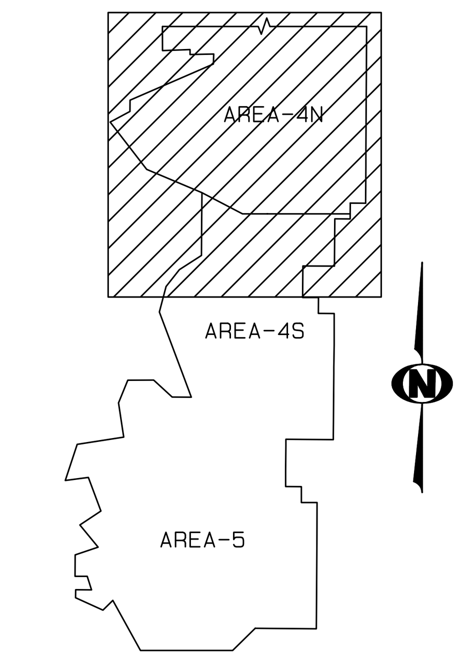
PINABETE PERMIT CUT AND FILL CONTOURS

PREPARED BY NL	DRAWN BY NL	SCALE 1"= 500'
APPROVED BY	DATE 03-19-2012	





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SCALE 1"=500'
SCALE INDICATED BASED ON A 24"x36" PLOT CONFIGURATION

LEGEND

- PERMIT BOUNDARY
- LEASE BOUNDARY
- GRADING LIMIT
- D-22 DOZER CUT AND FILL BLOCKS
- T-2 TRUCK CUT AND FILL BLOCKS

Original certified exhibits are maintained at the mine site and at OSM.

REV. No.	DATE	DRAFT. BY	REVISION DESCRIPTION	ENG.	E.Q.	P.E.	
12-A	Mar 2012	NL	PREPARED FOR OSM SUBMITTAL			OSE	

APPROVALS

CERTIFICATION STATEMENT

I, Sean Ennis, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

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Mar. 30, 2012

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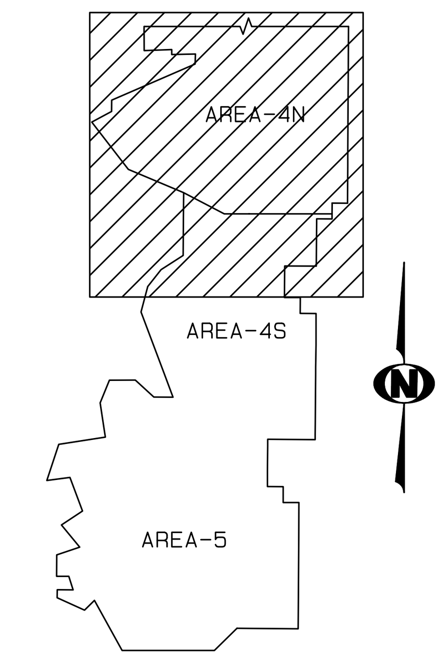
PINABETE PERMIT
CUT AND FILL BLOCKS

PREPARED BY NL	DRAWN BY NL	SCALE 1"= 500'
APPROVED BY	DATE 03-20-2012	



0 250 500 750 1000ft

SCALE 1":500'

SCALE INDICATED BASED ON A 24"x36" PLOT CONFIGURATION

LEGEND

- PERMIT BOUNDARY
- LEASE BOUNDARY
- GRADING LIMIT
- fy 22 TOPSOIL REPLACEMENT POLYGONS

Original certified exhibits are maintained at the mine site and at OSM.

REV. No.	DATE	DRAFT. BY	REVISION DESCRIPTION	ENG.	E.Q.	P.E.	
12-A	Mar 2012	NL	PREPARED FOR OSM SUBMITTAL			OSE	

APPROVALS

CERTIFICATION STATEMENT

I, Sean Ennis, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SEAN ENNIS NEW MEXICO 16638 LICENSED PROFESSIONAL

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Mar. 30, 2012

EXHIBIT 50.4-3

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PINABETE PERMIT
TOPSOIL REPLACEMENT

PREPARED BY NL	DRAWN BY NL	SCALE 1"= 500'
APPROVED BY	DATE 03-20-2012	

Appendix 50.A

Detailed Reclamation Bond Calculation

LEGEND	
XXX	Data From A Link
XXX	Data Calculated From A Link
XXX	User Input Data
XXX	Calculated Data To A Link
XXX	Calculated Data
XXX	Requires Updating
XXX	Newly Updated

Figure 1

TABLE 50-A-23

HISTORICAL EQUIPMENT OWNERSHIP AND OPERATING COSTS

Equipment Model	Ownership Costs ($/hr)			Overhaul Costs ($/hr)				Field Repair and Fuel Costs ($/hr)												Escalated
	Depreciation	Depreciation Multiplier	**Adjusted Depreciation**	Labor	Labor Multiplier	**Adjusted Labor**	**O/H Parts**	Labor	Labor Multiplier	**Adjusted Labor**	**Parts**	Fuel	Fuel Multiplier	**Adjusted Fuel**	**Lube**	Tires	Tire Multiplier	**Adjusted Tires**	**GEC (2)**	Total ($/hr)
D9R Dozer Semi-U Blad	$ 24.39	0.83	**$ 20.33**	$ 6.88	0.870	**$ 5.98**	**$ 18.38**	$ 8.06	0.870	**$ 7.01**	**$ 17.90**	$ 21.67	1.728	**$ 37.46**	**$ 6.63**	$ -	$ 1.73	**$ -**	**$ 2.98**	**126.20**
D10R Dozer Semi-U Blad	$ 34.24	0.83	**$ 28.53**	$ 6.88	0.870	**$ 5.98**	**$ 25.53**	$ 8.06	0.870	**$ 7.01**	**$ 24.87**	$ 30.12	1.728	**$ 52.06**	**$ 9.21**	$ -	$ 1.73	**$ -**	**$ 4.14**	**170.63**
D11R Dozer U Blade	$ 55.27	0.83	**$ 46.06**	$ 6.88	0.870	**$ 5.98**	**$ 41.22**	$ 8.06	0.870	**$ 7.01**	**$ 40.15**	$ 44.92	1.728	**$ 77.64**	**$ 14.49**	$ -	$ 1.73	**$ -**	**$ 6.69**	**260.64**
637G Scraper	$ 25.01	0.83	**$ 20.84**	$ 6.72	0.870	**$ 5.84**	**$ 18.33**	$ 10.07	0.870	**$ 8.76**	**$ 18.19**	$ 28.12	1.728	**$ 48.60**	**$ 8.77**	$ 5.21	$ 1.73	**$ 5.21**	**$ 0.77**	**144.95**
992G Loader	$ 67.59	0.83	**$ 56.33**	$ 4.20	0.870	**$ 3.65**	**$ 14.26**	$ 5.12	0.870	**$ 4.45**	**$ 15.73**	$ 38.66	1.728	**$ 66.82**	**$ 12.77**	$ 22.57	$ 1.73	**$ 22.57**	**$ 2.14**	**213.30**
777D Truck	$ 42.09	0.83	**$ 35.08**	$ 16.06	0.870	**$ 13.97**	**$ 14.58**	$ 9.86	0.870	**$ 8.57**	**$ 9.00**	$ 27.20	1.728	**$ 47.01**	**$ 10.54**	$ 13.72	$ 1.73	**$ 13.72**	**$ -**	**162.43**
16H Grader	$ 18.42	0.83	**$ 15.35**	$ 3.02	0.870	**$ 2.63**	**$ 8.57**	$ 2.52	0.870	**$ 2.19**	**$ 8.31**	$ 13.29	1.728	**$ 22.97**	**$ 4.25**	$ 5.29	$ 1.73	**$ 5.29**	**$ 0.69**	**75.60**
Water Truck 10,000 gal	$ 28.40	0.83	**$ 23.67**	$ 5.76	0.870	**$ 5.01**	**$ 5.71**	$ 13.97	0.870	**$ 12.15**	**$ 11.01**	$ 22.25	1.728	**$ 38.46**	**$ 5.81**	$ 9.32	$ 1.73	**$ 9.32**	**$ -**	**117.79**
Small Backh Cat 446B	$ 6.11	0.83	**$ 5.09**	$ 2.10	0.870	**$ 1.83**	**$ 2.25**	$ 2.77	0.870	**$ 2.41**	**$ 1.99**	$ 5.99	1.728	**$ 10.35**	**$ 1.52**	$ 1.62	$ 1.73	**$ 1.62**	**$ 0.28**	**28.94**
16H Grader, ripping	$ 19.21	0.83	**$ 16.01**	$ 3.05	0.870	**$ 2.65**	**$ 8.78**	$ 2.72	0.870	**$ 2.37**	**$ 8.67**	$ 13.29	1.728	**$ 22.97**	**$ 4.32**	$ 5.29	$ 1.73	**$ 5.29**	**$ 0.92**	**77.55**
Pickup Truck	$ 2.40	0.83	**$ 2.00**	$ 0.47	0.870	**$ 0.41**	**$ 0.48**	$ 0.59	0.870	**$ 0.51**	**$ 0.47**	$ 3.88	1.728	**$ 6.71**	**$ 0.52**	$ 0.36	$ 1.73	**$ 0.36**	**$ -**	**11.96**
Mechanic truck	$ 3.19	0.83	**$ 2.66**	$ 0.47	0.870	**$ 0.41**	**$ 0.64**	$ 0.59	0.870	**$ 0.51**	**$ 0.62**	$ 2.26	1.728	**$ 3.91**	**$ 0.41**	$ 0.48	$ 1.73	**$ 0.48**	**$ -**	**10.26**

The Total $/hr are used in Worksheet 13

1) CRG - PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2004 edition.
2) GEC - Ground Engaging Components

Multipliers are calculated as follows:

Depreciation:	Assume two shifts per day		
	Assume 90% availability on all equipment		**0.83**
Labor - Heavy Equipment Mechanic: Field Repair and Fuel Costs			
((0.08)(CRG Wages) + Local Wages) / CRG Wages			
	CFG Wages	$35.46 /hr	
	Local Wages	$28.00 /hr	
			0.87
Parts:	No adjustment		**1**
Fuel (Diesel):	CFG Cost	$1.51 /gal	
	Local Cost	$2.61 /gal	
	Fuel Multiplier		**1.73**
Lube:	No adjustment		**1**
Tires:	XXX 2004 costs		**1**
GEC:	No adjustment		**1**
Inflation:			**0.144**

