STATE OF COLORADO

Lennberg - DNR, Patrick <patrick.lennberg@state.co.us>

Lyons Quarry (M-1977-208) Bond Calculation Adequacy Response

1 message

Robin Bay <rbay@habitatmanagementinc.com> Tue, Aug 15, 2023 at 5:59 AM
To: Patrick Lennberg - DNR <patrick.lennberg@state.co.us>
Cc: "erik.estrada@cemex.com" <erik.estrada@cemex.com>, "Cita Cisse (cita.cisse@cemex.com)" <cita.cisse@cemex.com>

Patrick,

I am submitting the attached adequacy response to the Lyons Quarry bond calculation on behalf of CEMEX.

Regards,

Robin

Robin Forest Bay

Principal Environmental Scientist

719-928-1717

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Habitat Management
Environmental & Natural Resource Services

Lyons Quarry (M-1977-208) Bond Calculation Adequacy Response.pdf
2223K

August 15, 2023

Patrick Lennberg
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, Colorado 80203

RE: Lyons Quarry, Permit No. M-1977-208, Reclamation Cost Estimate
Preliminary Adequacy Review Response

Mr. Lennberg:

On May 2nd, 2023, CEMEX received your Preliminary Adequacy Review in response to our March 10th submittal of a Reclamation Bond Estimate for the Lyons Quarry Permit (M-1977-208). Your Preliminary Adequacy Review identified 12 adequacy items to be addressed. Responses to each item are provided in the attached document and numbered as in your review. Additionally, we have attached a revised reclamation map for Lyons Quarry and updated cost estimate tables.

Please contact me if you need additional information at erik.estrada@cemex.com.

Sincerely,

Erik Estrada
Plant Manager, Lyons Plant Operations

Enclosures: Lyons Quarry Reclamation Cost Estimate Adequacy Review Response with Exhibits
Revised Reclamation Map
Revised Cost Estimate Tables

Cc: Cita Cisse, Quarry Manager, Lyons Plant Operations
Robin Bay, Principal Environmental Scientist, Habitat Management, Inc.

The following numbered items address the 12 adequacy items detailed in the May 2nd, 2023, DRMS Preliminary Adequacy Review of the Lyons Quarry Reclamation Bond Calculation.

1. *Please provide a map along with an aerial image overlay that accounts for all the buildings and structures. Include with the map or maps a legend that identifies the structures as they are used within the provided tables.*

   A site map for the Plant area is attached as Exhibit 1. Tables 2 – 4 have been updated to match the names in Exhibit 1.

2. *Please provide the number of power poles, the height of the poles and the number of poles with cross arms that are found at the site.*

   There are 90 power poles within the Lyons Quarry permit boundary that serve both the plant and surrounding properties. All poles are 10 meters in above-ground height and all of them include cross arms.

3. *Is there asbestos or any other hazardous materials contained in the buildings or other structures at the site that would need to be managed prior to demolition?*

   Asbestos-containing transite was used in the construction of several of the older structures at the plant (see table below and refer to Exhibit 1 for locations). CEMEX understands that DRMS's CIRCES software will provide a cost estimate for asbestos management based on the square footage provided below.

Map ID	Transite Location	Approximate Area (SF)
D	Raw Materials Silos	4,160
E	Pack house	540
L	Burner Building	2,112
O	Homogenizing Silo	256
P	Coal Facilities	4,224
Total		**11,292**

   CEMEX appropriately disposes of any hazardous waste that is produced at the plant no later than 90 days after the waste is produced, as required by federal regulations. Chemicals used in processing will be consumed prior to plant closure. Therefore, no hazardous waste will be on site at the time of plant closure. The only processing chemical stored on site in quantities greater than 55 gallons is the ammonia for the selective noncatalytic reduction system (SNCR).

4. *Please provide the dimensions of the metal buildings listed in Table 3.*

   Tables 2 - 4 have been revised and updated to make the cost estimate clearer. All of the items listed on these tables are identified on the Exhibit 1 map. Table 2 includes dimensions and building materials for all structures shown on Exhibit 1. Table 3 includes all steel demolition that is separate from typical building demolition (i.e., not included in Table 2) as well as costs for steel roofs that are on concrete buildings. Table 4 includes only the quantities and costs for demolition of concrete foundations and floors; concrete building demolition costs are included in Table 2. Detailed calculations for all concrete structures are included as a new Table 11.

5. *The buildings listed in Table 4 are not all contained in Table 2, please update Table 2 with the building dimensions as the Division uses these dimensions in its calculations, e.g. bag house, raw materials dryer, stack, primary crusher, secondary crusher, and homogenizing silos.*

   Completed. Please see response to adequacy item #4.

6. *The cost estimate for the GCL, does that include QA/QC during installation? What is the cost estimate based on?*

   It was assumed that QA/QC would be covered under the management costs included under Indirect Costs in the bond estimate. The GCL cost was based on a quote from a local supplier for the materials and an evaluation of installation costs from several internet sources. Based on the adequacy review, we have solicited a quote from a local construction contractor for the installation, which was slightly higher than that included in the original estimate. The attached cost estimate tables have been updated to reflect this number from the solicited quote.

7. *What is the source for the shale material for C-Pit? Since Dowe Flats is no longer a viable source of shale material it needs to be imported. Please provide a cost estimate for importing 50,000 cy of shale material.*

   The topsoil stockpile in the southeastern corner of the Lyons Quarry property was placed on top of original ground that included a relatively shallow layer of shale material. Test pits in five locations on this stockpile revealed that under the topsoil, there is more than enough shale to adequately cap C-Pit. The shale layer will be less than 3 feet from the ground surface once the topsoil is removed. Table 6 in the revised cost estimate below has been updated to reflect this new source of shale cap material.

8. *What is the source of backfill material for C-Pit? Please provide a materials balance sheet that shows where material used for final reclamation is being sourced.*

   In the event that C-Pit has not been completely backfilled at the time of final reclamation, the plan included in the previously submitted cost estimate was to excavate the backfill material from the on-site concrete disposal cell location. However, it was determined that this approach was not feasible. Instead, the remaining backfill material for C-Pit will be taken from the reclaimed hill west of C-Pit, where B-Pit used to be (see Exhibit 3). The current estimated volume of backfill required for C-Pit is 200,963 CY (see response #11 below for details). For this bond calculation, it was assumed that the full 200,963 CY of material would be excavated from B-Pit hill.

   Additionally, the 108,000 CY of clean soil material required for protecting the clay liner, interstitial fill, and cover for the concrete disposal cell will also be excavated from this location. Because the B-Pit Borrow Area has been reclaimed, the topsoil would be stripped and windrowed prior to removal of the borrowed materials. After the borrowed materials are removed, the final surface would be regraded, retopsoiled, and revegetated. The revised cost estimates in Tables 6 – 9 reflect these additional tasks.

