

STATE OF
COLORADO

Renfro - DNR, Joel <joel.renfro@state.co.us>

TR-03 Adequacy Comments

Renfro - DNR, Joel <joel.renfro@state.co.us>

Thu, Jan 18, 2024 at 4:06 PM

To: Jason McGraw <jason.mcgraw@generalshale.com>

Hi Jason,

I made edits to the Division's reclamation cost estimate for Navajo Clay Mine per our discussion last week on Wednesday, 1/10. The edits I made are as follows:

001:

Changed 2 dozers to 1 dozer to complete the task
Reduced the initial material volume from 24200 CCY (1.5ac x 10ft) to 20167 CCY (1.25ac x 10ft). This better represents the area that will be backfilled.

003/005/007/008/009:

Changed the scraper from a 627G to a 631G
Changed the support motor grader from a 14m to a 140m
Changed the support dozer from a D8 to a D6

007:

Reduced the initial material volume from 6776 CCY (6.3ac x 8in) to 5163 CCY (4.8 x 8in). In the first draft of the Division's estimate, the area to be re-topsoiled included some area near the topsoil stockpiles opposite of the pit. Upon reevaluating the Division determined that the area would not need to be re-topsoiled since it had not been disturbed. This subtracted 1.5ac from the initial topsoil volume. When we spoke you mentioned there being usable topsoil underneath the topsoil piles based on previous estimates. Unfortunately, without any supporting documentation, the Division must assume that the area under the topsoil stockpiles will need to be re-topsoiled.

010:

Reduced the fertilizer application from 307 lbs/ac to 40 lbs/ac. In the first draft of the Division's estimate, it was initially calculated as 40 lbs of Nitrogen per acre, meaning you would need 307 lbs per acre of Potassium Nitrate fertilizer to achieve that. It has been made clear that you wish to apply 40 lbs per acre of Potassium Nitrate, which has been correctly updated in this estimate.

011:

1 D8 dozer was removed from mobilization
14M motor grader was replaced with a 140M motor grader
627G scrapers were replaced with 631G scrapers
1 D6 dozer was added to mobilization

I attempted to change all dozers to D6's, but ultimately it increased the dozer tasks significantly. Additionally, a D8 dozer would be a better fit for the job anyway. I also tried 623G scrapers, but the 631G proved to be better suited for the job as well as more efficient, keeping hours costs down.

I also wanted to address the failure rate on the 010 revegetation task. I confirmed that a 25% failure rate is standard, especially within that area, so I don't have much wiggle room in changing that percentage.

All around, I was able to reduce the final cost (including indirect costs) from \$241,064 to \$210,741.

If you wish to continue discussing this cost estimation feel free to reach out with any questions. I'm more than happy to discuss them over the phone, however, I'd like to request you to detail anything you would like changed over email as well so I can accurately document any changes.

Lastly, I just wanted to confirm where I can and can't negotiate on the cost estimation. Any rates, such as cost/hour, are based on last year's estimations and are fixed, so I cannot adjust those. The most recent update to our cost-estimating program overall increased most rates, and many mines within the past year are experiencing an increase in reclamation costs. The only thing I can change is input values such as volumes, haul distances, material composition, type/quantity of machinery, etc.

The TR-03 is still open in case you want to make any changes through the TR, and has a decision day set for February 2, 2024. Thanks again for talking with me last week about the cost estimation. Please review the attached updated estimation and return to me with any questions.