TABLE 50-A-1

DEMOLITION UNIT COSTS

Means Reference Number (1)			ID	Item	Unit	2008 Bare Costs (1)	2008 Unit Costs
02 41	16.13	0012	1	Large urban buildings, steel	CF	$0.22	$0.22
02 41	16.13	5000	1a	Large urban buildings, steel, no interior walls reduce by 50%	CF	$0.11	$0.11
02 41	16.13	0050	2	Large urban buildings, concrete	CF	$0.30	$0.30
02 41	16.13	5000	2a	Large urban buildings, concrete, no interior walls reduce by 5	CF	$0.15	$0.15
02 41	16.13	0080	3	Large Urban buildings, masonry	CF	$0.23	$0.23
02 41	16.13	5000	3a	Large Urban buildings, masonry, no interior walls reduce by 5	CF	$0.12	$0.12
02 41	16.13	0100	4	Large urban buildings, mixture of types	CF	$0.23	$0.23
02 41	16.13	0500	5	Small urban buildings, steel	CF	$0.23	$0.23
02 41	16.13	5000	5a	Small urban buildings, steel, no interior walls reduce by 50%	CF	$0.12	$0.12
02 41	16.13	0600	6	Small urban buildings, concrete	CF	$0.30	$0.30
02 41	16.13	5000	6a	Small urban buildings, concrete, no interior walls reduce by 5	CF	$0.15	$0.15
02 41	16.13	0650	7	Small Urban buildings, masonry	CF	$0.23	$0.23
02 41	16.13	5000	7a	Small Urban buildings, masonry, no interior walls reduce by 5	CF	$0.12	$0.12
02 41	16.17	0240	8	Floor, 4" concrete slab, plain	SF	$2.69	$2.89
02 41	16.17	0280	8a	Floor, 4" concrete slab, mesh reinforced	SF	$2.86	$3.06
02 41	16.17	0300	8b	Floor, 4" concrete slab, mesh reinforced, rods	SF	$3.37	$3.57
02 41	16.17	0400	9	Floor, 6" concrete slab, plain	SF	$3.59	$3.88
02 41	16.17	0420	9a	Floor, 6" concrete slab, mesh reinforced	SF	$3.96	$4.25
02 41	16.17	0440	9b	Floor, 6" concrete slab, mesh reinforced, rods	SF	$4.49	$4.78
02 41	16.17	0420	10	Floor, 8"concrete slab, mesh reinforced	SF	$5.28	$5.67
02 41	16.17	0440	10a	Floor, 8"concrete slab, mesh reinforced, rods	SF	$5.99	$6.38
02 41	16.17	0440	11	Floor, 12"concrete slab, mesh reinforces rods	SF	$8.98	$9.57
02 41	16.17	1000	12	Footings, concrete, 1' x 2'	LF	$9.33	$10.50
02 41	16.17	2600	12a	Footings, concrete, 1' x 2', average reinforcing + 10%	LF	$10.26	$11.43
02 41	16.17	1080	13	Footings, concrete, 1.5' x 2'	LF	$11.16	$12.92
02 41	16.17	2600	13a	Footings, concrete, 1.5' x 2', average reinforcing + 10%	LF	$12.28	$14.03
02 41	16.17	1120	14	Footings, concrete 1.5' x 3'	LF	$13.95	$16.58
02 41	16.17	2600	14a	Footings, concrete, 1.5' x 3', average reinforcing + 10%	LF	$15.35	$17.98
02 41	16.17	1140	15	Footings, concrete, 2' x 3'	LF	$15.95	$19.46
02 41	16.17	2600	15a	Footings, concrete, 2' x 3', average reinforcing + 10%	LF	$17.55	$21.06
02 41	16.17	1140	16	Footings, concrete, 2' x 6'	LF	$31.90	$38.92
02 41	16.17	2600	16a	Footings, concrete, 2' x 6', average reinforcing + 10%	LF	$35.09	$42.11
02 41	16.18	1140	51	Footings, concrete, 2' x 6', average reinforcing + 10%	LF	$102.08	$120.81
02 41	16.17	2400	17	Walls, concrete, 3.5" thick	SF	$4.92	$5.09
02 41	16.17	2400	18	Walls, concrete, 6" thick	SF	$8.43	$8.72
02 41	16.17	2600	18a	Walls, concrete, 6" thick, Average reinforcing + 10%	SF	$9.27	$9.57
02 41	16.17	2420	19	Walls, concrete, 8" thick	SF	$9.64	$10.03
02 41	16.17	2600	19a	Walls, concrete, 8" thick, Average reinforcing + 10%	SF	$10.60	$10.99
02 41	16.17	2440	49	Walls, concrete, 10" thick	SF	$11.20	$11.69
02 41	16.17	2600	49a	Walls, concrete, 10" thick, Average reinforcing + 10%	SF	$12.32	$12.81
02 41	16.17	2500	50	Walls, concrete, 12" thick	SF	$13.45	$14.04
02 41	16.17	2600	50a	Walls, concrete, 12" thick, Average reinforcing + 10%	SF	$14.80	$15.38
02 41	16.17	2500	20	Walls, concrete, 18" thick, Average reinforcing + 10%	SF	$23.86	$24.74
02 41	16.17	2500	21	Walls, concrete, 2' thick, Average reinforcing + 10%	SF	$31.81	$32.98

TABLE 50-A-1

DEMOLITION UNIT COSTS

Means Reference Number (1)			ID	Item	Unit	2008 Bare Costs (1)	2008 Unit Costs
02 41	16.17	4250	22	Disposal, Concrete/Masonry, Up to 5 mile haul	CY	$11.90	$11.90
02 41	13.60	1650	23	Fencing, 5-strand barbed wire	LF	$1.64	$1.64
02 41	13.60	1700	24	Fencing, chain link, posts and fabric, 8' to 10' high	LF	$2.25	$3.71
02 41	13.38	2700	25	Cast iron pipe, 4" diameter	LF	$3.36	$3.36
02 41	13.54	0200	26	Plastic conduit, 3" to 6"	LF	$1.82	$1.82
02 41	13.33	4200	27	Sidewalk, concrete, mesh reinforced (converted to SF)	SF	$6.67	$6.67
02 41	13.17	5050	28	Pavement, bituminous, 4"- 6" (converted to SF)	SF	$0.58	$0.88
02 41	13.17	5200	29	Driveway, concrete, 6", mesh reinforced (converted to SF)	SF	$0.96	$1.26
02 41	13.17	5500	30	Concrete, 7" to 2' thick, reinforced (converted to CF)	CF	$3.41	$4.58
02 41	16.13	0500	31	Steel Tanks, Piping & Culvert (Use small building, steel)	CF	$0.23	$0.23
			32	69 kV Power Lines	MI	$6,136.34	$7,019.97
Unit Costs from 2004 (See "2" below)			33	Conveyor	LF	$19.89	$22.75
			34	Water Wells	EA	$1,602.63	$1,833.41
			35	Seedbed Prep per Acre	Acre	$348.00	$382.80
			36	Seeding, Mulching, Irrigation per Acre	Acre	$1,165.00	$1,281.50
			37	Drill Operator	Labor Hour	$28.00	$28.00
			38	Blast Laborer	Labor Hour	$28.00	$28.00
			39	Blast Foremen	Labor Hour	$28.00	$28.00
02 41	13.70	0600	40	Gabions, 18-36 inches deep	SY	$83.00	$98.80
02 41	13.43	0200	41	Box Culvert 8'x12'x8'	LF	$13.70	$24.82
02 41	13.86	0100	42	Road Rug (Geotextile Lining Material use Synthetic Grass Co	SF	$0.23	$0.33
02 41	13.33	0800	43	Guard Rail, corrugated steel	LF	$1.67	$1.67
02 41	13.62	0400	44	Chain Link Gates,	EA	$143.00	$143.00
02 41	13.78	0400	71	Communications Tower, 300', 70lb section	EA	$2,910.00	$2,910.00
02 41	19.23	3080		Machine Loading Rubbish Truck	CY	$13.35	$13.35
02 41	19.23	5100		Rubbish Haul 20 CY Truck	MI	$0.49	$0.49
Calculated			45	Rubbish Disposal (50 MI Haul)	CY	$15.80	$15.80
			46	Primacord	LF	$0.09	$0.10
Unit Costs			47	ANFO	lb	$0.14	$0.15
			48	Primers	EA	$4.05	$4.63

1). Updated with data used for the 2011 Area 4 North pre-2016 worksheets

2). Based on http://inflationdata.com/Inflation/Inflation_Rate/InflationCalculator.asp (Inflation from ??? Updated with information from BHP - F 11.3%

TABLE 50-A-23

EQUIPMENT OWNERSHIP AND OPERATING COSTS

Equipment Model		Ownership Costs ($/hr)			Overhaul Costs ($/hr)				Field Repair and Fuel Costs ($/hr)												**2008 Total [$/hr]**
		Depreciation	Depreciation Multiplier	**Adjusted Depreciation**	Labor	Labor Multiplier	**Adjusted Labor**	**O/H Parts**	Labor	Labor Multiplier	**Adjusted Labor**	**Parts**	Fuel	Fuel Multiplier	**Adjusted Fuel**	**Lube**	Tires	Tire Multiplier	**Adjusted Tires**	**GEC (2)**	
D9R Dozer	Semi-U Blade	$ 24.39	0.83	**$ 20.33**	$ 9.27	0.80	**$ 7.39**	**$ 21.54**	$ 10.85	0.80	**$ 8.65**	**$ 20.98**	$ 44.20	1.02	**$ 45.21**	**$ 8.88**	**$ -**	1.00	**$ -**	**$ 2.98**	**$ 143.09**
D10R Dozer	Semi-U Blade	$ 34.24	0.83	**$ 28.53**	$ 9.27	0.80	**$ 7.39**	**$ 29.93**	$ 10.85	0.80	**$ 8.65**	**$ 29.15**	$ 61.88	1.02	**$ 63.29**	**$ 12.38**	**$ -**	1.00	**$ -**	**$ 4.14**	**$ 183.47**
D11R Dozer	U Blade	$ 67.91	0.83	**$ 56.59**	$ 9.27	0.80	**$ 7.39**	**$ 54.65**	$ 10.85	0.80	**$ 8.65**	**$ 53.22**	$ 91.63	1.02	**$ 93.72**	**$ 21.45**	**$ -**	1.00	**$ -**	**$ 8.22**	**$ 303.90**
637G Scraper		$ 39.27	0.83	**$ 32.73**	$ 13.57	0.80	**$ 10.82**	**$ 27.48**	$ 20.35	0.80	**$ 16.23**	**$ 27.69**	$ 91.64	1.02	**$ 93.73**	**$ 18.47**	**$ 6.48**	1.00	**$ 6.48**	**$ 1.18**	**$ 234.80**
992G Loader		$ 83.57	0.83	**$ 69.64**	$ 5.65	0.80	**$ 4.51**	**$ 18.62**	$ 6.90	0.80	**$ 5.50**	**$ 20.54**	$ 77.96	1.02	**$ 79.74**	**$ 18.81**	**$ 29.46**	1.00	**$ 29.46**	**$ 2.65**	**$ 249.47**
777D Truck		$ 42.09	0.83	**$ 35.08**	$ 20.80	0.80	**$ 16.59**	**$ 16.72**	$ 12.78	0.80	**$ 10.19**	**$ 10.32**	$ 57.78	1.02	**$ 59.10**	**$ 13.60**	**$ 15.73**	1.00	**$ 15.73**	**$ -**	**$ 177.32**
16H Grader		$ 23.31	0.83	**$ 19.43**	$ 4.07	0.80	**$ 3.25**	**$ 11.71**	$ 3.39	0.80	**$ 2.70**	**$ 11.35**	$ 28.09	1.02	**$ 28.73**	**$ 6.50**	**$ 7.23**	1.00	**$ 7.23**	**$ 0.88**	**$ 91.77**
Water Truck	10,000 gal	$ 31.73	0.83	**$ 26.44**	$ 7.46	0.80	**$ 5.95**	**$ 6.37**	$ 18.09	0.80	**$ 14.43**	**$ 12.30**	$ 47.26	1.02	**$ 48.34**	**$ 8.73**	**$ 10.41**	1.00	**$ 10.41**	**$ -**	**$ 132.96**
Small Backhoe	Cat 446D	$ 7.02	0.83	**$ 5.85**	$ 2.83	0.80	**$ 2.26**	**$ 2.74**	$ 3.73	0.80	**$ 2.97**	**$ 2.42**	$ 12.10	1.02	**$ 12.38**	**$ 2.27**	**$ 1.97**	1.00	**$ 1.97**	**$ 0.32**	**$ 33.18**
Grader Ripper		$ 2.19	0.83	**$ 1.83**	$ 0.05	0.80	**$ 0.04**	**$ 0.68**	$ 0.90	0.80	**$ 0.72**	**$ 1.01**	$ -	1.02	**$ -**	**$ 0.19**	**$ -**	1.00	**$ -**	**$ 0.84**	**$ 5.30**
16H Grader, ripping		$ 25.50	0.83	**$ 21.25**	$ 4.12	0.80	**$ 3.29**	**$ 12.39**	$ 4.29	0.80	**$ 3.42**	**$ 12.36**	$ 28.09	1.02	**$ 28.73**	**$ 6.69**	**$ 7.23**	1.00	**$ 7.23**	**$ 1.72**	**$ 97.08**
Pickup Truck	1 ton 4x4	$ 3.50	0.83	**$ 2.92**	$ 0.68	0.80	**$ 0.54**	**$ 0.76**	$ 0.86	0.80	**$ 0.69**	**$ 0.73**	$ 16.24	1.02	**$ 16.61**	**$ 1.84**	**$ 0.56**	1.00	**$ 0.56**	**$ -**	**$ 24.65**
Mechanic truck	1.75 ton 4x4	$ 4.92	0.83	**$ 4.10**	$ 0.68	0.80	**$ 0.54**	**$ 1.06**	$ 0.86	0.80	**$ 0.69**	**$ 1.03**	$ 17.11	1.02	**$ 17.50**	**$ 1.63**	**$ 0.79**	1.00	**$ 0.79**	**$ -**	**$ 27.34**
DMM2 Drill		$ 42.48	0.83	**$ 35.40**	$ 47.57	0.80	**$ 37.93**	**$ 23.44**	$ 88.83	0.80	**$ 70.84**	**$ 40.84**	$ 82.60	1.02	**$ 84.48**	**$ 15.68**	**$ -**	1.00	**$ -**	**$ 4.08**	**$ 312.69**

The Total $/hr are used in Worksheet 13

1) CRG - PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 1st Half 2011 edition.

2) GEC - Ground Engaging Components

Multipliers are calculated as follows:

Depreciation:	Assume two shifts per day		
	Assume 90% availability on all equipment		**0.83**
Labor - Heavy Equipment Mechanic: Field Repair and Fuel Costs			
((0.08)(CRG Wages) + Local Wages) / CRG Wages			
	CFG Wages	$49.37 /hr	
	Local Wages	$35.42 /hr	
			0.80
Parts:	No adjustment		**1**
Fuel (Diesel):	CFG Cost	$3.07 /gal	
	Local Cost	$3.14 /gal	
	Fuel Multiplier		**1.02**
Lube:	No adjustment		**1**
Tires:	No adjustment		**1**
GEC:	No adjustment		**1**
Inflation:			**11.3%**

TABLE 50-A-24
EQUIPMENT OPERATOR WAGE RATES

Equipment Operator	Operator Rates [$/hr][1]
D9R Dozer	$35.42
D10R Dozer	$35.42
D11R Dozer	$35.42
16H Grader	$35.42
637G Scraper	$35.42
992G Loader	$35.42
777D Truck	$35.42
Water Truck	$35.42
Tractor	$35.42
Track Hoe	$35.42
Small Backhoe	$35.42
Small Dumptruck	$35.42
Drill Operator	$35.42
Blast Laborer	$35.42
Blast Foremen	$35.42
Pickup Truck	$24.04

1) Labor Rates including burden, excluding Profit&Overheac
from ACME Inc. contract in force for 2011.