9. *According to TR7 the Operator estimates $625,000 would be needed to treat water that remains in C-Pit prior to disposal. Worst case scenario the State would need to treat water prior to backfilling. Please provide an updated cost estimate for this item and include in this estimate the amount of time required to treat water.*

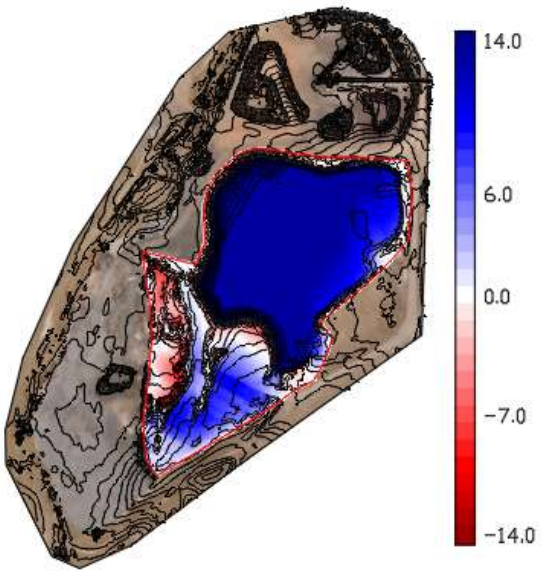
   In 2006, at the time of TR7 approval, there were approximately 35 million gallons of water in C-Pit and the estimated treatment cost was $625,000. Currently, there are approximately 15 million gallons of water in C-Pit (see response #10 below). CEMEX has contacted remediation contractors and learned that there is better technology available today than was available in 2006. However, the contractors are unable to provide a quote without conducting a new engineering study, which would take several months. To expedite this bond estimate, CEMEX proposes that the previous amount of $625,000 be retained in the cost estimate even though there is currently less than half of the water previously calculated to be treated. CEMEX will have a new engineering study done and submit a technical revision to update the water treatment technology no later than March 1, 2024.

10. *What is the volume of water in C Pit?*

    The volume of water in C-Pit fluctuates slightly depending on rainfall, evaporation, and use for dust suppression. The estimated volume at the time of the last aerial flyover on December 12, 2022, was 15,132,635 gallons. This estimate was made using aerial imagery and SURPAC 35 modelling software. Please see Exhibit 2 for details of the calculation.

11. *Please provide the volume calculation used to estimate the volume of backfill required for C-Pit.*

    The C-Pit backfill volume was calculated using data from an aerial flyover in AutoCAD. The image below shows the area included in the calculation. The calculated volume was 265,819 CY. Because the top two feet of this area will be capped with shale, 48,077 CY were removed from the total for a resulting 200,963 CY of required backfill.



12. *The Division estimates the area requiring a 2 foot shale cap to be 16.9 acres not the 14.9 acres provided. Please provide the area of C-Pit that requires a 2 foot shale cap.*

    The acreage that is still in the process of being backfilled and capped was calculated at 14.9 acres based on aerial imagery used in TR#17. The green area shown below is already at final elevation and capped with 2-ft of shale. The orange areas are still being backfilled.

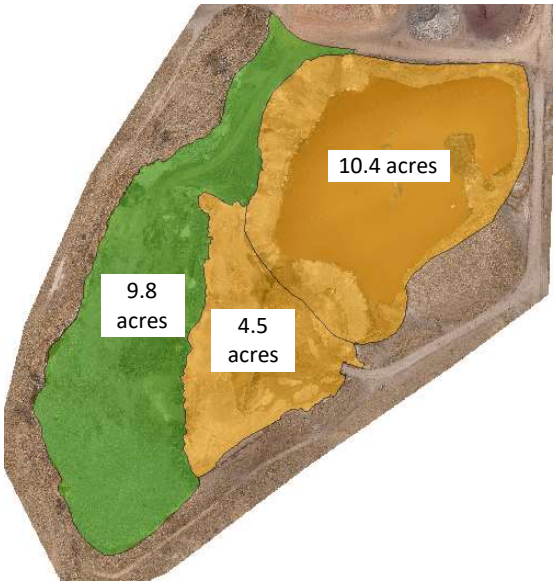
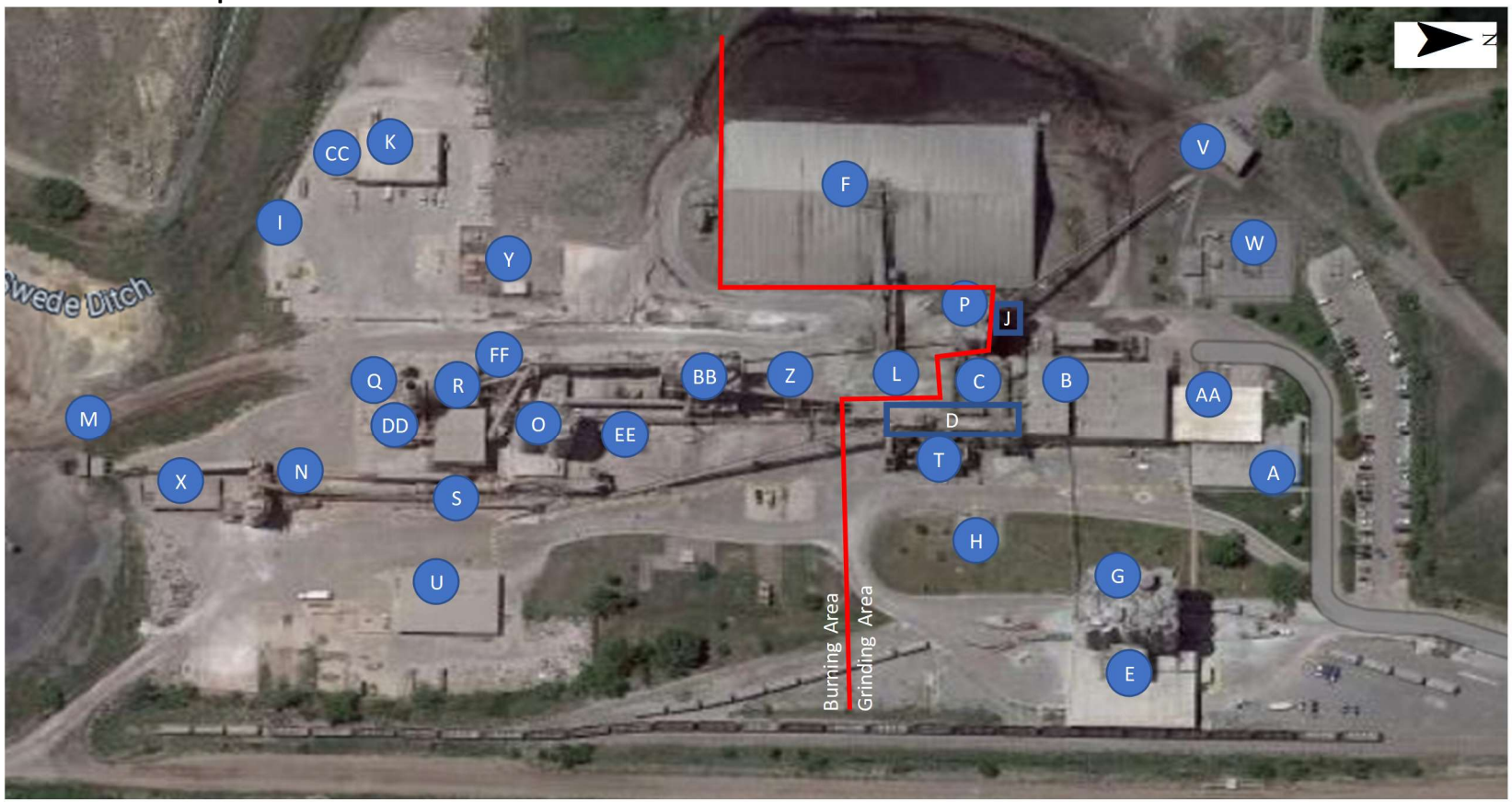