Thank you,

Joel

[Quoted text hidden]



Navajo Clay Mine TR-03 Cost Estimate Draft 2.pdf

701K

COST SUMMARY WORK

Task description: Cost Estimate Updated for TR-03

Site: Navajo Clay Pit

Permit Action: TR-03

Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 000

State: Colorado

Abbreviation: None

Date: 1/18/2024

County: Elbert

Filename: M004-000

2:23:29 PM

User: JR2

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Backfill pit with overburden	DOZER	1	49.47	\$21,105
002	Push check dam bricks into pit	DOZER	1	1.03	\$440
003	Haul and fill pit with remaining scrap brick	SCRAPER1	1	0.54	\$920
004	Cut and fill remaining highwalls to 3H:1V	DOZER	1	46.13	\$19,679
005	Scrape overburden from stockpile pad and fill pit	SCRAPER1	1	18.52	\$31,300
006	Rip compacted areas	RIPPER	1	20.44	\$9,162
007	Retopsoil pit area	SCRAPER1	1	6.62	\$11,193
008	Retopsoil stockpile area	SCRAPER1	1	4.19	\$7,074
009	Retopsoil access road	SCRAPER1	1	4.32	\$4,459
010	Revegetate 25 acres	REVEGE	1	25.00	\$48,755
011	Mobilization/demobilization of equipment	MOBILIZE	1	8.20	\$17,689
<u>SUBTOTALS:</u>				184.46	\$171,776

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance: 2.02

Total = \$3,470

Performance bond: 1.05

Total = \$1,804

Job superintendent: 92.23

Total = \$6,002

Profit: 10.00

Total = \$17,178

TOTAL O & P = \$28,453

CONTRACT AMOUNT (direct + O & P) = \$200,229

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs): \$500

Total = \$500

Engineering work and/or contract/bid preparation: 0.00

Total = \$0

Reclamation management and/or administration: 5.00

\$10,011

CONTINGENCY: 0.00

Total = \$0

TOTAL INDIRECT COST = \$38,965

TOTAL BOND AMOUNT (direct + indirect) = \$210,741

BULLDOZER WORKTask description: **Backfill pit with overburden**Site: **Navajo Clay Pit**Permit Action: **TR-03**Permit/Job#: **M1993004****PROJECT IDENTIFICATION**Task #: **001**State: **Colorado**Abbreviation: **None**Date: **1/18/2024**County: **Elbert**Filename: **M004-001****2:24:29 PM**User: **JR2**Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**Basic Machine: **Cat D8T - 8SU**Horsepower: **310**Blade Type: **Semi-Universal**Attachment: **NA**Shift Basis: **1 per day**Data Source: **(CRG)****Cost Breakdown:**

		<u>Utilization %</u>
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$41.30	NA

Total unit Cost/Hour: **\$426.60**Total Fleet Cost/Hour: **\$426.60****MATERIAL QUANTITIES**Initial Volume: **20,167**Swell factor: **1.125**Loose volume: **22,688 LCY**Source of estimated volume: **1.25ac pit x 10ft**Source of estimated swell factor: **Cat Handbook****HOURLY PRODUCTION**Average push distance: **150 feet**Unadjusted hourly production: **634.3 LCY/hr**Materials consistency description: **Consolidated stockpile 1.0**Average push gradient: **-5 %**Average site altitude: **6,150 feet**Material weight: **2,650 lbs/LCY**Weight description: **Decomposed rock - 25% Rock, 75% Earth****Job Condition Correction Factor**

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	1.000	(CAT HB)
Dozing method:	1.200	(SLOT)

Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	1.000	(DOZ-OC)
Push gradient:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.868	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.7230

Adjusted unit production: 458.60 LCY/hr

Adjusted fleet production: **458.6** LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)
 Unit cost: \$0.930/LCY

Total job time: **49.47** Hours
 Total job cost: **\$21,105**

BULLDOZER WORKTask description: **Push check dam bricks into pit**Site: **Navajo Clay Pit**Permit Action: **TR-03**Permit/Job#: **M1993004****PROJECT IDENTIFICATION**Task #: **002**State: **Colorado**Abbreviation: **None**Date: **1/18/2024**County: **Elbert**Filename: **M004-002****2:22:15 PM**User: **JR2**Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**Basic Machine: **Cat D8T - 8SU**Horsepower: **310**Blade Type: **Semi-Universal**Attachment: **NA**Shift Basis: **1 per day**Data Source: **(CRG)****Cost Breakdown:**

		<u>Utilization %</u>
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$41.30	NA