TABLE 50-A-26
BOND EQUIPMENT AVAILABILITIES

EQUIPMENT	AVERAGE AVAILABILITY
Front-End Loaders	90.0%
Haul Trucks	90.0%
Dozers	90.0%
Scrapers	90.0%
Drills	90.0%
Motor Graders	90.0%

Navajo Mine Area 4 Project (2016 to 2021)

Dozer Polygons

Poly ID	Volume	Av. Push Distance	Grade	Area		For Wt. Average	
	yd^3	ft.	%	ft^2	Acres	Distance	Grade
D-1	148,000	296	-6.0	298,185	6.8	43,808,000	-888,000
D-2	615,000	297	-7.9	967,949	22.2	182,655,000	-4,858,500
D-3	160,000	230	-8.2	343,771	7.9	36,800,000	-1,312,000
D-4	557,000	424	-9.1	835,263	19.2	236,168,000	-5,068,700
D-5	594,000	305	-10.8	784,394	18.0	181,170,000	-6,415,200
D-6	447,000	142	-13.4	1,627,685	37.4	63,474,000	-5,989,800
D-7	376,000	161	-2.0	1,033,351	23.7	60,536,000	-752,000
D-8	116,000	229	-17.3	231,796	5.3	26,564,000	-2,006,800
D-9	558,000	343	-10.3	781,331	17.9	191,394,000	-5,747,400
D-10	1,122,000	422	-16.2	884,165	20.3	473,484,000	-18,176,400
D-11	200,000	169	-23.8	290,376	6.7	33,800,000	-4,760,000
D-12	113,000	160	-15.2	205,816	4.7	18,080,000	-1,717,600
D-13	125,000	251	-9.7	219,575	5.0	31,375,000	-1,212,500
D-14	210,000	200	-19.7	347,249	8.0	42,000,000	-4,137,000
D-15	415,000	247	-18.6	705,422	16.2	102,505,000	-7,719,000
D-16	341,000	77	3.1	1,229,156	28.2	26,257,000	1,057,100
D-17	470,000	280	-17.5	680,018	15.6	131,600,000	-8,225,000
D-18	240,000	237	-18.0	403,153	9.3	56,880,000	-4,320,000
D-19	357,000	343	-18.0	421,780	9.7	122,451,000	-6,426,000
D-20	414,000	423	-16.5	495,153	11.4	175,122,000	-6,831,000
D-21	551,000	411	-14.9	603,640	13.9	226,461,000	-8,209,900
D-22	435,000	387	-15.0	386,551	8.9	168,345,000	-6,525,000
D-23	401,000	443	-5.2	419,033	9.6	177,643,000	-2,085,200
D-24	383,000	407	-4.9	507,072	11.6	155,881,000	-1,876,700
D-25	186,000	281	1.2	479,916	11.0	52,266,000	223,200
D-26	609,000	441	-4.2	802,972	18.4	268,569,000	-2,557,800
D-27	816,000	461	-5.2	619,609	14.2	376,176,000	-4,243,200
D-28	813,000	471	-5.7	708,896	16.3	382,923,000	-4,634,100
D-29	350,000	362	-11.3	392,946	9.0	126,700,000	-3,955,000
D-30	639,000	343	-9.3	692,411	15.9	219,177,000	-5,942,700
D-31	398,000	287	-14.7	539,048	12.4	114,226,000	-5,850,600
D-32	164,000	215	-15.8	289,203	6.6	35,260,000	-2,591,200
D-33	38,000	129	-12.7	276,826	6.4	4,902,000	-482,600
D-34	114,000	256	-8.6	303,370	7.0	29,184,000	-980,400
D-35	134,000	274	-12.6	174,102	4.0	36,716,000	-1,688,400
D-36	46,000	152	-23.9	109,252	2.5	6,992,000	-1,099,400
D-37	1,130,000	210	-12.0	2,392,735	54.9	237,300,000	-13,560,000
D-38	312,000	93	-15.4	1,056,409	24.3	29,016,000	-4,804,800
D-39	38,000	193	-15.7	324,081	7.4	7,334,000	-596,600
Total	**15,135,000**			**23,863,663**	**548**	**4,891,194,000**	**-166,966,200**
Wt. Average		**323**	**-11.0**				

Scraper or Truck / Loader or Scraper Polygons

Poly ID	Volume	Av. One way Distance	Grade	Cut area		Fill Area (if separate)		Scrapers For Wt. Average		Truck Shovel For Wt. Average	
	yd^3	ft.	%	ft^2	Acres	ft^2	Acres	Distance	Grade	Distance	Grade
T-1	1,404,000	1326	-5.1	1,010,786	23.2	1,568,094	36.0	1,861,704,000	-7,160,400		
T-2	4,442,000	520	-9.6	5,781,685	132.7		0.0	2,309,840,000	-42,643,200		
T-3	2,131,000	4435	-1.7	1,598,039	36.7	1,293,090	29.7			9,450,985,000	-3,622,700
T-4	2,756,000	3666	-2.6	3,204,708	73.6	592,567	13.6			10,103,496,000	-7,165,600
T-5	2,998,000	918	-2.8	4,059,397	93.2		0.0	2,752,164,000	-8,394,400		
T-6	1,042,000	3931	-2.4	550,815	12.6	246,147	5.7			4,096,102,000	-2,500,800
T-7	928,000	796	-6.1	1,699,471	39.0		0.0	738,688,000	-5,660,800		
T-8	4,100,000	1722	-4.8	2,384,529	54.7	1,321,731	30.3	7,060,200,000	-19,680,000		
TOTALS		**WEIGHTED AVERAGES**		**TOTALS**				############	-83,538,800	23,650,583,000	-13,289,100
Scraper	**13,872,000**	**1061**	**-6.0**	**20,289,432**	**466**	**5,021,629**	**115**				
Truck / Shovel	**5,929,000**	**3989**	**-2.2**								

NOTES:

1) Cut off between scraper and truck / shovel is 2000 one way

High Wall Reclamation **1,336,000** **bcy**

TABLE 50-A-7
AREA 4 BOND REGRADE EARTHMOVING
DOZERS

17-May-12

Cut Block	Total Volume cu. yds.	Permanent Program %	Permanent Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project										
D-1	148,000	100%	148,000	D-1	296	296			-6	Straight or Radial Push
D-2	615,000	100%	615,000	D-2	297	297			-7.9	Straight or Radial Push
D-3	160,000	100%	160,000	D-3	230	230			-8.2	Straight or Radial Push
D-4	557,000	100%	557,000	D-4	424	424			-9.1	Straight or Radial Push
D-5	594,000	100%	594,000	D-5	305	305			-10.8	Straight or Radial Push
D-6	447,000	100%	447,000	D-6	142	142			-13.4	Straight or Radial Push
D-7	376,000	100%	376,000	D-7	161	161			-2	Straight or Radial Push
D-8	116,000	100%	116,000	D-8	229	229			-17.3	Straight or Radial Push
D-9	558,000	100%	558,000	D-9	343	343			-10.3	Straight or Radial Push
D-10	1,122,000	100%	1,122,000	D-10	422	422			-16.2	Straight or Radial Push
D-11	200,000	100%	200,000	D-11	169	169			-23.8	Straight or Radial Push
D-12	113,000	100%	113,000	D-12	160	160			-15.2	Straight or Radial Push
D-13	125,000	100%	125,000	D-13	251	251			-9.7	Straight or Radial Push
D-14	210,000	100%	210,000	D-14	200	200			-19.7	Straight or Radial Push
D-15	415,000	100%	415,000	D-15	247	247			-18.6	Straight or Radial Push
D-16	341,000	100%	341,000	D-16	77	77			3.1	Straight or Radial Push
D-17	470,000	100%	470,000	D-17	280	280			-17.5	Straight or Radial Push
D-18	240,000	100%	240,000	D-18	237	237			-18	Straight or Radial Push
D-19	357,000	100%	357,000	D-19	343	343			-18	Straight or Radial Push
D-20	414,000	100%	414,000	D-20	423	423			-16.5	Straight or Radial Push
D-21	551,000	100%	551,000	D-21	411	411			-14.9	Straight or Radial Push
D-22	435,000	100%	435,000	D-22	387	387			-15	Straight or Radial Push
D-23	401,000	100%	401,000	D-23	443	443			-5.2	Straight or Radial Push
D-24	383,000	100%	383,000	D-24	407	407			-4.9	Straight or Radial Push
D-25	186,000	100%	186,000	D-25	281	281			1.2	Straight or Radial Push
D-26	609,000	100%	609,000	D-26	441	441			-4.2	Straight or Radial Push
D-27	816,000	100%	816,000	D-27	461	461			-5.2	Straight or Radial Push
D-28	813,000	100%	813,000	D-28	471	471			-5.7	Straight or Radial Push
D-29	350,000	100%	350,000	D-29	362	362			-11.3	Straight or Radial Push
D-30	639,000	100%	639,000	D-30	343	343			-9.3	Straight or Radial Push
D-31	398,000	100%	398,000	D-31	287	287			-14.7	Straight or Radial Push
D-32	164,000	100%	164,000	D-32	215	215			-15.8	Straight or Radial Push
D-33	38,000	100%	38,000	D-33	129	129			-12.7	Straight or Radial Push
D-34	114,000	100%	114,000	D-34	256	256			-8.6	Straight or Radial Push
D-35	134,000	100%	134,000	D-35	274	274			-12.6	Straight or Radial Push
D-36	46,000	100%	46,000	D-36	152	152			-23.9	Straight or Radial Push
D-37	1,130,000	100%	1,130,000	D-37	210	210			-12	Straight or Radial Push
D-38	312,000	100%	312,000	D-38	93	93			-15.4	Straight or Radial Push
D-39	38,000	100%	38,000	D-39	193	193			-15.7	Straight or Radial Push
Totals				Weighted Average						
Area 4 Project	**15,135,000**	**100%**	**15,135,000**		**323**	**323**			**-11.0**	
GRAND TOTAL	**15,135,000**		**15,135,000**							

Total yards go to Worksheet 3

TABLE 50-A-10
AREA 4 BOND REGRADE EARTHMOVING
TRUCKS AND LOADER

17-May-12

Cut Block	Total Volume cu. yds.	Permanent Program %	Permanent Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project										
T-3	2,131,000	100%	2,131,000			4,435			-1.7	Adj. Dist. reflects haul route
T-4	2,756,000	100%	2,756,000			3,666			-2.6	Adj. Dist. reflects haul route
T-6	1,042,000	100%	1,042,000			3,931			-2.4	Adj. Dist. reflects haul route
Totals				**Weighted Average**						
Area 4 Project	**5,929,000**	**100%**	**5,929,000**			**3,989**			**-2.2**	
GRAND TOTAL	**5,929,000**		**5,929,000**							

Total yards go to Worksheet 3

TABLE 50-A-18
AREA 4 BOND REGRADE EARTHMOVING
SCRAPERS

17-May-12

Cut Block	Total Volume cu. yds.	Permanent Program %	Permanent Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project										
T-1	1,404,000	100%	1,404,000			1,326			-5.1	Adj. Dist. reflects haul route
T-2	4,442,000	100%	4,442,000			520			-9.6	Adj. Dist. reflects haul route
T-5	2,998,000	100%	2,998,000			918			-2.8	Adj. Dist. reflects haul route
T-7	928,000	100%	928,000			796			-6.1	Adj. Dist. reflects haul route
T-8	4,100,000	100%	4,100,000			1,722			-4.8	Adj. Dist. reflects haul route
Totals				**Weighted Average**						
Area 4 Project	**13,872,000**	**100%**	**13,872,000**			**1,061**			**-6.0**	
GRAND TOTAL	**13,872,000**		**13,872,000**							

Total yards go to Worksheet 3

TABLE 50-A-13
AREA 4 BOND REGRADE TOPSOILING
TRUCKS AND LOADER

17-May-12

Cut Block	Total Volume cu. yds.	Area acres	Perm. Topsoil Volume cu. yds.	Root Zone Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project	865,111	1,128.9	865,111		**Area 4 Project**		2,970			4.00%	Adj. Dist. reflects haul route
TOTAL	865,111	1,128.9	865,111		Weighted Average:		2,970			4.00%	

Total yards and acres go to Worksheet 3

Assumption:

0.48	feet topsoil replacement depth Area 4
	Used Marston's weighted average of 2970 feet haul for topsoil on Area 4 North

TABLE 50-A-16
AREA 4 BOND REGRADE MITIGATION
TRUCKS AND LOADER

17-May-12

Cut Block	Total Volume cu. yds.	Area acres	Topsoil Volume cu. yds.	Perm. Root Zone Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project	693,364	1,128.9		693,364	**Area 4 Project**		8,372			4.00%	Adj. Dist. reflects haul route
TOTAL	693,364	1,129		693,364	Weighted Average		8,372			4.00%	

Total yards go to Worksheet 3

Assumptions:	10.8%	of all reclaim acres require mitigation
	4	feet total of mitigation and topsoil
	3.5	feet of mitigation "suitable" materials Area 4
	0.5	feet topsoil replacement depth Area 4

TABLE 50-A-22
AREA BOND REGRADE MITIGATION
SCRAPERS

17-May-12

Cut Block	Total Volume cu. yds.	Area acres	Topsoil Volume cu. yds.	Root Zone Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project					**Area 4 Project**						Adj. Dist. reflects haul route
TOTAL	-	-		-	Weighted Average						

Total yards go to Worksheet 3

Assumptions:	10.8%	of all reclaim acres require mitigation
	4.0	feet total of mitigation and topsoil
		Assume that all mitigation suitable materials will be found an average of 2000 one way feet away from location of need
		Analysis of mine plan drawing shows that this should be possible.