Exhibit 1: Plant Map



ID	Description	ID	Description	ID	Description	ID	Description
A	Administration Building	I	Wash House	Q	Stack	Y	Fuel Tanks
B	Mill Building	J	Electrical Room	R	Bag House	Z	Kiln
C	Control Center	K	Mobile Equipment Shed	S	Raw Material Dryer	AA	Maintenance Shop
D	Raw Materials Silos	L	Burner Building	T	Dust Suppressor	BB	Preheater Tower
E	Pack House	M	Primary Crusher	U	Warehouse	CC	Oil House
F	Clinker Storage Building	N	Secondary Crusher	V	Coal Unloading Building	DD	Blower Building
G	Finished Cement Silo	O	Homogenizing silos	W	Power Substation	EE	SNCR
H	Pump House	P	Coal Facilities	X	Brick shed	FF	Lime/Carbon Silos

Exhibit 2: C-Pit Water Volume Calculations

Lyons Quarry C-Pit Water Volumes

Date of this Calculation (05/23/2023)

Variables *(dated on 05/23/2023)*

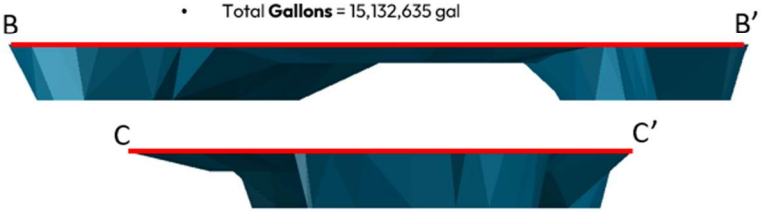
- Water Surface **Elevation** = 5,215 ft.
- West and East Bottom **Elevation** = 5,200 ft.
- Middle Bottom **Elevation** = 5,210 ft.

- Middle **Water Depth** = 5 ft.
- West & East **Water Depth** = 15 ft

- Outer Boundary **Perimeter** = 2,511 ft
- East / West Polygon **Perimeter** = 675 ft. / 1,103ft.
- Middle Polygon **Perimeter** = 1,117 ft.

Volumes

- Total **Cubic Feet** = 2,022,939 ft^3
- Total **Gallons** = 15,132,635 gal



Calculation Derivation:

1. The perimeter of the water was ***digitized*** from image *(Right)* at **all** 4 depth levels.
2. The 4 digitized polygons were ***imported*** into SURPAC 3D modeling software
3. The 4 polygons were set to the proper **elevations** listed above on the Z Axis.
4. A ***solid was created*** in SURPAC software using the variables from Item 3 above.
5. A ***volume report was generated*** after creating the Solid in Item 4 in (ft^3)
6. The volume in (ft^3) was then ***converted*** to Gallons through the conversion below:
   - **7.47 x (ft^3) = Gallons**