Total unit Cost/Hour: **\$426.60**Total Fleet Cost/Hour: **\$426.60****MATERIAL QUANTITIES**Initial Volume: **231**Swell factor: **1.000**Loose volume: **231 LCY**Source of estimated volume: **Estimated 25 check dams + additional 25% volume of OB**Source of estimated swell factor: **Cat Handbook****HOURLY PRODUCTION**Average push distance: **200 feet**Unadjusted hourly production: **491.9 LCY/hr**Materials consistency description: **Rock, avg. ripped or blasted 0.7**Average push gradient: **-5 %**Average site altitude: **6,150 feet**Material weight: **2,950 lbs/LCY**Weight description: **Slag - broken****Job Condition Correction Factor**

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	0.700	(CAT HB)
Dozing method:	1.200	(SLOT)

Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	1.000	(DOZ-OC)
Push gradient:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.780	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4548

Adjusted unit production: 223.72 LCY/hr

Adjusted fleet production: **223.72** LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)

Unit cost: \$1.907/LCY

Total job time: **1.03** Hours

Total job cost: **\$440**

SCRAPER TEAM WORKTask description: **Haul and fill pit with remaining scrap brick**Site: **Navajo Clay Pit**Permit Action: Tr-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 003State: ColoradoAbbreviation: NoneDate: 1/18/2024
2:25:52 PMCounty: ElbertFilename: M004-003User: JR2Agency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D6T LGP
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 140M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:**Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	50	NA	50	50
Ownership cost/hour:	\$341.67	NA	\$127.53	NA	\$83.57	\$11.35
Operating cost/hour:	\$285.26	NA	\$41.57	NA	\$28.78	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$657.83	NA	\$210.40	NA	\$140.90	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,315.66		Support: \$210.40		Maint: \$163.71	

Total work team cost/hour: **\$1,689.77****MATERIAL QUANTITIES**Initial volume: 500

CCY

Swell factor: 1.000Loose volume: **500**

LCY

Source of estimated volume: Operator will import 500 cy of scrap brick for pit backfillSource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

Material weight: 2,950 lbs/LCY
 Material description: Slag - broken
 Rated Payload: 81,600 pounds
 Payload Capacity: 27.66 LCY

Struck Volume: 24.00 LCY
 Heaped Volume: 34.00 LCY
 Average Volume: 29.00 LCY
 Adjusted Capacity: **27.66** LCY

Cycle Time:Scraper Loading Time: 0.80 MinutesManeuver and Spread Time: 0.70 MinutesJob Condition Correction:

Site Altitude: 6150 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:Road Condition: Rutted dirt, little maintenance, no water, 2" tire penetration 5.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	700.00	5.00	5.00	10.00	638	1.12

Haul Time: 1.12 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	700.00	-5.00	5.00	0.00	2937	0.38

Return Time: 0.38 minutesTotal Scraper team cycle time: 3.00 minutesAdjusted for job conditions: 459.17 LCY/HourSelected Number of Scrapers: 2 Scraper(s)Adjusted single scraper team (unit) hourly production: 918.35 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 918.35 LCY/HourUnadjusted unit production/hour: 553.22 LCY/Hour

Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COSTFleet size: 1 Team(s)Total job time: 0.54 HoursUnit cost: \$1.840 /LCYTotal job cost: \$920

BULLDOZER WORKTask description: Cut and fill remaining highwalls to 3H:1VSite: Navajo Clay PitPermit Action: TR-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 004State: ColoradoAbbreviation: NoneDate: 1/18/2024County: ElbertFilename: M004-0042:28:51 PMUser: JR2Agency or organization name: DRMS**HOURLY EQUIPMENT COST**Basic Machine: Cat D8T - 8SUHorsepower: 310Blade Type: Semi-UniversalAttachment: NAShift Basis: 1 per dayData Source: (CRG)**Cost Breakdown:**

		<u>Utilization %</u>
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$41.30	NA