TABLE 50-A-21
AREA 4 BOND REGRADE TOPSOILING
SCRAPERS

17-May-12

Cut Block	Total Topsoil Volume cu. yds.	Area acres	Perm. Topsoil Volume cu. yds.	Root Zone Volume cu. yds.	Fill Block	Centroid Distance ft.	Planned Adj. Distance ft.	Cut Elev. ft	Fill Elev. ft	Grade %	Comments
Area 4 Project					**Area 4 Project**						Adj. Dist. reflects haul route
TOTAL	-	-	-		Weighted Average:						

Total yards and acres go to Worksheet 3

Assumption:

0.48	feet topsoil replacement depth Area 4
	Used Marston's weighted average of 2970 feet haul for topsoil on Area 4 North

TABLE 12-B-2
CULVERT VOLUMES FOR DEMOLITION AND REMOVAL

CULVERT ID	Diameter [in]	Length [ft]	Volume [ft^3]
CP-189	30	318	1,561
		Total	**1,561**

TABLE 12-B-3
BACKFILLING OF PONDS AND IMPOUNDMENTS

Pond	Pond Volume		Dam[2]					Dozer Push Distance	Backfill Volume[3]
	[ac-ft]	[bcy][1]	Bottom [ft]	Top [ft]	Height [ft]	Length [ft]	Volume [bcy][1]	[ft]	[bcy][1]
Pond 3	1.2	1,936	-	-	-	-	Incised	200	1,936
Pond 4	6.8	10,971	-	-	-	-	Incised	200	10,971
Pond 401	3.9	6,292	-	-	-	-	Incised	200	6,292
Pond 402	7.9	12,745	-	-	-	-	Incised	200	12,745
Pond 416	10.4	16,779	-	-	-	-	Incised	200	16,779
Pond 408	1.5	2,420	-	-	-	-	Incised	200	2,420
Pond 409-410	0.9	1,452	-	-	-	-	Incised	200	1,452
Pond 411	1.7	2,743	-	-	-	-	Incised	200	2,743
Pond 412	3.2	5,163	-	-	-	-	Incised	200	5,163
Pond 413	2.6	4,195	-	-	-	-	Incised	200	4,195
Pond 415	1.0	1,565	40	10	6	80	444	100	444
Pond 416	18.7	30,153	50	14	10	800	9,481	150	9,481
	TOTAL	**96,413**	**Weighted Average Push Distance [ft]**					**173.40**	**74,621**

(1) BCY = Bank cubic yards

(2) Dam volume is the trapezoidal cross-sectional area times the length.

(3) Backfill volume is the smaller of the dam volume or pond volume.
This assumes that either the pond is filled or the dam is removed and pushed into the pond.

Project: Pinabete Permit
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TABLE 12-B-4
ROAD RIPPING

Description	Length [ft]	Width [ft]	Area [acres]	Equipment	
Area 4 Project - East Pit Road	2,102	80	3.86	Cat 16G Motor Grader	A4N
Area 4 Project - Middle Pit Road	2,416	80	4.44	Cat 16G Motor Grader	A4N
Area 4 Project - West Pit Road	4,980	80	9.15	Cat 16G Motor Grader	A4N
Area 4 Project - West Loop Road	31,955	80	58.69	Cat 16G Motor Grader	A4N
Area 4 Project - East Loop Road	22,330	80	41.01	Cat 16G Motor Grader	A4N
Total			**117.14**		

TABLE 12-B-25

DRILL AND BLAST QUANTITIES

Area	Volume [yd^3]	Equipment	Comments
Area 4 Project	1,336,000	Ingersoll-Rand DM23	Drilling and Blasting pit highwalls
Total	**1,336,000**		

NOT UPDATED - NO NEW BUILDINGS FOR THIS PLAN

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 2

STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Structure							Buildings / Utilities / Other Structures				Floors, Surfaces & Walls				Footings			
							Volume [ft3]	Ref	Unit Cost	Cost	Area [ft2]	Ref	Unit Cost	Cost	Length [ft]	Ref	Unit Cost	Cost
Area 4 North																		
Buildings - Above Concrete	Length (ft)	Width (ft)	Area (sf)	Height (ft)	#	Construction												
							-	4	0.23	$0								
							-	1	0.22	$0								
							-	1	0.22	$0								
							-	1	0.22	$0								
							-	1	0.22	$0								
							-	1a	0.11	$0								
							-	1	0.22	$0								
							-	1	0.22	$0								
							-	1a	0.11	$0								
							-	1	0.22	$0								
							-	5a	0.12	$0								
							-	1a	0.11	$0								
							-	2a	0.15	$0								
							-	1a	0.11	$0								
							-	1	0.22	$0								
Concrete - Footings	Length (ft) on Long Axis	Length (ft) on Short Axis			#	Construction												
															-	12a	11.43	$0
															-	12a	11.43	$0
															-	15a	21.06	$0
															-	12a	11.43	$0
															-	12a	11.43	$0
															-	12a	11.43	$0
															-	12a	11.43	$0
															-	15a	21.06	$0
															-	12a	11.43	$0
															-	15a	21.06	$0
															-	13a	14.03	$0
															-	12a	11.43	$0
															-	15a	21.06	$0
															-	12a	11.43	$0
															-	12a	11.43	$0

NOT UPDATED - NO NEW BUILDINGS FOR THIS PLAN

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 2
STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Structure							Buildings / Utilities / Other Structures				Floors, Surfaces & Walls				Footings			
							Volume [ft3]	Ref	Unit Cost	Cost	Area [ft2]	Ref	Unit Cost	Cost	Length [ft]	Ref	Unit Cost	Cost
Concrete - Floors, Surfaces & Walls	Length (ft)	Width (ft)	Area (sf)		#	Construction												
											-	8b	3.57	$0				
											-	8b	3.57	$0				
											-	11	9.57	$0				
											-	9b	4.78	$0				
											-	9b	4.78	$0				
											-	8b	3.57	$0				
											-	8b	3.57	$0				
											-	11	9.57	$0				
											-	9b	4.78	$0				
											-	11	9.57	$0				
											-	10a	6.38	$0				
											-	8b	3.57	$0				
											-	11	9.57	$0				
											-	8b	3.57	$0				
											-	8b	3.57	$0				
Concrete/Asphalt - Aprons & Driveways	Length (ft)	Width (ft)	Area (sf)		#	Construction												
											-	28	0.88	$0				
											-	28	0.88	$0				
											-	28	0.88	$0				
											-	29	1.26	$0				
											-	11	9.57	$0				
											-	9b	4.78	$0				
											-	11	9.57	$0				
											-	11	9.57	$0				
											-	8b	3.57	$0				
Concrete - CSBF Below Grade	Height (ft)	Width (ft)	Area (sf)	Thick (ft)	#	Construction												
											-	50a	15.38	$0				
											-	21	32.98	$0				
											-	50	14.04	$0				
Utilities			Length (lf)			Construction	Length (lf)											
							-	25	3.36	$0								
							-	25	3.36	$0								
							-	32	7,019.97	$0								
							-	26	1.82	$0								

NOT UPDATED - NO NEW BUILDINGS FOR THIS PLAN

WORKSHEET NO. 2

STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Structure							Buildings / Utilities / Other Structures				Floors, Surfaces & Walls				Footings			
							Volume [ft3]	Ref	Unit Cost	Cost	Area [ft2]	Ref	Unit Cost	Cost	Length [ft]	Ref	Unit Cost	Cost
Other Structures	Length (ft)	Width (ft)	Area (sf)	Capacity (gal)	#	Construction												
							-	24	3.71	$0								
							-	24	3.71	$0								
							-	20	24.74	$0								
							-	31	0.23	$0								
							-	11	9.57	$0								
							-	11	9.57	$0								
							-	11	9.57	$0								
							-	28	0.88	$0								
							-	28	0.88	$0								
							-	28	0.88	$0								
							-	28	0.88	$0								
							-	28	0.88	$0								
							-	71	2,910.00	$0								
							-	31	0.23	$0								
Conveyors	Length (ft)	Width (ft)	Area (sf)		#	Construction												
							-	33	22.75	$0								
							-	29	1.26	$0								
							-	11	9.57	$0								
Area 4 South																		
Buildings - Above Concrete	Length (ft)	Width (ft)	Area (sf)	Height (ft)	#	Construction												
			0			Steel Building	-	1	0.22	$0								
			0			Steel Building	-	1	0.22	$0								

NOT UPDATED - NO NEW BUILDINGS FOR THIS PLAN

WORKSHEET NO. 2

STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Structure							Buildings / Utilities / Other Structures				Floors, Surfaces & Walls				Footings			
							Volume [ft3]	Ref	Unit Cost	Cost	Area [ft2]	Ref	Unit Cost	Cost	Length [ft]	Ref	Unit Cost	Cost
Concrete - Footings	Length (ft) on Long Axis	Length (ft) on Short Axis			#	Construction												
						Concrete									-	12a	11.43	$0
Concrete - Floors, Surfaces & Walls	Length (ft)	Width (ft)	Area (sf)		#	Construction												
			-			Concrete					-	9a	4.25	$0				
			-			MSE Wall					-	20	24.74	$0				
Concrete/Asphalt - Aprons & Driveways																		
Concrete - Truck Dump Below Grade	Height (ft)	Width (ft)	Area (sf)	Thick (ft)	#	Construction												
			-			Concrete					-	21	32.98	$0				
			-			Concrete					-	11	9.57	$0				
			-			Concrete					-	50a	15.38	$0				
Utilities			Length (lf)			Construction												
Underground Piping			11,818				-	25	3.36	$0								
Aboveground Piping			2,659				-	25	3.36	$0								
Overhead Powerlines (69-kV max)			57,300				-	32	7,019.97	$0								
Electrical Bulks (Conduit, Cable, Fixtures, Boxes)			112,455				-	26	1.82	$0								
Other Structures	Length (ft)	Width (ft)	Area (sf)	Capacity (gal)	#	Construction												
Raw Water Storage Tank					1	Steel Tank	-	31	0.23	$0								
Conveyors	Length (ft)	Width (ft)	Area (sf)		#	Construction												
CV-01 through CV-04							-	33	22.75	$0								
Conveyor Footing Ties			0			Concrete Ties	-	29	1.26	$0								
Transfer Point and Take-Up Tower Foundations			0			Concrete	-	11	9.57	$0								
TOTAL										**$0**				**$0**				**$0**
TOTAL DEMOLITION COST																		**$0**

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 3
MATERIAL HANDLING SUMMARY SHEET

Acty	Description	Quantity	Swell Factor	Adjusted Quantity	Push/Haul Distance [ft]	Push/Haul Grade [%]	Equipment
	Area 4 Project						
1	Drill & Blast Area 4 Project	1,336,000 BCY					DMM2
2	Grading - Dozer Area 4 Project	15,135,000 LCY	1	15,135,000 LCY	323	-11.0%	D11R
3	Grading - Loader/Truck Area 4 Project	5,929,000 LCY	1	5,929,000 LCY	3,989	-2.2%	992G/777D
4	Grading - Scrapers Area 4 Project	13,872,000 LCY	1	13,872,000 LCY	1,061	-6.0%	637G
5	Topsoil - Loader/Truck Area 4 Project	865,111 BCY	1.142	987,957 LCY	2,970	4.0%	992G/777D
6	Topsoil - Scrapers Area 4 Project	0 BCY	1.142	0 LCY	0	0.0%	637G
7	Mitigation - Loader/Truck Area 4 Project	693,364 BCY	1.142	791,821 LCY	8,372	4.0%	992G/777D
8	Mitigation - Scrapers Area 4 Project	0 BCY	1.142	0 LCY	0	0.0%	637G
9	Revegetation Area 4 Project	1,129 ac.					
10							
22	**Other**						
23	Backfill Ponds Area 4 Project	74,621 BCY	1.142	85,217 LCY	173	0.00%	D11R
24	Regrade Conveyor/Ash Haul Corridor	0 LCY	1	0 LCY	0	0.00%	992G/777D
25	Regrade Field Stockpile Area	0 LCY	1	0 LCY	0	0.00%	D11R
26	Backfill Pinabete Diversion	0 BCY	1.142	0 LCY	0	0.00%	992G/777D
27	Regrade Truck Dump Area	0 LCY	1	0 LCY	0	0.00%	992G/777D
28	Regrade Haul Roads	0 BCY	1.142	0 LCY	0	0.00%	637G
29	Road Ripping Area 4 Project	117 ac.					16H
30							
31							
32	Intentionally Left Blank	0			100	1.00%	
33	Grading Topsoil Areas	0			100	1.00%	16H
34	Revegetation Roads Area 4 Project	117 ac.					
35							
36							
37							
38							
39							
40							