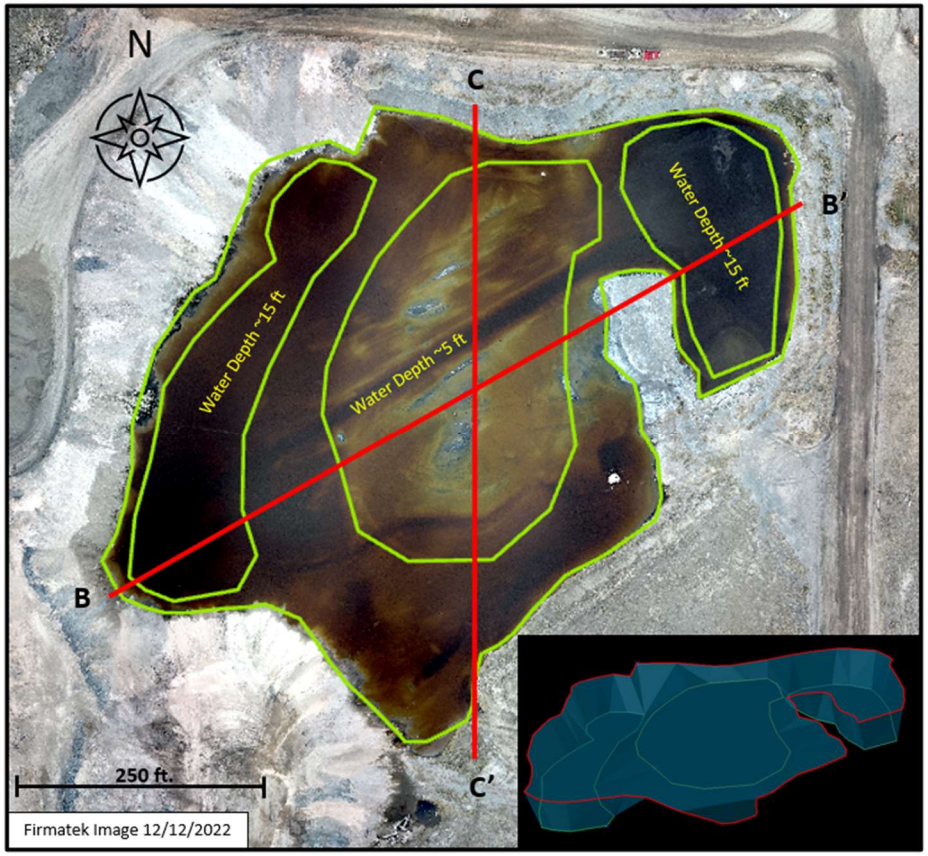


Exhibit 3: Revised Reclamation Map

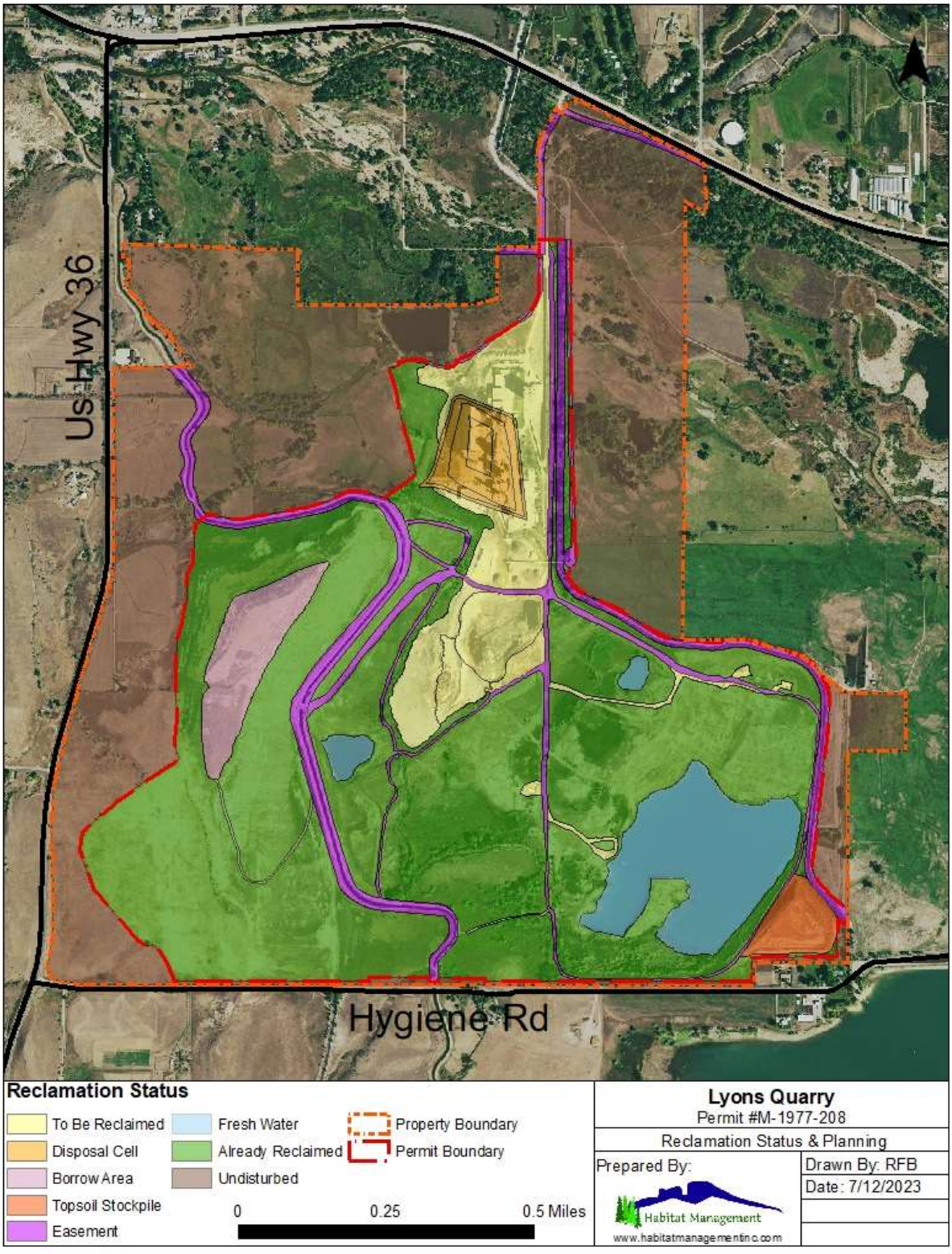


Table 1: Cost Estimate Summary

Task			Cost[1]
Direct Costs			
Reclamation Tasks			
Demolition/Disposal of Buildings/Structures		(Table 2)	$ 3,949,066
Steel Demolition/Disposal		(Table 3)	$ 955,602
Concrete Demolition/Disposal		(Table 4)	$ 2,598,923
Other Reclamation Costs[2]		(Table 5)	$ 652,212
On-Site Concrete Disposal Cell		(Table 6)	$ 472,043
Backfill & Capping of C Pit area		(Table 7)	$ 517,095
Grading & Ripping		(Table 8)	$ 14,048
Growth Media Application		(Table 9)	$ 266,396
Revegetation		(Table 10)	$ 179,182
Mobilization/Demobilization	2.5%	of Reclamation Tasks	$ 240,114
		Total Direct Costs	**$ 9,844,681**
Indirect Costs			
Overhead & Profit			
Liability Insurance	2.02%	of Direct Costs	$ 198,863
Performance Bond	1.05%	of Direct Costs	$ 103,369
Profit	10%	of Direct Costs	$ 984,468
Superintendent	0.25%	of Direct Costs	$ 24,612
		Total Overhead & Profit	**$ 1,311,312**
Legal, Engineering, & Project Management			
Financial Warranty			$ 500
Engineering Work	4.25%	of Contract Amount	$ 474,130
Reclamation Management	5%	of Contract Amount	$ 557,800
		$ 2,343,742	**$ 2,343,742**
Total Contract Amount (Direct Costs + Overhead & Profit)			**$ 11,155,993**
Total Bond Amount			**$ 13,499,735**

[1] All costs based on CIRCES Cost estimates from September 2020 or April 2003 with an inflation factor applied per the US Bureau of Labor Statistics (https://www.bls.gov/data/inflation_calculator.htm)

[2] Asbestos abatement cost to be determined by DRMS estimating software.

Table 2: Structure Demolition

	Structures	Building Material	Len. LF	Wid. LF	Dia. LF	Ht. LF	Airspace CF	Demolition Type	Unit Cost $/CF	Total Cost
Grinding Area										
A	Administration Building	Concrete	105	46		14	67,620	SC, onsite, 1000' haul	$ 0.258	$ 17,445.96
B	Mill Building	Concrete	168	97		53	863,688	MC, onsite, 1000' haul	$ 0.316	$ 272,925.41
C	Control Center	Concrete	88	37		38	123,728	MC, onsite, 1000' haul	$ 0.316	$ 39,098.05
			37	34		20	25,160	SC, onsite, 1000' haul	$ 0.258	$ 6,491.28
D	Raw Material Silos	Concrete	6 silos[3]				3,435	SC, onsite, 1000' haul	$ 0.258	$ 886.23
E	Pack House	Concrete	150	72		25	270,000	SC, onsite, 1000' haul	$ 0.258	$ 69,660.00
			45	41		36	66,420	SC, onsite, 1000' haul	$ 0.258	$ 17,136.36
F	Clinker Storage Building	Concrete	388	200		79	6,130,400	MC, onsite, 1000' haul	$ 0.316	$ 1,937,206.40
					27	73	573	SC, onsite, 1000' haul	$ 0.258	$ 147.72
G	Finished Cement Silos	Concrete	15 silos[3]				7,540	SC, onsite, 1000' haul	$ 0.258	$ 1,945.32
H	Pump house	Concrete[1]	25	25		15	9,375	SC, onsite, 1000' haul	$ 0.258	$ 2,418.75
J	Electrical Room	Concrete[1]	26	15		15	5,850	SC, onsite, 1000' haul	$ 0.258	$ 1,509.30
T	Dust Suppressor	Steel	70	30		60	126,000	SN, offsite, 15-mi haul	$ 1.141	$ 143,766.00
V	Coal Unloading Building	Steel[2]	71	36		30	76,680	SN, offsite, 15-mi haul	$ 1.141	$ 87,491.88
AA	Maintenance Shop	Concrete	120	65		24	187,200	SC, onsite, 1000' haul	$ 0.258	$ 48,297.60
Burning Area										
I	Wash house	Concrete	10	10		8	800	SC, onsite, 1000' haul	$ 0.258	$ 206.40
K	Mobile Equipment Shed	Steel[2]	103	64		35	230,720	SN, offsite, 15-mi haul	$ 1.141	$ 263,251.52
L	Burner Building	Concrete[1]	120	91		53	578,760	MC, onsite, 1000' haul	$ 0.316	$ 182,888.16
			48	91		25	109,200	SC, onsite, 1000' haul	$ 0.258	$ 28,173.60
M	Primary Crusher	Steel[2]	10	10		10	1,000	SN, offsite, 15-mi haul	$ 1.141	$ 1,141.00
		Concrete	43	20		30	25,800	SC, onsite, 1000' haul	$ 0.258	$ 6,656.40
N	Secondary Crusher	Steel[2]	3 silos[3]				1,649	SN, offsite, 15-mi haul	$ 1.141	$ 1,881.51
O	Homogenizing Silos	Concrete	3 silos[3]				2,326	SC, onsite, 1000' haul	$ 0.258	$ 600.11
P	Coal Facilities	Concrete			50	135	1,963	SC, onsite, 1000' haul	$ 0.258	$ 506.58
Q	Stack	Concrete			44	195	1,521	MC, onsite, 1000' haul	$ 0.316	$ 480.49
R	Bag house	Steel	130	60		45	351,000	MN, offsite, 15-mi haul	$ 1.180	$ 414,180.00

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Table 2 (continued): Structure Demolition

