



APPENDIX 4.1-1

TABLE 2

SCRAPER & TRUCK PRODUCTIVITY

Scraper Productivity - Calculation of Average Cycle Times																			
TASK DESCRIPTION	HAULAGE AREA	MAX. CAP. (CYD)	EFFECT. CAP. (CYD)	ROLLING RESIST.	GRADE RESIST.	EFFECT RESIST.	AVERAGE HAUL DISTANCE (FT)	LOADED HAUL TIME (MIN.)	RETURN HAUL TIME (MIN)	LOADING TIME (MIN)	DUMP, SPREAD, & MAN. (MIN.)	TOTAL CYCLE TIME (MIN)	MAX. PROD. (CYD / HR.)	TOTAL CORRECTION FACTOR	ADJ. PROD. (LCY/HR)	FLEET SIZE <sup>1</sup>	ADJ. FLEET PROD. (LCY/HR)	AREA VOLUME (LCY)	TOTAL HOURS
<b>SCRAPER SPGM REPLAMENT</b>																			
Place Growth Medium on Pit 1 (See Note 3)	Pit 1	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	1,301,706	2,084
Place Suitable Overburden Material	Pit 1	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	1,301,706	2,084
Place Suitable Overburden Material	Stockpile to Pond 1	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	68,405	109
Place Suitable Overburden Material	Stockpile to Pond 2	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	56,789	91
Place Suitable Overburden Material	Stockpile to Pond 3	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	26,459	42
Place Suitable Overburden Material	Stockpile to Collection Ditch 1A	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	27,749	44
Place Suitable Overburden Material	Stockpile to Collection Ditch 2A	44	35	10%	0%	10%	1,500	1.53	0.95	1.10	0.6	4.18	632	0.49	312	2	625	2,581	4
<b>Subtotal Pit 1</b>																		<b>2,785,396</b>	<b>4,458</b>
Place Growth Medium on Facilities	Stockpile to Facilities Area	44	35	10%	0.0%	10%	1,000	1.10	0.75	1.10	0.6	3.55	744	0.49	368	1	368	32,033	87
<b>Subtotal Facilities</b>																			87
<b>TOTALS</b>																		<b>2,817,429</b>	<b>4,546</b>
<b>TRUCK AND LOADER PRODUCTIVITY</b>																			
		MAX. CAP. (CYD)	EFFECT. CAP. (CYD)	ROLL. RESIST.	GRADE RESIST.	EFFECT RESIST.	AVE. HAUL DIST. (FT)	LOADED HAUL TIME (MIN.)	RETURN HAUL TIME (MIN)	LOADING TIME (MIN)	DUMP, SPREAD, & MAN. (MIN.)	TOTAL CYCLE TIME (MIN)	MAX. PROD. (CYD / HR.)	TOTAL CORR. FACTOR	ADJ. PROD. (LCY/HR)	FLEET SIZE <sup>1</sup>	ADJ. FLEET PROD. (LCY/HR)	AREA VOLUME (LCY)	
<b>TRUCK AND LOADER BACKFILL</b>																			
<b>Rippable Material to Backfill Pit</b>																			
Spoil Material to Backfill Pit 1	Truck Haul	79	55	10%	0%	10%	11,400	8.84	4.09	2.96	1.1	16.99	278	0.73	203	4	813	2,486,404	3,060
Spoil Material to Backfill Pit 1 Region 1	Truck Haul	79	55	10%	0%	10%	500	4.25	2.10	2.96	1.1	10.41	454	0.73	332	4	1,326	1,967,013	1,483
Spoil Material to Backfill Pit 1 Region 2	Truck Haul	79	55	10%	0%	10%	500	4.25	2.10	2.96	1.1	10.41	454	0.73	332	4	1,326	475,645	359
Spoil Material to Backfill Pit 1 Region 3	Truck Haul	79	55	10%	0%	10%	500	4.25	2.10	2.96	1.1	10.41	454	0.73	332	4	1,326	43,746	33
<b>Subtotal Truck/Loader Backfill</b>																		<b>4,972,808</b>	<b>4,935</b>
<b>TOTALS</b>																		<b>4,972,808</b>	<b>4,935</b>

Notes:

- Fleet size is calculated by dividing the total cycle time by push cycle time. Push Cycle Time = 0.6 maneuver and dump + 1.1 Load Time + 1.04 return = 2.74 minutes
- Average Acres/hour is based on a nominal 4 foot of thickness.
- For the purposes of the bond calculation, it was assumed that the redistribution of growth material over all areas will be optimized to achieve a maximum haul distance of 1,500 feet.
- Max. = Maximum
- Effect. = Effective
- Cap. = Capacity
- Resist. = Resistance
- CYD = Cubic yard
- FT = Feet
10. MIN. = Minute
11. HR. = Hour
12. PROD. = Production
13. ADJ. = Adjusted
14. LCY = Loose cubic yard