Swell factor = 1.142 Weighted Average Between In-Situ and Stockpile Swells

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 5A

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

2 Grading - Dozer Area 4 Project

Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

-11.0% grade on average

323 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd^3]

Productivity Calculations[3]:

Operating Adjustment Factor = 0.9 (operator factor) * 1.0 (material factor) * 0.8 (work hour factor) * 1.2 (grade factor) * 0.9 (weight correction factor) * 0.9 (visibility factor) * 1.0 (elevation factor) * 1.1 (production factor) = 0.8

Net Hourly Production = 0.8 (operating adjustment factor) * 990 LCY/hr (Normal Hourly Production) = 760 LCY/hr

Hours Required[2] = 15,135,000 LCY (volume to be moved[1]) / 760 LCY/hr (net hourly production) = 19,924.5 hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 5B

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

23 Backfill Ponds Area 4 Project

Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

0.0% grade on average

173 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd^3]

Productivity Calculations[3]:

Operating Adjustment Factor = 0.9 (operator factor) * 1.0 (material factor) * 0.8 (work hour factor) * 1.0 (grade factor) * 0.9 (weight correction factor) * 0.9 (visibility factor) * 1.0 (elevation factor) * 1.1 (production factor) = 0.6

Net Hourly Production = 0.6 (operating adjustment factor) * 1,650 LCY/hr (Normal Hourly Production) = 1,037 LCY/hr

Hours Required[2] = 85,217 LCY (volume to be moved[1]) / 1,037 LCY/hr (net hourly production) = 82.2 hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 5C

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

1.0% grade on average

100 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd³]

Productivity Calculations[3]:

Operating Adjustment Factor	=	0.9	*	1.0	*	0.8	*	1.0	*	0.9	*	0.9	*	1.0	*	1.1	= 0.6
		operator factor		material factor		work hour factor		grade factor		weight correction factor		visibility factor		elevation factor		production factor	

Net Hourly Production	=	0.6	*	2,690 LCY/hr	=	1,657 LCY/hr
		operating adjustment factor		Normal Hourly Production		

Hours Required[2]	=	- LCY	/	1,657 LCY/hr	=	- hrs
		volume to be moved[1]		net hourly production		

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 5D

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

1.0% grade on average

100 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd^3]

Productivity Calculations[3]:

Operating Adjustment Factor = 0.9 (operator factor) * 1.0 (material factor) * 0.8 (work hour factor) * 1.0 (grade factor) * 0.9 (weight correction factor) * 0.9 (visibility factor) * 1.0 (elevation factor) * 1.1 (production factor) = 0.6

Net Hourly Production = 0.6 (operating adjustment factor) * 2,690 LCY/hr (Normal Hourly Production) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 5E

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

1.0% grade on average

100 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd^3]

Productivity Calculations[3]:

Operating Adjustment Factor = 0.9 (operator factor) * 1.0 (material factor) * 0.8 (work hour factor) * 1.0 (grade factor) * 0.9 (weight correction factor) * 0.9 (visibility factor) * 1.0 (elevation factor) * 1.1 (production factor) = 0.6

Net Hourly Production = 0.6 (operating adjustment factor) * 2,690 LCY/hr (Normal Hourly Production) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 5F

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

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Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

1.0% grade on average

100 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd^3]

Productivity Calculations[3]:

Operating Adjustment Factor	=	0.9	*	1.0	*	0.8	*	1.0	*	0.9	*	0.9	*	1.0	*	1.1	= 0.6
		operator factor		material factor		work hour factor		grade factor		weight correction factor		visibility factor		elevation factor		production factor	

Net Hourly Production	=	0.6	*	2,690 LCY/hr	=	1,657 LCY/hr
		operating adjustment factor		Normal Hourly Production		

Hours Required[2]	=	- LCY	/	1,657 LCY/hr	=	- hrs
		volume to be moved[1]		net hourly production		

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 5G

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Dozer Used (type, size, etc.)[3]

Caterpillar D11R, Universal blade

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.)

1.0% grade on average

100 ft typical dozer push distance

2,700 Loose clay and sand density [lb/yd^3]

Productivity Calculations[3]:

Operating Adjustment Factor = 0.9 (operator factor) * 1.0 (material factor) * 0.8 (work hour factor) * 1.0 (grade factor) * 0.9 (weight correction factor) * 0.9 (visibility factor) * 1.0 (elevation factor) * 1.1 (production factor) = 0.6

Net Hourly Production = 0.6 (operating adjustment factor) * 2,690 LCY/hr (Normal Hourly Production) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8A
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

3 Grading - Loader/Truck Area 4 Project

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
0.90 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = (loaded haul time) + (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 0.90 (bucket fill factor) = 13.5 LCY

Net Hourly Production = 13.5 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,038 LCY/hr

Hours Required[2] = 5,929,000 LCY (volume to be moved[1]) / 1,038 LCY/hr (net hourly production) = 5,709 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8B

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

7 Mitigation - Loader/Truck Area 4 Project

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks

0.90 Bucket Fill Factor

15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = ____ (loaded haul time) + ____ (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 1.05 (bucket fill factor) = 15.8 LCY

Net Hourly Production = 15.8 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,212 LCY/hr

Hours Required[2] = 791,821 LCY (volume to be moved[1]) / 1,212 LCY/hr (net hourly production) = 654 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8C
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

5 Topsoil - Loader/Truck Area 4 Project

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
1.05 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = (loaded haul time) + (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 1.05 (bucket fill factor) = 15.8 LCY

Net Hourly Production = 15.8 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,212 LCY/hr

Hours Required[2] = 987,957 LCY (volume to be moved[1]) / 1,212 LCY/hr (net hourly production) = 815 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8D

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks

0.95 Bucket Fill Factor

15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = ____ (loaded haul time) + ____ (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 0.95 (bucket fill factor) = 14.3 LCY

Net Hourly Production = 14.3 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,096 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,096 LCY/hr (net hourly production) = 0 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8E
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
1.05 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = (loaded haul time) + (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 1.05 (bucket fill factor) = 15.8 LCY

Net Hourly Production = 15.8 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,212 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,212 LCY/hr (net hourly production) = 0 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8F
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
1.05 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = (loaded haul time) + (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 1.05 (bucket fill factor) = 15.8 LCY

Net Hourly Production = 15.8 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,212 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,212 LCY/hr (net hourly production) = 0 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 8G

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
1.05 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = ______ (loaded haul time) + ______ (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 1.05 (bucket fill factor) = 15.8 LCY

Net Hourly Production = 15.8 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,212 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,212 LCY/hr (net hourly production) = 0 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8H
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
0.95 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = (loaded haul time) + (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 0.95 (bucket fill factor) = 14.3 LCY

Net Hourly Production = 14.3 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,096 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,096 LCY/hr (net hourly production) = 0 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 8H
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Loader Used (type, size, etc.)[3]

Caterpillar 992G with 15 CYD Bucket

Description of Loader Use (origin, destination, grade,haul distance, etc.)

Load Caterpillar 777D Trucks
0.88 Bucket Fill Factor
15 Rated Bucket Capacity [LCY]

Productivity Calculations[3]

Cycle Time = ______ (loaded haul time) + ______ (empty haul time) + 0.65 min (basic cycle time) = 0.65 min

Net Bucket Capacity = 15 LCY (heaped bucket capacity) * 0.88 (bucket fill factor) = 13.2 LCY

Net Hourly Production = 13.2 LCY (net bucket capacity) / 0.65 min (cycle time) * 50 min/hr (work hour factor) = 1,015 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 1,015 LCY/hr (net hourly production) = 0 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9A

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

3 Grading - Loader/Truck Area 4 Project

Characterization of Truck Used (type, size, etc.)[3]

	Caterpillar 777D
55	Struck Capacity [LCY]
79	Heaped Capacity [LCY]
67	Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

3,989	ft. average haul distance
-2.2%	Grade (Loaded)
3.0%	Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 13.5 LCY (loader bucket net capacity) = 5.0 passes

Loading Time Per Truck = 0.65 min (loader cycle time) * 5 (loader passes per truck) = 3.2 min

Number of Trucks Required = 7.7 min (truck cycle time) / 3.2 min (truck loading time) = 2 trucks (round down)

Hourly Production = 9 LCY/min (production rate) * 50 min/hr (work hour factor) = 436 LCY/hr

Net Truck Capacity = 13.5 LCY (loader bucket net capacity) * 5 (loader passes per truck) = 67 LCY

Truck Cycle Time = 2.2 min (haul time) + 1.2 min (return time) + 3.2 min (loading time per truck) + 1.0 min (dump and maneuver time) = 7.7 min

Production Rate = 67 LCY (net truck capacity) / 7.7 min (cycle time) = 8.7 LCY/min

Hours Required[2] = 5,929,000 LCY (volume to be moved[1]) / 436 LCY/hr (hourly production) = 13,607 hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9B

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

7 Mitigation - Loader/Truck Area 4 Project

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

8,372 ft. average haul distance
4.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 13.5 LCY (loader bucket net capacity) = 5 passes

Loading Time Per Truck = 0.7 min (loader cycle time) * 5 (loader passes per truck) = 3.2 min

Number of Trucks Required = 11.5 min (truck cycle time) / 3.2 min (truck loading time) = 3 trucks (round down)

Hourly Production = 6 LCY/min (production rate) * 50 min/hr (work hour factor) = 292 LCY/hr

Net Truck Capacity = 14 LCY (loader bucket net capacity) * 5 (loader passes per truck) = 67 LCY

Truck Cycle Time = 4.7 min (haul time) + 2.5 min (return time) + 3.2 min (loading time per truck) + 1.0 min (dump and maneuver time) = 11.5 min

Production Rate = 67 LCY (net truck capacity) / 11.5 min (cycle time) = 5.8 LCY/min

Hours Required[2] = 791,821 LCY (volume to be moved[1]) / 292 LCY/hr (hourly production) = 2,716 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9C

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

5 Topsoil - Loader/Truck Area 4 Project

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

2,970 ft. average haul distance
4.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 16 LCY (loader bucket net capacity) = 4 passes

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Number of Trucks Required = 6.2 min (truck cycle time) / 2.6 min (truck loading time) = 2 trucks (round down)

Hourly Production = 10 LCY/min (production rate) * 50 min/hr (work hour factor) = 510 LCY/hr

Net Truck Capacity = 16 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 63 LCY

Truck Cycle Time = 1.7 min (haul time) + 0.9 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 6.2 min

Production Rate = 63 LCY (net truck capacity) / 6.2 min (cycle time) = 10.2 LCY/min

Hours Required[2] = 987,957 LCY (volume to be moved[1]) / 510 LCY/hr (hourly production) = 1,935 hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9D

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100 ft. average haul distance
1.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 14 LCY (loader bucket net capacity) = 4 passes

Net Truck Capacity = 14 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 57 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 3.7 min

Number of Trucks Required = 3.7 min (truck cycle time) / 2.6 min (truck loading time) = 1 trucks (round down)

Production Rate = 57 LCY (net truck capacity) / 3.7 min (cycle time) = 15.5 LCY/min

Hourly Production = 15 LCY/min (production rate) * 50 min/hr (work hour factor) = 773 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 773 LCY/hr (hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 9E

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100 ft. average haul distance
1.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 16 LCY (loader bucket net capacity) = 4 passes

Net Truck Capacity = 16 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 63 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 3.7 min

Number of Trucks Required = 3.7 min (truck cycle time) / 2.6 min (truck loading time) = 1 trucks (round down)

Production Rate = 63 LCY (net truck capacity) / 3.7 min (cycle time) = 17.1 LCY/min

Hourly Production = 17 LCY/min (production rate) * 50 min/hr (work hour factor) = 854 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 854 LCY/hr (hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 9F

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100 ft. average haul distance
1.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 16 LCY (loader bucket net capacity) = 4 passes

Net Truck Capacity = 16 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 63 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 3.7 min

Number of Trucks Required = 3.7 min (truck cycle time) / 2.6 min (truck loading time) = 1 trucks (round down)

Production Rate = 63 LCY (net truck capacity) / 3.7 min (cycle time) = 17.1 LCY/min

Hourly Production = 17 LCY/min (production rate) * 50 min/hr (work hour factor) = 854 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 854 LCY/hr (hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9G

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100 ft. average haul distance
1.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 16 LCY (loader bucket net capacity) = 4 passes