Structures		Building Material	Len. LF	Wid. LF	Dia. LF	Ht. LF	Airspace CF	Demolition Type	Unit Cost $/CF	Total Cost
Burning Area										
S	Raw Material Dryer	Steel[2]	21	16		16	5,376	MN, offsite, 15-mi haul	$ 1.180	$ 6,343.68
U	Warehouse	Steel[2]	122	74.5		20	181,780	SN, offsite, 15-mi haul	$ 1.141	$ 207,410.98
X	Brick Shed	Concrete[1]	96	40		18	69,120	SC, onsite, 1000' haul	$ 0.258	$ 17,832.96
Z	Kiln	Steel	10	24		11	2,640	SN, offsite, 15-mi haul	$ 1.141	$ 3,012.24
BB	Preheater Tower	Steel[2]	55	40		60	132,000	MN, offsite, 15-mi haul	$ 1.180	$ 155,760.00
CC	Oil House	Steel[2]	16	32		11	5,632	SN, offsite, 15-mi haul	$ 1.141	$ 6,426.11
DD	Blower Building	Steel[2]	32	12		10	3,840	SN, offsite, 15-mi haul	$ 1.141	$ 4,381.44
EE	SNCR	Steel[2]	10	12		11	1,320	SN, offsite, 15-mi haul	$ 1.141	$ 1,506.12
Total							**9,670,116**			**$ 3,949,065.55**

[1] Steel roof included in Table 3
[2] Concrete foundation/floor included in Table 4
[3] See Table 11 for detailed calculations

Table 3: Steel Demolition

Structure		Item	Qty	Len. LF	Wid. LF	Ht LF	Total	Units	Unit Cost $/Unit	Total Cost
Grinding Area										
B	Mill Building	Hoppers	15	Dia.= 27		27	231,885	CF	$ 1.24	$ 287,537.40
		Hoppers	12	Dia.= 20		20	75,396	CF	$ 1.24	$ 93,491.04
		Hoppers	4	Dia.= 40		40	201,060	CF	$ 1.24	$ 249,314.40
		Hoppers	1	Dia.= 30		30	21,206	CF	$ 1.24	$ 26,295.44
		Hoppers	1	Dia.= 26		26	13,804	CF	$ 1.24	$ 17,116.96
		Hoppers	1	Dia.= 32		32	25,736	CF	$ 1.24	$ 31,912.64
		Hoppers	1	Dia.= 21		25.2	8,728	CF	$ 1.24	$ 10,822.72
		Hoppers	1	Dia.= 20		20	6,283	CF	$ 1.24	$ 7,790.92
		Stairs	1	300	3		900	CF	$ 1.06	$ 954.00
D	Raw Material Silos	Stairs	12	170	3		6,120	CF	$ 1.06	$ 6,487.20
		Stairs	1	50	3		150	CF	$ 1.06	$ 159.00
		Fencing		100		8	800	SF	$ 3.12	$ 2,496.00
		Conveyors		500	0.555 CY/LF		278	CY	$ 51.27	$ 14,227.43
E	Pack House	Stairs	12	125	3		4,500	CF	$ 1.06	$ 4,770.00
		Stairs	3	250	3		2,250	CF	$ 1.06	$ 2,385.00
F	Clinker Storage Building	Stairs	1	500	3		1,500	CF	$ 1.06	$ 1,590.00
		Conveyors		300	0.555 CY/LF		167	CY	$ 51.27	$ 8,536.46
G	Finished Cement Silos	Stairs	1	400	3		1,200	CF	$ 1.06	$ 1,272.00
		Stairs	1	300	3		900	CF	$ 1.06	$ 954.00
		Fencing		300		8	2,400	SF	$ 3.12	$ 7,488.00
		Exterior Grating					2,287	SF	$ 1.06	$ 2,424.22
		Interior Grating					14,300	SF	$ 1.06	$ 15,158.00
H	Pump house	Roof		25	26	0.5	325	CF	$ 1.06	$ 344.50
J	Electrical Room	Roof		26	16	0.5	208	CF	$ 1.06	$ 220.48
T	Dust Suppressor	Stairs	1	250	3		750	CF	$ 1.06	$ 795.00
W	Power Substation	Fencing		440		8	3,520	SF	$ 3.12	$ 10,982.40
	Walkways	Fencing		300		8	2,400	SF	$ 3.12	$ 7,488.00
		Grating		500		6	3,000	SF	$ 1.06	$ 3,180.00

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Table 3 (continued): Steel Demolition

Structure		Item	Qty	Len. LF	Wid. LF	Ht LF	Total	Units	Unit Cost $/Unit	Total Cost
Burning Area										
L	Burner Building	Stairs	1	200	3		600	CF	$ 1.06	$ 636.00
		Stairs	1	100	3		300	CF	$ 1.06	$ 318.00
		Roof		91	50	0.5	2,275	CF	$ 1.06	$ 2,411.50
N	Secondary Crusher	Stairs	2	80	3		480	CF	$ 1.06	$ 508.80
		Stairs	2	100	3		600	CF	$ 1.06	$ 636.00
		Stairs	2	63	3		378	CF	$ 1.06	$ 400.68
		Conveyors		500	0.555 CY/LF		278	CY	$ 51.27	$ 14,227.43
		Conveyors		400	0.555 CY/LF		222	CY	$ 51.27	$ 11,381.94
O	Homogenizing Silos	Stairs	2	125	3		750	CF	$ 1.06	$ 795.00
		Stairs	2	100	3		600	CF	$ 1.06	$ 636.00
		Exterior Grating					763	SF	$ 1.06	$ 808.78
		Interior Grating					4,767	SF	$ 1.06	$ 5,053.02
P	Coal Facilities	Stairs	1	100	3		300	CF	$ 1.06	$ 318.00
		Conveyors		200	0.555 CY/LF		111	CY	$ 51.27	$ 5,690.97
R	Bag House	Hoppers	13	Dia.=	10	2	2,041	CF	$ 1.24	$ 2,530.84
		"V" Hopper	1	70	6		7,560	CF	$ 1.24	$ 9,374.40
S	Raw Material Dryer	Stairs	1	60	3		180	CF	$ 1.06	$ 190.80
X	Brick Shed	Roof		96	41	0.5	1,968	CF	$ 1.06	$ 2,086.08
Y	Fuel Tanks	Diesel	1				10,000	Gal	$ 0.10	$ 1,000.00
		Gasoline	1				5,000	Gal	$ 0.10	$ 500.00
Z	Kiln	Conveyors		800	0.555 CY/LF		444	CY	$ 51.27	$ 22,763.88
		Conveyors		800	0.555 CY/LF		444	CY	$ 51.27	$ 22,763.88
EE	SNCR	Fencing	1	192		8	1,536	SF	$ 3.12	$ 4,792.32
		Piping		370			370	LF	$ 14.95	$ 5,531.50
		Tank	1				35,000	Gal	$ 0.10	$ 3,500.00
FF	Lime/Carbon Silos	Hoppers	1				5125	CF	$ 1.24	$ 6,355.00
		Hoppers	1				2847	CF	$ 1.24	$ 3,530.28
	Walkways	Fencing	1	300		8	2,400	SF	$ 3.12	$ 7,488.00
		Grating		500		6	3,000	SF	$ 1.06	$ 3,180.00
Total										**$ 955,602.31**