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TABLE 3

EARTHMOVING HOURS AND COSTS SUMMARY

DESCRIPTION	EARTHMOVING HOURS				
	SCRAPER (657G)	DOZER (D11T)	LOADER (993K)	TRUCK (777F)	DOZER (D9T)
SPGM Respread Mining Area	2,084				
SPGM Respread Associated Disturbance	87	735			
Normal Spoil Grading			4,935	3,060	4,935
Final Pit (Spoil Side)	2,084	1,931		1,875	
Pit Ramp and Haul Road Grading		830			
Public Road Regrading		23			
Ponds and Diversion Grading	291	59			
<b>Subtotal Area Bond</b>	<b>4,546</b>	<b>3,578</b>	<b>4,935</b>	<b>4,935</b>	<b>4,935</b>

DESCRIPTION	EARTHMOVING COSTS SUMMARY						
	SCRAPER (657G)	DOZER (D11T)	LOADER (993K)	TRUCK (777F)	DOZER (D9T)	GRADER (16M)	WATER WAGON
Total Equipment Hours	4,546	3,578	4,935	4,935	4,935	5,338	379
Total Estimated Hourly Costs <sup>1</sup>	\$ 316.72	\$ 318.65	\$ 279.67	\$ 233.02	\$ 189.98	\$ 143.56	\$ 143.56
<i>Subtotal Equipment Operating Costs</i>	<i>\$ 1,439,658</i>	<i>\$ 1,140,257</i>	<i>\$ 1,380,091</i>	<i>\$ 1,149,887</i>	<i>\$ 937,497</i>	<i>\$ 766,292</i>	<i>\$ 54,380</i>
<b>Total Equipment Cost</b>							<b>6,868,062</b>

Notes:

1. Estimated Hourly Costs from North Dakota Reclamation Division, Policy Memorandum No. 16 to Mine Operators - Reclamation Estimating Guidelines July 22, 2010.