Net Truck Capacity = 16 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 63 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 3.7 min

Number of Trucks Required = 3.7 min (truck cycle time) / 2.6 min (truck loading time) = 1 trucks (round down)

Production Rate = 63 LCY (net truck capacity) / 3.7 min (cycle time) = 17.1 LCY/min

Hourly Production = 17 LCY/min (production rate) * 50 min/hr (work hour factor) = 854 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 854 LCY/hr (hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9H

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D
55 Struck Capacity [LCY]
79 Heaped Capacity [LCY]
67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100 ft. average haul distance
1.0% Grade (Loaded)
3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 14 LCY (loader bucket net capacity) = 4 passes

Net Truck Capacity = 14 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 57 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 3.7 min

Number of Trucks Required = 3.7 min (truck cycle time) / 2.6 min (truck loading time) = 1 trucks (round down)

Production Rate = 57 LCY (net truck capacity) / 3.7 min (cycle time) = 15.5 LCY/min

Hourly Production = 15 LCY/min (production rate) * 50 min/hr (work hour factor) = 773 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 773 LCY/hr (hourly production) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 9I

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

Caterpillar 777D

55 Struck Capacity [LCY]

79 Heaped Capacity [LCY]

67 Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100 ft. average haul distance

1.0% Grade (Loaded)

3.0% Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 14 LCY (loader bucket net capacity) = 4 passes

Net Truck Capacity = 14 LCY (loader bucket net capacity) * 4 (loader passes per truck) = 57 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 4 (loader passes per truck) = 2.6 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 2.6 min (loading time per truck) + 1.0 min (dump and maneuver time) = 3.7 min

Number of Trucks Required = 3.7 min (truck cycle time) / 2.6 min (truck loading time) = 1 trucks (round down)

Production Rate = 57 LCY (net truck capacity) / 3.7 min (cycle time) = 15.5 LCY/min

Hourly Production = 15 LCY/min (production rate) * 50 min/hr (work hour factor) = 773 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 773 LCY/hr (work hour factor) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 9J

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Truck Used (type, size, etc.)[3]

	Caterpillar 777D
55	Struck Capacity [LCY]
79	Heaped Capacity [LCY]
67	Adjusted Capacity (Average of Struck and Heaped) [LCY]

Description of Truck Use (origin, destination, grade,haul distance, truck capacity, etc.):

100	ft. average haul distance
1.0%	Grade (Loaded)
3.0%	Rolling Resisance

Productivity Calculation[3]

Loader Passes Per Truck = 67 LCY (truck capacity) / 13 LCY (loader bucket net capacity) = 5 passes

Net Truck Capacity = 13 LCY (loader bucket net capacity) * 5 (loader passes per truck) = 66 LCY

Loading Time Per Truck = 0.7 min (loader cycle time) * 5 (loader passes per truck) = 3.3 min

Truck Cycle Time = 0.1 min (haul time) + 0.0 min (return time) + 3.3 min (loading time per truck) + 1.0 min (dump and maneuver time) = 4.3 min

Number of Trucks Required = 4.3 min (truck cycle time) / 3.3 min (truck loading time) = 1 trucks (round down)

Production Rate = 66 LCY (net truck capacity) / 4.3 min (cycle time) = 15.2 LCY/min

Hourly Production = 15 LCY/min (production rate) * 50 min/hr (work hour factor) = 761 LCY/hr

Hours Required[2] = - LCY (volume to be moved[1]) / 761 LCY/hr (work hour factor) = - hrs

Data Sources:

1) Volume to be moved from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 11A
PRODUCTIVITY AND HOURS REQUIRED FOR SCRAPER USE

Earthmoving Activity:

4 Grading - Scrapers Area 4 Project

Characterization of Scraper Used (type, size, etc.)3

Caterpillar 637G Scrapers Push-Pull Pair

24 Struck Capacity [yd^3]

34 Heaped Capacity [yd^3]

29 Adjusted Capacity (Average of Struck and Heaped) [yd^3]

Description of Scraper Use (origin, destination, grade, haul distance, material, etc.)

1,061 ft. average haul distance

-6.0% Grade (Loaded)

3% Rolling Resisance

Productivity Calculations[3]:

Cycle Time[3]	=	1.0 min	+	0.7 min	+	0.6 min	+	0.6 min	=	2.8 min
		load time per pair		loaded trip time		maneuver and spread time		return trip time		
Net Hourly Production	=	29 LCY	*	50 min/hr	/	2.8 min	*	2	=	1,027 LCY/hr
		adjusted capacity		work hour factor		cycle time		number of scrapers		
Hours Required[2]	=	13,872,000 LCY	/	1027 LCY/hr	=	13,513 hrs				
		volume to be handled[1]		net hourly production						

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 11B

PRODUCTIVITY AND HOURS REQUIRED FOR SCRAPER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Scraper Used (type, size, etc.)3

Caterpillar 637G Scrapers Push-Pull Pair

24 Struck Capacity [yd3]

34 Heaped Capacity [yd3]

29 Adjusted Capacity (Average of Struck and Heaped) [yd3]

Description of Scraper Use (origin, destination, grade, haul distance, material, etc.)

100 ft. average haul distance

1.0% Grade (Loaded)

3% Rolling Resisance

Productivity Calculations[3]:

Cycle Time[3] = 1.0 min (load time per pair) + 0.1 min (loaded trip time) + 0.6 min (maneuver and spread time) + 0.1 min (return trip time) = 1.8 min

Net Hourly Production = 29 LCY (adjusted capacity) * 50 min/hr (work hour factor) / 1.8 min (cycle time) * 2 (number of scrapers) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be handled[1]) / 1657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 11C
PRODUCTIVITY AND HOURS REQUIRED FOR SCRAPER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Scraper Used (type, size, etc.)3

Caterpillar 637G Scrapers Push-Pull Pair
24 Struck Capacity [yd^3]
34 Heaped Capacity [yd^3]
29 Adjusted Capacity (Average of Struck and Heaped) [yd^3]

Description of Scraper Use (origin, destination, grade, haul distance, material, etc.)

100 ft. average haul distance
1.0% Grade (Loaded)
3% Rolling Resisance

Productivity Calculations[3]:

Cycle Time[3] = 1.0 min (load time per pair) + 0.1 min (loaded trip time) + 0.6 min (maneuver and spread time) + 0.1 min (return trip time) = 1.8 min

Net Hourly Production = 29 LCY (adjusted capacity) * 50 min/hr (work hour factor) / 1.8 min (cycle time) * 2 (number of scrapers) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be handled[1]) / 1657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 11D
PRODUCTIVITY AND HOURS REQUIRED FOR SCRAPER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Scraper Used (type, size, etc.)3

Caterpillar 637G Scrapers Push-Pull Pair
24 Struck Capacity [yd^3]
34 Heaped Capacity [yd^3]
29 Adjusted Capacity (Average of Struck and Heaped) [yd^3]

Description of Scraper Use (origin, destination, grade, haul distance, material, etc.)

100 ft. average haul distance
1.0% Grade (Loaded)
3% Rolling Resisance

Productivity Calculations[3]:

Cycle Time[3]	=	1.0 min	+	0.1 min	+	0.6 min	+	0.1 min	=	1.8 min
		load time per pair		loaded trip time		maneuver and spread time		return trip time		
Net Hourly Production	=	29 LCY	*	50 min/hr	/	1.8 min	*	2	=	1,657 LCY/hr
		adjusted capacity		work hour factor		cycle time		number of scrapers		
Hours Required[2]	=	- LCY	/	1657 LCY/hr	=	- hrs				
		volume to be handled[1]		net hourly production						

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 11E

PRODUCTIVITY AND HOURS REQUIRED FOR SCRAPER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Scraper Used (type, size, etc.)3

Caterpillar 637G Scrapers Push-Pull Pair

24 Struck Capacity [yd^3]

34 Heaped Capacity [yd^3]

29 Adjusted Capacity (Average of Struck and Heaped) [yd^3]

Description of Scraper Use (origin, destination, grade, haul distance, material, etc.)

100 ft. average haul distance

1.0% Grade (Loaded)

3% Rolling Resisance

Productivity Calculations[3]:

Cycle Time[3] = 1.0 min (load time per pair) + 0.1 min (loaded trip time) + 0.6 min (maneuver and spread time) + 0.1 min (return trip time) = 1.8 min

Net Hourly Production = 29 LCY (adjusted capacity) * 50 min/hr (work hour factor) / 1.8 min (cycle time) * 2 (number of scrapers) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be handled[1]) / 1657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 11F
PRODUCTIVITY AND HOURS REQUIRED FOR SCRAPER USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Scraper Used (type, size, etc.)3

Caterpillar 637G Scrapers Push-Pull Pair

24 Struck Capacity [yd^3]

34 Heaped Capacity [yd^3]

29 Adjusted Capacity (Average of Struck and Heaped) [yd^3]

Description of Scraper Use (origin, destination, grade, haul distance, material, etc.)

100 ft. average haul distance

1.0% Grade (Loaded)

3% Rolling Resisance

Productivity Calculations[3]:

Cycle Time[3] = 1.0 min (load time per pair) + 0.1 min (loaded trip time) + 0.6 min (maneuver and spread time) + 0.1 min (return trip time) = 1.8 min

Net Hourly Production = 29 LCY (adjusted capacity) * 50 min/hr (work hour factor) / 1.8 min (cycle time) * 2 (number of scrapers) = 1,657 LCY/hr

Hours Required[2] = - LCY (volume to be handled[1]) / 1657 LCY/hr (net hourly production) = - hrs

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

WORKSHEET NO. 12A

PRODUCTIVITY AND HOURS FOR MOTOR GRADER USE -- GRADING

Earthmoving Activity:

29 Road Ripping Area 4 Project

Characterization of Grader Used (type, size capacity, etc.)[3]

Caterpillar 16H

Description of Grader Route (push distance,% blade effective length, operating speed, etc.):

9.75 Ripper width [ft]

Productivity Calculations[3]:

Contour Grading:

Hourly Productivity = 3.4 mi/hr (speed) x 9.75 ft. (effective blade width) x 5,280 ft/mi (conversion factor) / 43,560 ft^2/ac (conversion factor) x 0.83 (work hour factor) x 0.90 (availability) = 3.0 ac / hr

Hours Required = 0 ac (acreage to be graded[1]) / 2.99 ac/hr (hourly productivity) = 0 hr

Scarification:

Hourly Productivity = 1.25 mi/hr (work speed) x 9.75 ft. (scarifier width) x 5,280 ft/mi (conversion factor) / 43,560 ft^2/ac (conversion factor) x 0.83 (work hour factor) x 0.90 (availability) = 1.1 ac / hr

Hours Required = 117 ac (acreage to be ripped[1]) / 1.10 ac/hr (hourly productivity) = 107 hr

Total Hours Required[2] = 0 hr (grading hours required) + 107 hr (scarification hours required) = 107 hr

Data Sources:

1) Acres from Worksheet 3
2) Hours required go to Worksheet 13
3) Caterpillar Performance Handbook, Edition 37

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 12B

PRODUCTIVITY AND HOURS FOR MOTOR GRADER USE -- GRADING

Earthmoving Activity:

33 Grading Topsoil Areas

Characterization of Grader Used (type, size capacity, etc.)[3]

Caterpillar 16H

Description of Grader Route (push distance,% blade effective length, operating speed, etc.):

11.9 Ripper width [ft]

Productivity Calculations[3]:

Contour Grading:

Hourly Productivity	=	3.4 mi/hr	x	11.90 ft.	x	5,280 ft/mi	/	43,560 ft^2 /ac	x	0.83	x	0.90	=	3.7 ac / hr	Hours Required	=	1,246 ac	/	3.65 ac/hr	= 341 hr
		speed		effective blade width		conversion factor		conversion factor		work hour factor		availability					acreage to be graded[1]		hourly productivity	

Scarification:

Hourly Productivity	=	1.25 mi/hr	x	9.75 ft.	x	5,280 ft/mi	/	43,560 ft^2 /ac	x	0.83	x	0.90	=	1.1 ac / hr	Hours Required	=	- ac	/	1.10 ac/hr	= - hr
		work speed		scarifier width		conversion factor		conversion factor		work hour factor		availability					acreage to be ripped*		hourly productivity	

Total Hours Required[2]	=	341 hr	+	0 hr	= 341 hr
		grading hours required		scarification hours required	

Data Sources:

1) Acres from Worksheet 3

2) Hours required go to Worksheet 13

3) Caterpillar Performance Handbook, Edition 37

*No Ripping on Topsoiled Areas

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13A
SUMMARY CALCULATION OF EARTHMOVING COSTS - Dozers