Table 4: Concrete Foundation/Floor Demolition

Structures		Description	Qty	Length LF	Width LF	Dia. LF	Thickness LF	Total CY	Unit Cost $/CY	Total Cost
Grinding Area										
A	Administration building	Floor	1	33	12		0.5	7	$ 54.21	$ 379.47
B	Mill Building	Floor	1	35	35		0.5	23	$ 54.21	$ 1,246.82
		Raw Mill Foundation	5	Variable[1]			5	557	$ 54.21	$ 30,194.82
		Finish Mill Foundation	5	Variable[1]			5	762	$ 54.21	$ 41,307.82
		Separator Slab	1	Variable[1]			1	93	$ 54.21	$ 5,041.51
		Additional Foundation	3	10	3		4	13	$ 54.21	$ 704.73
C	Control Center	Floor	2	88	37		0.33	80	$ 54.21	$ 4,336.78
			44	2	37		0.67	81	$ 54.21	$ 4,390.99
	Pack house	Floor	3	41	36		1	164	$ 54.21	$ 8,890.40
			1	100	75		1	278	$ 54.21	$ 15,070.31
F	Clinker Storage Building	Outside Clinker Pit	2	21	15		1.5	35	$ 54.21	$ 1,897.34
			1	27	15		1.5	23	$ 54.21	$ 1,246.82
			1	Variable[1]			1.5	44	$ 54.21	$ 2,385.23
		Marginal Clinker	3	20	15		1	33	$ 54.21	$ 1,788.92
V	Coal Unloading Building	Conveyor Bases	2	Variable[1]				80	$ 54.21	$ 4,336.78
	Pavement	All outside paved areas		Variable[1]			1	22,222	$ 54.21	$ 1,204,648.75
Burning Area										
I	Wash house	Foundation	4	10	8		0.67	8	$ 54.21	$ 433.68
K	Mobile Equipment Shed		4	Variable[1]				95	$ 54.21	$ 5,149.92
L	Burner Building	Foundation	4	3	12		4	21	$ 54.21	$ 1,138.40
		Foundation	4	Variable[1]			3	14	$ 54.21	$ 758.94
		Interior Floor	1	47	114		1	198	$ 54.21	$ 10,733.53
M	Primary Crusher	Control Building	3	10	10		0.67	7	$ 54.21	$ 379.47
N	Secondary Crusher	Silo Floor	2		1	32	1	60	$ 54.21	$ 3,252.58
P	Coal Facilities	Silo Floor	1	10	10		5	19	$ 54.21	$ 1,029.98
		Coal Cyclone	1	18	24		2	32	$ 54.21	$ 1,734.71
S	Raw Material Dryer	Foundation	5	Variable[1]			5	174	$ 54.21	$ 9,432.49
U	Warehouse	Foundation	1	122	74.5		1	337	$ 54.21	$ 18,268.68

Continued on next page

Table 4 (continued): Concrete Foundation/Floor Demolition

Structures		Description	Qty	Length LF	Width LF	Dia. LF	Thickness LF	Total CY	Unit Cost $/CY	Total Cost
Burning Area										
BB	Preheater Tower	Foundation	1	55	40		1	81	$ 54.21	$ 4,390.99
CC	Oil House	Foundation	1	16	32		1	19	$ 54.21	$ 1,029.98
DD	Blower Building	Foundation	1	32	12		1	14	$ 54.21	$ 758.94
EE	SNCR	Foundation	1	35	50		1	65	$ 54.21	$ 3,523.63
FF	Lime/Carbon Silos	Lime Injection Silo	1	Variable[1]			1	52	$ 54.21	$ 2,818.91
		Activated Carbon Silo	1	Variable[1]			1	29	$ 54.21	$ 1,572.08
	Pavement	All outside paved areas		Variable[1]			1	22,222	$ 54.21	$ 1,204,648.75
Total								**47,942**		**$ 2,598,923.16**

[1] See Table 11 for detailed calculations

Table 5: Other Reclamation Costs

Reclamation Area/Task	Description	Quantity		Operating Costs $/Unit	Operating Costs Total Cost
Asbestos Abatement					
Plant Buildings	Contractor Quote	11,292	SF	TBD[1]	TBD[1]
Utility Lines					
Utility Poles		90	EA	$ 302.000	$ 27,180
Utility Lines		2,640	LF	$ 0.012	$ 32
Water Selenium Removal					
C-Pit	Biological Treatment	15,132,635	Gal	$ 0.041	$ 625,000
Total					**$ 652,212**

[1] Asbestos abatement cost to be determined by DRMS estimating software.

Table 6: On-Site Concrete Disposal Cell

Reclamation Area/Task	Equipment	Quantity	Distance (ft)	Materials		Productivity			Operating Costs		
				Product	$/Unit	Units/Hr	Hours	$/Unit	$/Hr	$/Unit	Total Cost
On-Site Concrete Disposal Cell											
Excavation	CAT637G Push-Pull Scraper Fleet	1,000 CY	500			1,214	0.8	$ 1.120	$1,359.68	$ 1.120	$ 1,120.00
Geosynthetic Clay Liner	CAT988G Loader/4 Laborers	378,000 SF		GCL	$0.354	6,975	54.2	$ 0.090	$3,096.90	$ 0.444	$167,832.00
3 Ft Clay Liner Protective Cover[1]	CAT637G Push-Pull Scraper Fleet	42,000 CY	4,000			600	70.0	$ 2.682	$1,609.20	$ 2.682	$112,644.00
Interstitial Fill[1]	CAT637G Push-Pull Scraper Fleet	27,000 CY	4,000			600	45.0	$ 2.682	$1,609.20	$ 2.682	$ 72,414.00
30 Inch Cover[1,2]	CAT637G Push-Pull Scraper Fleet	40,000 CY	4,000			600	66.7	$ 2.682	$1,609.20	$ 2.682	$107,280.00
Stormwater Diversion Ditch	CAT345 Excavator	4,000 LF				100	40.0	$ 2.500	$ 250.00	$ 2.500	$ 10,000.00
10 Ft x 10 Ft Riprap Pad	CAT345 Excavator/CAT988G Loader	7 CY		9" minus	$35.00	7	1.0	$ 72.64	$ 753.48	$ 107.64	$ 753.48
Total											**$472,043.48**

[1] Hauled from B-Pit Borrow Area
[2] Topsoil not included

Table 7: Backfill & Capping

Reclamation Area/Task	Equipment	Quantity	Distance	Productivity		Operating Costs		
			LF	CY/Hr	Hours	$/Hr	$/CY	Total Cost
B-Pit Borrow Area								
Topsoil Stripping	D9T Dozer	22,587 CY	300	844	26.8	$ 741.03	$ 0.878	$ 19,831.39
C-Pit								
Backfill from B-Pit Borrow	Cat992G Loader/CAT 777F Trucks	205,158 CY	4,000	1,230	166.8	$ 2,140.20	$ 1.74	$ 356,974.92
2Ft Shale Cap	CAT637G Push-Pull Scraper Fleet	48,077 CY	5,000	531	90.5	$ 1,549.46	$ 2.918	$ 140,288.69
Totals		**253,235 CY**						**$ 517,094.99**

Table 8: Ripping & Grading

Reclamation Area/Task	Equipment	Quantity		Productivity		Operating Costs		
				Ac/Hr	Hours	$/Hr	$/Ac	Total Cost
Plant Area								
Rough Grade	16G Grader	31.1	Ac	8.44	3.7	$ 371.11	$ 43.97	$ 1,367.47
Fine Grade	16G Grader	31.1	Ac	3.89	8.0	$ 370.60	$ 95.27	$ 2,962.90
C-Pit								
Rough Grade	16G Grader	27.0	Ac	8.44	3.2	$ 371.11	$ 43.97	$ 1,187.19
Fine Grade	16G Grader	27.0	Ac	3.89	6.9	$ 370.60	$ 95.27	$ 2,572.29
Other Roads & Facilities								
Ripping	16G Grader	4.0	Ac	4.58	0.9	$ 391.96	$ 85.58	$ 342.32
Fine Grade	16G Grader	4.0	Ac	3.89	1.0	$ 370.60	$ 95.27	$ 381.08
On-Site Concrete Disposal Cell								
Ripping	16G Grader	13.3	Ac	4.58	2.9	$ 391.96	$ 85.58	$ 1,138.21
Fine Grade	16G Grader	13.3	Ac	3.89	3.4	$ 370.60	$ 95.27	$ 1,267.09
B-Pit Borrow Area								
Fine Grade	16G Grader	21.0	Ac	3.89	5.4	$ 370.60	$ 95.27	$ 2,000.67
Topsoil Stockpile								
Fine Grade	16G Grader	8.7	Ac	3.89	2.2	$ 370.60	$ 95.27	$ 828.85
Totals		**180.5**	**Ac**					**$ 14,048.07**