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TABLE 4

REVEGETATION COSTS SUMMARY

Seed Mixtures					
	SPECIES	POUNDS OF PURE LIVE SEED	\$/PLS POUND <sup>1</sup>	EXT. AMOUNT	
	<b>Native Grassland</b>				
	Western Wheatgrass	4.0	\$2.50	\$10.00	
	Slender Wheatgrass	1.0	\$1.50	\$1.50	
	Green Needlegrass	4.0	\$2.50	\$10.00	
	Sideoats Grama	4.0	\$6.75	\$27.00	
	Switchgrass	2.0	\$1.50	\$3.00	
	Big Bluestem	1.0	\$3.75	\$3.75	
	Little Bluestem	1.0	\$9.00	\$9.00	
	Blue Grama	1.0	\$7.50	\$7.50	
	Buffalo Grass	1.0	\$12.00	\$12.00	
	Prairie Sandreed	1.0	\$7.00	\$7.00	
	Canada Wildrye	0.0	\$3.75	\$0.00	
	Indian Grass	0.0	\$5.00	\$0.00	
	Sand Bluestem	0.0	\$12.00	\$0.00	
	Thickspike Wheatgrass	0.0	\$4.00	\$0.00	
	Prairie Junegrass	0.0	\$30.00	\$0.00	
	Source: ND Reclamation Cost Guidelines				
	<b>Subtotal Native Grassland</b>	<b>20.0</b>		<b>\$90.75</b>	
	SPECIES	POUNDS OF PURE LIVE SEED	\$/PLS POUND <sup>1</sup>	EXT. AMOUNT	
	<b>Pre-cropland, Cropland, &amp; Pastureland</b>				
	Russian Wildrye	4.0	\$3.25	\$13.00	
	Intermediate Wheatgrass	7.0	\$1.25	\$8.75	
	Pubescent Wheatgrass	7.0	\$1.30	\$9.10	
	Alfalfa	3.0	\$2.25	\$6.75	
	Crested Wheatgrass	0	\$2.35	\$0.00	
	Reed Canarygrass	0.0	\$3.00	\$0.00	
	Smooth Bromegrass	0.0	\$1.25	\$0.00	
	Tall Wheatgrass	0.0	\$2.75	\$0.00	
	Source: ND Reclamation Cost Guidelines				
	<b>Subtotal Pre-cropland, Cropland, &amp; Pastureland</b>	<b>21.0</b>		<b>\$37.60</b>	
WOODLAND					
	MATERIALS	\$/100 FT PLANTED	\$/TREE PLANTED	EXT. AMOUNT	
	Trees \$20/100 ft of trees	\$20.00	\$1.44		
	Fabric \$50/100 ft of fabric	\$50.00			
	SPECIES	STOCKING RATE TREES/ACRE			
	American Plum	430.0		\$620.14	
	Silver Buffaloberry	225.0		\$324.49	
	Western Serviceberry	325.0		\$468.71	
	Common Chokecherry	225.0		\$324.49	
	Hawthorn	100.0		\$144.22	
	Redosier Dogwood	100.0		\$144.22	
	Silverberry	215.0		\$310.07	
	Woods Rose	110.0		\$158.64	
	Western Snowberry	110.0		\$158.64	
	Green Ash	370.0		\$533.61	
	Box Elder	100.0		\$144.22	
	Bur Oak	15.0		\$21.63	
	<b>Subtotal Woodland</b>	<b>2325.0</b>		<b>\$3,353.09</b>	
	Source: Stark County Soil Conservation District				
Revegetation Factors					
	Type of Work	ACRES	PERCENT OF TOTAL ACRES	\$/ACRE	EXT. AMOUNT
	Tillage or Seed Bed preparation	584.0	100%	\$16.02	\$9,355.68
	Rockpicking	559.1	96%	\$50.00	\$27,955.00
	Seeding - Pasture/Pre-cropland mixture	559.1	96%	\$9.53	\$5,328.22
	Seeding - Rangeland mixture	24.9	4%	\$14.30	\$355.95
	Mulching - slopes 0 to 10 percent	570.9	98%	\$100.00	\$57,090.00
	Mulching - slopes 10 percent and greater	13.1	2%	\$150.00	\$1,965.00
	<b>Subtotal</b>			<b>339.85</b>	<b>\$102,049.85</b>
	Source: ND Reclamation Cost Guidelines				
Custom Farm Work Rates					
	Type of Work	ACRES	\$/ACRE	EXT. AMOUNT	
	Deep Chiseling	584.0	\$8.01	\$4,677.84	
	Small Grain Seeding	559.1	\$9.53	\$5,328.22	
	Application of Dry Fertilizer	584.0	\$4.54	\$2,651.36	
	<b>Subtotal</b>		<b>22.08</b>	<b>\$12,657.42</b>	
	Source: ND Reclamation Cost Guidelines				
Weighted Average Cost					
		ACRES	COST PER ACRE	PERCENT USED	PERCENT X COST PER ACRE
	Fertilizer (per lb) 11-52-0	584.0	\$0.30	100%	\$0.30
	Native Grassland	74.8	\$90.75	13%	\$11.62
	Pre-cropland, Cropland, & Pastureland	484.3	\$37.60	83%	\$31.18
	Woodland	24.9	\$3,353.09	4%	\$142.97
	Revegetation Factors	584.0	\$339.85	100%	\$339.85
	Custom Farm Work	584.0	\$22.08	100%	\$22.08
	Weighted Average for Seed Mix				\$548.00
	Total Acres of Revegation				584.00
	<b>Total Revegation Costs</b>				<b>\$320,029.18</b>

Notes:

1. Average Seed price from North Dakota Reclamation Division, Policy Memorandum No. 16 to Mine Operators - Reclamation Estimating Guidelines July 22, 2010.

Lbs = Pounds

PLS = (Pure live seed)

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**TABLE 5**

**FINAL COSTS SUMMARY**

<b>Item</b>			
BOND AMOUNT SUBTOTAL:			
TOTAL EARTH MOVING COSTS:			\$6,868,062
Revegetation Costs:			\$320,029
Culvert and Gravel for Public Road Reconstruction			\$72,612
1% Add-on for Pumping and Miscellaneous Costs			\$72,607
<i>Subtotal Earth Moving, Revegetation, Roads, Pumping, and Misc Costs</i>			\$ 7,333,310
ENGINEERING AND DESIGN COSTS:	Costs/Acre	Acres	Total
Preparation of pre-reclamation topographic map (Permitted Acreage).	\$10.00	4581.4	\$45,814
Preparation of plans and specifications for the reclamation plan (Graded Acreage).	\$25.00	584.0	\$14,599
Preparation of a final topographic map (Permitted Acreage).	\$5.00	4581.4	\$22,907
Comparison of final topographic map to pre-reclamation topographic map for calculating earthwork moved (Grade Acreage).	\$10.00	584.0	\$5,840
<i>Subtotal Engineering and Design Cost</i>			\$89,160
Direct Field Supervision and Administrative		10% of first \$200,000 in reclamation cost	\$20,000
		1% of additional \$200,000 in reclamation cost	\$71,333
<i>Subtotal Supervision and Administrative Cost</i>			\$91,333
<b>TOTAL COSTS</b>			<b>\$7,513,800</b>