	Project	Equipment Type[1]	Ratio		Equipment Unit Costs [$/hr][2]		Labor Costs [$/hr][3]			Total Hours Required[4]		Total Cost [$]
2	Grading - Dozer Area 4 Project	D11R Dozer	100%	(	$304	+	$ 35	)	*	19,924	=	$ 6,760,674
23	Backfill Ponds Area 4 Project	D11R Dozer	100%	(	$304	+	$ 35	)	*	82	=	$ 27,879
32	Intentionally Left Blank	D11R Dozer	100%	(	$304	+	$ 35	)	*	-	=	$ -
32	Intentionally Left Blank	D11R Dozer	100%	(	$304	+	$ 35	)	*	-	=	$ -
32	Intentionally Left Blank	D11R Dozer	100%	(	$304	+	$ 35	)	*	-	=	$ -
32	Intentionally Left Blank	D11R Dozer	100%	(	$304	+	$ 35	)	*	-	=	$ -
32	Intentionally Left Blank	D11R Dozer	100%	(	$304	+	$ 35	)	*	-	=	$ -
										Total Cost	**=**	**$ 6,788,553**

Equipment and Accesory Identification

1) Caterpillar D11R with Universal Blade

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)

3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)

4) Total Hours Required from Worksheet 5

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13B
SUMMARY CALCULATION OF EARTHMOVING COSTS - Loaders

	Project	Equipment Type[1]	Ratio		Equipment Unit Costs [$/hr][2]		Labor Costs [$/hr][3]			Total Hours Required[4]		Total Cost [$]
3	**Grading - Loader/Truck Area 4 Project**	992G Loader	100%	(	$ 249	+	$ 35	)	*	5,709	=	$ 1,626,537
		16H Grader	50%	(	$ 92	+	$ 35	)	*	2,855	=	$ 363,102
		D9R Dozer	100%	(	$ 143	+	$ 35	)	*	5,709	=	$ 1,019,186
		Water Truck	50%	(	$ 133	+	$ 35	)	*	2,855	=	$ 480,686
7	**Mitigation - Loader/Truck Area 4 Project**	992G Loader	100%	(	$ 249	+	$ 35	)	*	654	=	$ 186,193
		16H Grader	50%	(	$ 92	+	$ 35	)	*	327	=	$ 41,565
		D9R Dozer	100%	(	$ 143	+	$ 35	)	*	654	=	$ 116,668
		Water Truck	50%	(	$ 133	+	$ 35	)	*	327	=	$ 55,025
5	**Topsoil - Loader/Truck Area 4 Project**	992G Loader	100%	(	$ 249	+	$ 35	)	*	815	=	$ 232,313
		16H Grader	50%	(	$ 92	+	$ 35	)	*	408	=	$ 51,861
		D9R Dozer	100%	(	$ 143	+	$ 35	)	*	815	=	$ 145,567
		Water Truck	50%	(	$ 133	+	$ 35	)	*	408	=	$ 68,655
32	**Intentionally Left Blank**	992G Loader	100%	(	$ 249	+	$ 35	)	*	-	=	$ -
		16H Grader	50%	(	$ 92	+	$ 35	)	*	-	=	$ -
		D9R Dozer	100%	(	$ 143	+	$ 35	)	*	-	=	$ -
		Water Truck	50%	(	$ 133	+	$ 35	)	*	-	=	$ -
32	**Intentionally Left Blank**	992G Loader	100%	(	$ 249	+	$ 35	)	*	-	=	$ -
		16H Grader	50%	(	$ 92	+	$ 35	)	*	-	=	$ -
		D9R Dozer	100%	(	$ 143	+	$ 35	)	*	-	=	$ -
		Water Truck	50%	(	$ 133	+	$ 35	)	*	-	=	$ -
										Total Cost	**=**	**$ 4,387,358**

Equipment and Accesory Identification

1) Caterpillar 992G Loader with standard 15 cubic yard bucket
   Caterpillar 16H Grader, standard blade, road maintenance time = 1/2 loader time
   Caterpillar D9R Dozer with Semi-Universal Blade time = loader time
   10,000 gal. Water truck, road maintenance time = 1/2 loader time

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)
3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)
4) Total Hours Required from Worksheet 8 and Note 1 above

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13C
SUMMARY CALCULATION OF EARTHMOVING COSTS - Loaders

	Project	Equipment Type[1]	Ratio	Equipment Unit Costs [$/hr][2]	Labor Costs [$/hr][3]	Total Hours Required[4]	Total Cost [$]
32	**Intentionally Left Blank**	992G Loader	100%	($249 +	$ 35)	* -	= $ -
		16H Grader	50%	($ 92 +	$ 35)	* -	= $ -
		D9R Dozer	100%	($143 +	$ 35)	* -	= $ -
		Water Truck	50%	($133 +	$ 35)	* -	= $ -
32	**Intentionally Left Blank**	992G Loader	100%	($249 +	$ 35)	* -	= $ -
		16H Grader	50%	($ 92 +	$ 35)	* -	= $ -
		D9R Dozer	100%	($143 +	$ 35)	* -	= $ -
		Water Truck	50%	($133 +	$ 35)	* -	= $ -
32	**Intentionally Left Blank**	992G Loader	100%	($249 +	$ 35)	* -	= $ -
		16H Grader	50%	($ 92 +	$ 35)	* -	= $ -
		D9R Dozer	100%	($143 +	$ 35)	* -	= $ -
		Water Truck	50%	($133 +	$ 35)	* -	= $ -
32	**Intentionally Left Blank**	992G Loader	100%	($249 +	$ 35)	* -	= $ -
		16H Grader	50%	($ 92 +	$ 35)	* -	= $ -
		D9R Dozer	100%	($143 +	$ 35)	* -	= $ -
		Water Truck	50%	($133 +	$ 35)	* -	= $ -
32	**Intentionally Left Blank**	992G Loader	100%	($249 +	$ 35)	* -	= $ -
		16H Grader	50%	($ 92 +	$ 35)	* -	= $ -
		D9R Dozer	100%	($143 +	$ 35)	* -	= $ -
		Water Truck	50%	($133 +	$ 35)	* -	= $ -
						Total Cost =	**$ -**

Equipment and Accesory Identification

1) Caterpillar 992G Loader with standard 15 cubic yard bucket
Caterpillar 16H Grader, standard blade, road maintenance time = 1/2 loader time
Caterpillar D9R Dozer with Semi-Universal Blade time = loader time
10,000 gal. Water truck, road maintenance time = 1/2 loader time

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)
3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)
4) Total Hours Required from Worksheet 8 and Note 1 above

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13D
SUMMARY CALCULATION OF EARTHMOVING COSTS - Trucks

	Project	Equipment Type[1]	Ratio	Equipment Unit Costs [$/hr][2]	Labor Costs [$/hr][3]	Total Hours Required[4]	Total Cost [$]
3	**Grading - Loader/Truck Area 4 Project**	777D Truck	100%	($177 +	$ 35)	* 13,607 =	$ 2,894,776
7	**Mitigation - Loader/Truck Area 4 Projec**	777D Truck	100%	($177 +	$ 35)	* 2,716 =	$ 577,759
5	**Topsoil - Loader/Truck Area 4 Project**	777D Truck	100%	($177 +	$ 35)	* 1,935 =	$ 411,718
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
32	**Intentionally Left Blank**	777D Truck	100%	($177 +	$ 35)	* - =	$ -
						Total Cost =	**$ 3,884,253**

Equipment and Accesory Identification

1) Caterpillar 777D Dump Truck, mechanical drive, standard bed

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)
3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)
4) Total Hours Required from Worksheet 9

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13E
SUMMARY CALCULATION OF EARTHMOVING COSTS - Scrapers

	Project	Equipment Type[1]	Ratio	Equipment Unit Costs [$/hr][2]	Labor Costs [$/hr][3]	Total Hours Required[4]	Total Cost [$]
4	**Grading - Scrapers Area 4 Project**	637G Scraper	100%	($ 235	+ $ 35)	* 13,513	= $ 3,651,598
		637G Scraper	100%	($ 235	+ $ 35)	* 13,513	= $ 3,651,598
		16H Grader	13%	($ 92	+ $ 35)	* 1,689	= $ 214,851
		Water Truck	13%	($ 133	+ $ 35)	* 1,689	= $ 284,426
32	**Intentionally Left Blank**	637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		16H Grader	13%	($ 92	+ $ 35)	* -	= $ -
		Water Truck	13%	($ 133	+ $ 35)	* -	= $ -
32	**Intentionally Left Blank**	637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		16H Grader	13%	($ 92	+ $ 35)	* -	= $ -
		Water Truck	13%	($ 133	+ $ 35)	* -	= $ -
32	**Intentionally Left Blank**	637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		16H Grader	13%	($ 92	+ $ 35)	* -	= $ -
		Water Truck	13%	($ 133	+ $ 35)	* -	= $ -
32	**Intentionally Left Blank**	637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		637G Scraper	100%	($ 235	+ $ 35)	* -	= $ -
		16H Grader	13%	($ 92	+ $ 35)	* -	= $ -
		Water Truck	13%	($ 133	+ $ 35)	* -	= $ -
						Total Cost =	**$ 7,802,473**

Equipment and Accesory Identification

1) Caterpillar 637G Scraper Push-Pull Pair
   Caterpillar 16H Grader, standard blade, road maintenance time = 1/8 scraper time
   10,000 gal. Water truck, road maintenance time = 1/8 scraper time

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)
3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)
4) Total Hours Required from Worksheet 8 and Note 1 above

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13F

SUMMARY CALCULATION OF EARTHMOVING COSTS - Scrapers

Project	Equipment Type[1]	Ratio	Equipment Unit Costs [$/hr][2]	Labor Costs [$/hr][3]	Total Hours Required[4]	Total Cost [$]
32 **Intentionally Left Blank**	637G Scraper	100%	($235 +	$ 35)	* -	= $ -
	637G Scraper	100%	($235 +	$ 35)	* -	= $ -
	16H Grader	13%	($ 92 +	$ 35)	* -	= $ -
	Water Truck	13%	($133 +	$ 35)	* -	= $ -
32 **Intentionally Left Blank**	637G Scraper	100%	($235 +	$ 35)	* -	= $ -
	637G Scraper	100%	($235 +	$ 35)	* -	= $ -
	16H Grader	13%	($ 92 +	$ 35)	* -	= $ -
	Water Truck	13%	($133 +	$ 35)	* -	= $ -
32 **Intentionally Left Blank**						
32 **Intentionally Left Blank**						
32 **Intentionally Left Blank**						
					Total Cost =	**$ -**

Equipment and Accesory Identification

1) Caterpillar 992G Loader with standard 15 cubic yard bucket
Caterpillar 16H Grader, standard blade, road maintenance time = 1/8 scraper time
10,000 gal. Water truck, road maintenance time = 1/8 scraper time

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)
3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)
4) Total Hours Required from Worksheet 8 and Note 1 above

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 13G

SUMMARY CALCULATION OF EARTHMOVING COSTS - Motor Graders

	Project	Equipment Type[1]	Ratio	Equipment Unit Costs [$/hr][2]		Labor Costs [$/hr][3]		Total Hours Required[4]		Total Cost [$]
29	**Road Ripping Area 4 Project**	16H Grader, ripping	100%	($ 97	+	$ 35)	*	107	=	$ 14,112
33	**Grading Topsoil Areas**	16H Grader	100%	($ 92	+	$ 35)	*	341	=	$ 43,407
								Total Cost =		**$ 57,518**

Equipment and Accesory Identification

1) Caterpillar 16H Motor Grader with Ripper Blade

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)

3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)

4) Total Hours Required from Worksheet 12

WORKSHEET NO. 13H
SUMMARY CALCULATION OF EARTHMOVING COSTS - Drilling

	Project	Equipment Type[1]	Ratio	Equipment Unit Costs [$/hr][2]		Labor Costs [$/hr][3]			Total Hours Required[4]		Total Cost [$]
1	**Drill & Blast Area 4 Project**	DMM2 Drill	100%	($ 313	+	$ 35	)	*	343	=	$ 119,311
32	**Intentionally Left Blank**	DMM2 Drill	100%	($ 313	+	$ 35	)	*	0	=	$ 0
									Total Cost =		**$ 119,311**

Equipment and Accesory Identification

1) Ingersoll-Rand DMM2 Crawler-type Drill

Data Sources:

2) PRIMEDIA Equipmentwatch, "Cost Reference Guide for Construction Equipment," 2011 1st half edition. (see Table 12-B-23)

3) Labor Cost based on 2011 contract with ACME Inc. (see Table 12-B-24)

4) Total yardage drilled from 12-B-25 D&B

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 14A
REVEGETATION COSTS

Name and Description of Areas to be Revegetated:

9 Revegetation Area 4 Project

Description of Revegetation Activities

Costs For Seeding	=	1,129 ac	*	(	382.8 $/ac.	+	1281.5 $/ac.	)	=	$	1,878,822
		Acreage to be reseeded			cost for seedbed preparation		cost for seeding, fertilizing, mulching, and irrigation				

20% Contingency for vegetation failure:

Costs For Reseeding	=	226 ac	*	(	382.8 $/ac.	+	1281.5 $/ac.	)	=	$	375,764
		Acreage to be reseeded			cost for seedbed preparation		cost for seeding, fertilizing, mulching, and irrigation				

Other Revegetation Activity for this Area (e.g. Soil Sampling):

TOTAL REVEGETATION COST = $ 2,254,587

Data Sources:

Navajo Mine records for contractor planting costs

Seedbed Preparation includes discing and ripping, drill seeding, topsoil and spoil sampling

Irrigation costs are included with seeding, fertilizing and mulching costs

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 14B
REVEGETATION COSTS

Name and Description of Areas to be Revegetated:

34 Revegetation Roads Area 4 Project

Description of Revegetation Activities

20% Contingency for vegetation failure:

Costs For Seeding	=	117 ac	*	(	382.8 $/ac.	+	1281.5 $/ac.	)	=	$ 194,957
		Acreage to be reseeded			cost for seedbed preparation		cost for seeding, fertilizing, mulching, and irrigation			

20% Contingency for vegetation failure:

Costs For Reseeding	=	23 ac	*	(	382.8 $/ac.	+	1281.5 $/ac.	)	=	$ 38,991
		Acreage to be reseeded			cost for seedbed preparation		cost for seeding, fertilizing, mulching, and irrigation			

Other Revegetation Activity for this Area (e.g. Soil Sampling):

TOTAL REVEGETATION COST = $ 233,948

Data Sources:

Navajo Mine records for contractor planting costs

Seedbed Preparation includes discing and ripping, drill seeding, topsoil and spoil sampling

Irrigation costs are included with seeding, fertilizing and mulching costs

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 14C
REVEGETATION COSTS

Name and Description of Areas to be Revegetated:

32 Intentionally Left Blank

Description of Revegetation Activities

Costs For Seeding	=	- ac Acreage to be reseeded	*	(	382.8 $/ac. cost for seedbed preparation	+	1281.5 $/ac. cost for seeding, fertilizing, mulching, and irrigation	)	=	$ -

20% Contingency for vegetation failure:

Costs For Reseeding	=	0 ac Acreage to be reseeded	*	(	382.8 $/ac. cost for seedbed preparation	+	1281.5 $/ac. cost for seeding, fertilizing, mulching, and irrigation	)	=	$ -

Other Revegetation Activity for this Area (e.g. Soil Sampling):

TOTAL REVEGETATION COST = $ -

Data Sources:

Navajo Mine records for contractor planting costs

Seedbed Preparation includes discing and ripping, drill seeding, topsoil and spoil sampling

Irrigation costs are included with seeding, fertilizing and mulching costs

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 14D
REVEGETATION COSTS

Name and Description of Areas to be Revegetated:

32 Intentionally Left Blank

Description of Revegetation Activities

20% Contingency for vegetation failure:

Costs For Seeding = - ac (Acreage to be reseeded) * (382.8 $/ac. (cost for seedbed preparation) + 1281.5 $/ac. (cost for seeding, fertilizing, mulching, and irrigation)) = $ -

Reseeding 20% of permenent program lands that were revegged during or before 1999:

Costs For Reseeding = 0 ac (Acreage to be reseeded*) * (382.8 $/ac. (cost for seedbed preparation) + 1281.5 $/ac. (cost for seeding, fertilizing, mulching, and irrigation)) = $ -

Other Revegetation Activity for this Area (e.g. Soil Sampling):

TOTAL REVEGETATION COST = $ -

Data Sources:

Navajo Mine records for contractor planting costs

Seedbed Preparation includes discing and ripping, drill seeding, topsoil and spoil sampling

Irrigation costs are included with seeding, fertilizing and mulching costs

WORKSHEET NO. 15A

PRODUCTIVITY AND HOURS FOR DRILL USE

Earthmoving Activity:

1 Drill & Blast Area 4 Project

Characterization of Drill Used

Drill Model IR DMM2 Drill

Drill Bit Diameter	10.63 [in]	Burden	26 [ft]	1,233	Volume Shot per hole [bcy]
Drill Rod Length	35 [ft]	Bench Height	40 [ft]		
Penetration Rate	228 [ft/hr]	Spacing	32 [ft]		

Description of Activity:

Drilling holes to provide space for explosives

Calculation:

Cycles per Hour = 60 min (time available) / (10.5 min (drill time) + 1.6 min (rod feed time) + 0.4 min (rod pull time) + 2.0 min (misc.)) = 4.1 cycles/hr

Operating Delays = 30.0 min (lunch) + 15.0 min (shift change) + 10.0 min (blasting) + 6.0 min (service time) + 5.0 min (moving) + 5 min (misc.) = 71 min
= 14.8% of a shift
= 85.2% operational utilization

Effective Pit Utilization (EPU) = 85.2% (operational utilization) * 90.0% (availability) = 76.7%

Maximum Penetration Rate = 40 ft (bench height) * 4.1 cycles/hr (cycles per hour) * 76.7% EPU (pit utilization) = 126.5 ft/hr

Maximum Production:

per Scheduled Shift: = 26 ft (burden) * 32 ft (spacing) * 126.5 ft/hr (max. penetration rate) * 8.0 hr/shift (hours in a shift) / 27 ft^3/yd^3 (conversion factor) = 31,184 bcy/shift

per Scheduled Hour = 31,184 bcy/shift (max. production per sched. shift) / 8 hr/shift (conversion factor) = 3,898 bcy/hr

Drill Hours Required = 1,336,000 bcy (volume to be blasted) / 3,898 bcy/hr (production rate) = 343 hr

WORKSHEET NO. 15B

PRODUCTIVITY AND HOURS FOR DRILL USE

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Drill Used

Drill Model IR DMM2 Drill

Drill Bit Diameter	10.63 [in]	Burden	26 [ft]	1,233 Volume Shot per hole [bcy]
Drill Rod Length	35 [ft]	Bench Height	40 [ft]	
Penetration Rate	228 [ft/hr]	Spacing	32 [ft]	

Description of Activity:

Drilling holes to provide space for explosives

Calculation:

Cycles per Hour = 60 min (time available) / (10.5 min (drill time) + 1.6 min (rod feed time) + 0.4 min (rod pull time) + 2.0 min (misc.)) = 4.1 cycles/hr

Operating Delays = 30.0 min (lunch) + 15.0 min (shift change) + 10.0 min (blasting) + 6.0 min (service time) + 5.0 min (moving) + 5 min (misc.) = 71 min
= 14.8% of a shift
= 85.2% operational utilization

Effective Pit Utilization (EPU) = 85.2% (operational utilization) * 90.0% (availability) = 76.7%

Maximum Penetration Rate = 40 ft (bench height) * 4.1 cycles/hr (cycles per hour) * 76.7% EPU (pit utilization) = 126.5 ft/hr

Maximum Production:

per Scheduled Shift: = 26 ft (burden) * 32 ft (spacing) * 126.5 ft/hr (max. penetration rate) * 8.0 hr/shift (.) / 27 ft^3/yd^3 (conversion factor) = 31,184 bcy/shift

per Scheduled Hour = 31,184 bcy/shift (max. production per sched. shift) / 8 hr/shift (conversion factor) = 3,898 bcy/hr

Drill Hours Required = 0 bcy (volume to be blasted) / 3,898 bcy/hr (production rate) = 0 hr

WORKSHEET NO. 15C
PRODUCTIVITY AND COSTS FOR BLASTING ACTIVITIES

Earthmoving Activity:

1 Drill & Blast Area 4 Project

Characterization of Blasting Parameters

Ingersoll Rand DMM2 Drill

Burden	26 [ft]	Powder Factor [lb/bcy]	0.9 [lb/bcy]
Bench Height	40 [ft]	Volume Shot per hole [bcy]	1,233 [bcy]
Spacing	32 [ft]		

Description of Activity:

ANFO used with boosters and primacord for explosive load

Calculation:

Total ANFO Required = 1,336,000 bcy (volume to be blasted) * 0.9 lb/bcy (powder factor) = 1,202,400 lb

Miscellaneous Powder Supplies = 1,202,400 lb (ANFO required) * 5% (contingency factor) = 60,120 lb

Cord Cost per Hole =(26 ft (burden) + 32 ft (spacing) + 40 ft (bench height))* 10% (waste factor) * 0.10 $/ft (cord unit cost) = 11 $/hole

ANFO Cost per Hole = 1,233 bcy (volume shot per hole) * 0.9 lb/bcy (powder factor) * 0.15 $/lb (ANFO unit cost) = 171 $/hole

Primer Cost per Hole = 1 (primers per hole) * 4.63 $/ea (primer unit cost) = 4.63 $/hole

Volumetric Blasting Cost =(11 $/hole (cord cost per hole) + 171 $/hole (ANFO cost per hole) + 4.63 $/hole (primer cost per hole))/ 1,233 bcy (volume shot per hole) = 0.15 $/bcy

Total Blasting Cost = 0.15 $/bcy (volumetric blasting cost) * 1,336,000 bcy (volume to be blasted) = $ 202,751

WORKSHEET NO. 15D

PRODUCTIVITY AND COSTS FOR BLASTING ACTIVITIES

Earthmoving Activity:

32 Intentionally Left Blank

Characterization of Blasting Parameters

Ingersoll Rand DMM2 Drill

26	Burden [ft]	0.9	Powder Factor [lb/bcy]
32	Spacing [ft]	1,233	Volume Shot per hole [bcy]
40	Bench Height [ft]		

Description of Activity:

ANFO used with boosters and primacord for explosive load

Calculation:

Total ANFO Required = 0 bcy (volume to be blasted) * 0.9 lb/bcy (powder factor) = 0 lb

Miscellaneous Powder Supplies = 0 lb (ANFO required) * 5% (contingency factor) = 0 lb

Cord Cost per Hole =(26 ft (burden) + 32 ft (spacing) + 40 ft (bench height))* 10% (waste factor) * 0.10 $/ft (cord unit cost) = 11 $/hole

ANFO Cost per Hole = 1,233 bcy (volume shot per hole) * 0.9 lb/bcy (powder factor) * 0.15 $/lb (ANFO unit cost) = 171 $/hole

Primer Cost per Hole = 1 (primers per hole) * 4.63 $/ea (primer unit cost) = 4.63 $/hole

Volumetric Blasting Cost =(11 $/hole (cord cost per hole) + 171 $/hole (ANFO cost per hole) + 4.63 $/hole (primer cost per hole))/ 1,233 bcy (volume shot per hole) = 0.15 $/bcy

Total Blasting Cost = 0.15 $/bcy (volumetric blasting cost) * 0 bcy (volume to be blasted) = $ 0

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 15E

Other Reclamation Activity Costs

Earthmoving Activity:

Rip-Rap for Channels and Drop Structures

Calculation:

See detailed calculations in Appendix 12-C

Cost for Area 4 Project:	$ 62,260	from 2011 Area 4 N estimate (Marston)
Total:	$ 62,260	

Project: Pinabete Permit
Date: May-2012

WORKSHEET NO. 16

BOND 2016 to 2021 - PINABETE PERMIT RECLAMATION BOND SUMMARY SHEET

				2012 Estimate		
1	Total Facility and Structure Removal Costs		$	-		
2	Total Earthmoving Costs		$	23,039,465		
3	Total Revegetation Costs		$	2,488,535		
4	Total Blast and Other Reclamation Activities Costs		$	265,011		
5	Subtotal: Total Direct Costs				$	25,793,011
6	Mobilization and Demobilization (at 1.0% of Item 5)	1.0%			$	257,930
7	Contingencies (at 5.0% of Item 5)	5.0%			$	1,289,651
8	Engineering Redesign Fee (at 1.8% of Item 5)	1.8%			$	464,274
9	Contractor Profit and Overhead (at 15.0% of Item 5)	15.0%			$	3,868,952
10	Reclamation Management Fee (at 3.9% of Item 5)	3.9%			$	1,005,927
	GRAND TOTAL BOND AMOUNT *(Sum of Items 5 through 10)*				**$**	**32,679,745**

LESS Pre-2016 2011 Area 4N Calculation $16,459,152
(Facility and structure removal left in Pre-2016)

NEW BOND TO ADD FOR 2016 to 2021 (Area 4 Project)	**$16,220,593**

Project: Navajo Mine
Date: Sep-2011

WORKSHEET NO. 16a
AREA 4 NORTH RECLAMATION BOND SUMMARY SHEET

		2011 Estimate			
1	Total Facility and Structure Removal Costs	$621,216			
2	Total Earthmoving Costs	$12,040,004			
3	Total Revegetation Costs	$1,104,192			
4	Total Other Reclamation Activities Costs	$161,505			
5	Subtotal: Total Direct Costs			$13,926,917	$13,305,701
6	Mobilization and Demobilization (at 1.0% of Item 5)		1.00%	$139,269	$133,057.01
7	Contingencies (at 2.0% of Item 5)		2.00%	$278,538	$266,114.02
8	Engineering Redesign Fee (at 1.8% of Item 5)		1.80%	$250,685	$239,502.62
9	Contractor Profit and Overhead (at 15.0% of Item 5)		15.00%	$2,089,038	$1,995,855.15
10	Reclamation Management Fee (at 3.9% of Item 5)		3.90%	$543,150	$518,922.34
	GRAND TOTAL BOND AMOUNT (Sum of Items 5 through 10)			$17,227,596	
					$16,459,152
	LESS STRUCTURE NOT INCLUDED IN Post 2016				