Table 9: Topsoil Application

Reclamation Area/Source	Equipment	Quantity	Distance	Productivity		Operating Costs		
			LF	CY/Hr	Hours	$/Hr	$/CY	Total Cost
Plant Area								
31.1 acres	CAT637G Push-Pull Scraper Fleet	37,631 CY	5,000	531	71	$ 1,549.46	$ 2.918	$ 109,807.26
C Pit								
27 acres	CAT637G Push-Pull Scraper Fleet	32,670 CY	5,000	531	62	$ 1,549.46	$ 2.918	$ 95,331.06
Other Roads & Facilities								
4 acres	CAT637G Push-Pull Scraper Fleet	4,840 CY	2,500	783	6	$ 1,549.56	$ 1.979	$ 9,578.36
B-Pit Borrow Area								
21 acres	D9T Dozer	22,587 CY	300	844	27	$ 741.03	$ 0.878	$ 19,831.39
On-Site Concrete Disposal Cell								
13.3 acres	CAT637G Push-Pull Scraper Fleet	16,093 CY	2,500	783	21	$ 1,549.56	$ 1.979	$ 31,848.05
Totals		**113,821 CY**						**$ 266,396.11**

Table 10: Revegetation

10	Acres	Equipment	Materials				Productivity			Operating Costs		
			Product	Rate		$/Ac	Ac/Hr	Hours	$/Ac	$/Hr	$/Ac	Total Cost
Plant Area												
Seed Bed Preparation	31.1	Tractor & Disk					2	15.55	$122.17	$ 244.34	$ 122.17	$ 3,799.49
Fertilizer Application		Tractor & Spreader	Fertilizer	67	lb/ac	$ 32.47	4	7.775	$ 42.22	$ 298.76	$ 74.69	$ 2,322.86
Upland Seed Application		Tractor & Drill	Upland Seed	17.28	lb/ac	$291.19	2	15.55	$264.48	$1,111.34	$ 555.67	$ 17,281.34
Straw Mulch Application		Tractor & Crimper	Straw	2	ton/ac	$687.00	2	15.55	$ 79.99	$1,533.98	$ 766.99	$ 23,853.39
C-Pit												
Seed Bed Preparation	27.0	Tractor & Disk					2	13.5	$122.17	$ 244.34	$ 122.17	$ 3,298.59
Fertilizer Application		Tractor & Spreader	Fertilizer	67	lb/ac	$ 32.47	4	6.75	$ 42.22	$ 298.76	$ 74.69	$ 2,016.63
Upland Seed Application		Tractor & Drill	Upland Seed	17.28	lb/ac	$291.19	2	13.5	$264.48	$1,111.34	$ 555.67	$ 15,003.09
Straw Mulch Application		Tractor & Crimper	Straw	2	ton/ac	$687.00	2	13.5	$ 79.99	$1,533.98	$ 766.99	$ 20,708.73
Other Roads & Facilities												
Seed Bed Preparation	4.0	Tractor & Disk					2	2	$122.17	$ 244.34	$ 122.17	$ 488.68
Fertilizer Application		Tractor & Spreader	Fertilizer	67	lb/ac	$ 32.47	4	1	$ 42.22	$ 298.76	$ 74.69	$ 298.76
Upland Seed Application		Tractor & Drill	Upland Seed	17.28	lb/ac	$291.19	2	2	$264.48	$1,111.34	$ 555.67	$ 2,222.68
Straw Mulch Application		Tractor & Crimper	Straw	2	ton/ac	$687.00	2	2	$ 79.99	$1,533.98	$ 766.99	$ 3,067.96
On-Site Disposal Cell												
Seed Bed Preparation	15.4	Tractor & Disk					2	7.7	$122.17	$ 244.34	$ 122.17	$ 1,881.42
Fertilizer Application		Tractor & Spreader	Fertilizer	67	lb/ac	$ 32.47	4	3.85	$ 42.22	$ 298.76	$ 74.69	$ 1,150.23
Upland Seed Application		Tractor & Drill	Upland Seed	17.28	lb/ac	$291.19	2	7.7	$264.48	$1,111.34	$ 555.67	$ 8,557.32
Straw Mulch Application		Tractor & Crimper	Straw	2	ton/ac	$687.00	2	7.7	$ 79.99	$1,533.98	$ 766.99	$ 11,811.65
B-Pit Borrow Area												
Seed Bed Preparation	21.0	Tractor & Disk					2	10.5	$122.17	$ 244.34	$ 122.17	$ 2,565.57
Fertilizer Application		Tractor & Spreader	Fertilizer	67	lb/ac	$ 32.47	4	5.23	$ 42.22	$ 298.76	$ 74.69	$ 1,568.49
Upland Seed Application		Tractor & Drill	Upland Seed	17.28	lb/ac	$291.19	2	10.5	$264.48	$1,111.34	$ 555.67	$ 11,669.07
Straw Mulch Application		Tractor & Crimper	Straw	2	ton/ac	$687.00	2	10.5	$ 79.99	$1,533.98	$ 766.99	$ 16,106.79
Topsoil Stockpile												
Seed Bed Preparation	8.7	Tractor & Disk					2	4.35	$122.17	$ 244.34	$ 122.17	$ 1,062.88
Fertilizer Application		Tractor & Spreader	Fertilizer	67	lb/ac	$ 32.47	4	2.175	$ 42.22	$ 298.76	$ 74.69	$ 649.80
Upland Seed Application		Tractor & Drill	Upland Seed	17.28	lb/ac	$291.19	2	4.35	$264.48	$1,111.34	$ 555.67	$ 4,834.33
Straw Mulch Application		Tractor & Crimper	Straw	2	ton/ac	$687.00	2	4.35	$ 79.99	$1,533.98	$ 766.99	$ 6,672.81
Revegetation Maintenance												
Re-seeding	10%	Failure rate										$ 16,289.25
Totals	**86.2**											**$ 179,181.79**

Table 11: Concrete Quantity Backup Calculations

Structure		Type	Qty	Length LF	Width LF	Height LF	Dia. LF	CutOut CF	CY
Grinding Area									
A	Administration building	Block Wall	1	262	0.67	14			91
		Columns	22	1.5	0.67	14			11
		Interior Walls	1	742	0.67	14			256
		Floor	1	33	12	0.5			7
		Roof	1	46	105	0.5			89
		Flood Wall	1	185	1	4			27
B	Mill Building	Exterior Walls	2	120	0.33	53			157
			1	91	0.33	53			60
			60	1.6	0.67	53			126
			30	1.6	0.67	53			63
			2	48	0.33	91			108
			1	25	0.33	91			28
			1	78	0.33	91			88
			24	1.6	0.67	53			50
			6	1.6	0.67	53			13
			20	1.6	0.67	53			42
		Interior Walls	1	31	1.5	18			31
		Floor	1	35	35	0.5			23
		Precast Beams	1	1.3	2.3	93			10
			1	1	2.2	93			8
			1	1	1.8	66			4
		Columns	14	2.67	2.67	80			296
			14	1	1	50			26
		Raw Mill Foundation	1	46	20	4			136
			1	18	14	26			243
			1	9	26	9			78
			1	18	16	5			53
			1	16	16	5			47
		Finish Mill Foundation	1	88	4	28			365
			1	20	13	28			270
			1	28	9	5			47
			1	16	17	5			50
			1	16	10	5			30
		Roof	1	97	168	0.5			302
			24	97	2	0.67			116
		Foundation	3	10	3	4			13
		Separator Beams	2	5	3	86			96
			5	3	3	43			72
		Separator Slab	1	75	48	1		1080	93

Continued on next page

Table 11 (continued): Concrete Quantity Backup Calculations

Structure		Type	Qty	Length LF	Width LF	Height LF	Dia. LF	CutOut CF	CY
Grinding Area									
C	Control Center	Exterior Walls	2	37	0.67	38			70
			2	88	0.67	38			166
			2	34	0.67	20			34
			2	37	0.67	20			37
		Floors	2	88	37	0.33			80
			44	2	37	0.67			81
		Roof	1	88	37	0.33			40
			22	37	2	0.67			40
			1	25	37	0.33			11
			6	37	2	0.67			11
D	Raw Material Silos	Silos	6		0.58	73	27	38,263	785
E	Pack House	Walls	2	150	0.33	25			92
			75	2	0.67	25			93
			2	72	0.33	25			44
			36	2	0.67	25			45
			2	41	0.33	45			45
			20	2	0.67	45			45
			2	36	0.33	45			40
			9	2	0.67	45			20
		Floors	3	41	36	1			164
			1	100	75	1			278
		Roof	1	150	84	0.33			154
			21	150	2	0.67			156
		Columns	2	2	1	25			4
			2	2	1.5	70			16
			1	1	1	70			3
F	Clinker Storage Building	Roof	2	388	127	0.33			1,205
		Ts	194	2	0.67	127			1,223
		7s	25	2	0.67	79			98
		Ends (Δ)	1	100	0.33	79.2			97
		Outside Clinker Pit	2	21	15	1.5			35
			1	27	15	1.5			23
			1	27	15	15		4,900	44
		Marginal Clinker	3	20	15	1			33
		Clinker Silo	3		0.58	73	27	38,263	393
G	Finished Cement Silos	A1,A2,A4,A5	4		1	150	20	38,170	1,326
		A7	1		1.67	150	40	158,331	1,117
		A9,A10,A12,A13	4		1	150	20	38,170	1,326
		B1	1		1.67	150	40	158,331	1,117
		B2,B3,B5,B6	4		1	150	20	38,170	1,326
		B7	1		1.67	150	40	158,331	1,117

Continued on next page

Table 11 (continued): Concrete Quantity Backup Calculations

Structure		Type	Qty	Length LF	Width LF	Height LF	Dia. LF	CutOut CF	CY
Grinding Area									
H	Pump House		4	25	15	0.67			37
J	Electrical Room		2	22	0.33	15			8
			12	2	0.67	15			9
			2	26	0.33	15			10
			14	2	0.67	15			10
V	Coal Unloading Building	Walls	2	71	0.33	30			52
		Roof	36	2	0.67	30			54
		Walls	2	36	0.33	30			26
		Roof	9	2	0.67	30			13
		Conveyor Base	1						50
		Conveyor Base	1						30
AA	Maintenance Shop	Columns	1	251	0.33	24			74
		Ts	63	1.6	0.67	24			60
		Roof	1	120	65	0.5			144
	Pavement	Foundation							22,222
Burning Area									
I	Wash House	Foundation	4	10	8	0.67			8
K	Mobile Equipment Shed		2	32	0.33	30			23
			16	2	0.67	30			24
			2	96	0.33	30			70
			48	2	0.67	30			71
L	Burner Building	Piers	1	10	29	22			236
			1	13	23	29			321
			1	40	25	29			1,074
			1	19	25	35			616
			1	13	23	35			388
			1	13	24.5	38			448
		Columns	11	2	2	53			86
		Foundation	4	3	12	4			21
			3	2	10	3			7
			1	6	10	3			7
		Roof	1	69	128	0.33			108
			18	128	2	0.67			114
		Walls	2	128	0.33	53			166
			2	69	0.33	53			89
			64	2	0.67	53			168
			32	2	0.67	53			84
		Interior Floor	1	47	114	1			198

Continued on next page

Table 11 (continued): Concrete Quantity Backup Calculations

Structure		Type	Qty	Length	Width	Height	Dia.	CutOut	CY
				LF	LF	LF	LF	CF	
Burning Area									
M	Primary Crusher	Walls	2	43	2	30			191
			1	20	2	30			44
			6	1.1	0.9	6			1
			1	5	1	18			3
			2	522	0.5	1.3			25
		Roof	1	32	22	0.33			9
			8	2	0.67	22			9
		Control Building	3	10	10	0.67			7
		Divider	1	23	2	14			24
N	Secondary Crusher	Silo Floor	2		1	1	32		60
		Dust Silo	1		0.58	85	27.17	45,129	153
		Crusher Silo	1		0.67	55	32	40,607	134
		Surge Silo	1		0.58	44	20	12,257	58
O	Homogenizing Silos	Homogenizer	1		1.5	142	40	152,680	954
		Kiln Silo	1		1.33	142	31	89,573	652
		Dust Silo	1		0.58	52	20	14,486	69
P	Coal Facilities	Silo Foundation	1	10	10	5			19
		Coal Cyclone	1	18	24	2			32
		Coal Silo	1		0.9	135	50	246,330	694
		Cone	1		0.9	23	50	15,053	1,115
Q	Stack	Silos	1		1	195	44	270,161	976
R	Bag House	Columns	30	1.75	1.75	21			71
			40	1.75	1.75	45			204
		Walls	2	60	0.67	45			134
			2	130	0.67	45			290
S	Raw Material Dryer	Building	2	21	0.67	16			17
			2	16	0.67	16			13
		Foundation	1	5	15.5	13			37
			1	16.5	13	9			72
			1	7	9	2.5			6
			1	15.5	14	5			40
		Foundation	1	3.5	16	9			19
		Dust Collector	6	2	1.5	7			5
			1	4	10	10			15
			4	5	2.5	2.5			5
			2	3	2.5	2.5			1
			13	2.5	2.5	12			36
		Fan	1	10	5	4			7
			2	2.5	10	4			7

Continued on next page

Table 11 (continued): Concrete Quantity Backup Calculations

Structure		Type	Qty	Length	Width	Height	Dia.	CutOut	CY
				LF	LF	LF	LF	CF	
Burning Area									
U	Warehouse	Foundation	1	122	74.5	1			337
X	Brick Shed	Walls	2	96	0.33	18			42
		Roof	48	2	0.67	18			43
		Walls	2	40	0.33	18			18
		Roof	20	2	0.67	18			18
BB	Preheater Tower	Foundation	1	55	40	1			81
CC	Oil House	Foundation	1	16	32	1			19
DD	Blower Building	Foundation	1	32	12	1			14
EE	SNCR	Foundation	1	35	50	1			65
FF	Lime Silo	Foundation	1	20	20	3.5			52
	Carbon Silo	Foundation	1	15	15	3.5			29
	Pavement								22,222