Total unit Cost/Hour: \$426.60Total Fleet Cost/Hour: **\$426.60****MATERIAL QUANTITIES**Initial Volume: 14,583Swell factor: 1.125Loose volume: **16,406 LCY**Source of estimated volume: 1,740 ft L x 30 ft H, 1H:1V to 3H:1V SlopesSource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Average push distance: 200 feetUnadjusted hourly production: 491.9 LCY/hrMaterials consistency description: Consolidated stockpile 1.0Average push gradient: -5 %Average site altitude: 6,150 feetMaterial weight: 2,650 lbs/LCYWeight description: Decomposed rock - 25% Rock, 75% Earth**Job Condition Correction Factor**

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	1.000	(CAT HB)
Dozing method:	1.200	(SLOT)

Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	1.000	(DOZ-OC)
Push gradient:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.868	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.7230

Adjusted unit production: 355.64 LCY/hr

Adjusted fleet production: **355.64** LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)

Unit cost: \$1.200/LCY

Total job time: **46.13** Hours

Total job cost: **\$19,679**

SCRAPER TEAM WORKTask description: Scrape overburden from stockpile pad and fill pitSite: Navajo Clay PitPermit Action: Tr-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 005State: ColoradoAbbreviation: NoneDate: 1/18/2024
2:32:46 PMCounty: ElbertFilename: M004-005User: JR2Agency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D6T LGP
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 140M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:**Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	50	NA	50	50
Ownership cost/hour:	\$341.67	NA	\$127.53	NA	\$83.57	\$11.35
Operating cost/hour:	\$285.26	NA	\$41.57	NA	\$28.78	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$657.83	NA	\$210.40	NA	\$140.90	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,315.66		Support: \$210.40		Maint: \$163.71	

Total work team cost/hour: \$1,689.77**MATERIAL QUANTITIES**Initial volume: 16,456

CCY

Swell factor: 1.125Loose volume: 18,513

LCY

Source of estimated volume: 3.4 ac area x 3 ft depthSource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

Material weight: 2,650 lbs/LCY
 Material description: Decomposed rock - 25% Rock,
75% Earth
 Rated Payload: 81,600 pounds

Struck Volume: 24.00 LCY
 Heaped Volume: 34.00 LCY
 Average Volume: 29.00 LCY

Payload Capacity: 30.79 LCYAdjusted Capacity: 29.00 LCYCycle Time:Scraper Loading Time: 0.80 MinutesManeuver and Spread Time: 0.70 MinutesJob Condition Correction:

Site Altitude: 6150 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	3.00	8.00	783	1.05

Haul Time: 1.05 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	-5.00	3.00	-2.00	2920	0.34

Return Time: 0.34 minutesTotal Scraper team cycle time: 2.89 minutesAdjusted for job conditions: 499.72 LCY/HourSelected Number of Scrapers: 2 Scraper(s)Adjusted single scraper team (unit) hourly production: 999.45 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 999.45 LCY/HourUnadjusted unit production/hour: 602.08 LCY/Hour

Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COSTFleet size: 1 Team(s)Total job time: 18.52 HoursUnit cost: \$1.691 /LCYTotal job cost: \$31,300

BULLDOZER RIPPING WORK

Task description: Rip compacted areas

Site: Navajo Clay Pit Permit Action: TR-03 Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 006 State: Colorado Abbreviation: None
Date: 1/18/2024 County: Elbert Filename: M004-006
2:34:29 PM
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat D8T - 8SU Horsepower: 310
Ripper Attachment: 3-Shank Ripper Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper Ownership Cost/Hour:	\$14.11	NA
Ripper Operating Cost/Hour:	\$7.45	100
Operator Cost/Hour:	\$41.30	NA
Total Unit Cost/Hour:	\$448.16	
Total Fleet Cost/Hour:	\$448.16	

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic: NA Bank Volume: NA BCY NA
Area: 13.70 acres Rip Depth (ft): 1.50 Volume: 33,154 BCY or CCY

Source of estimated quantity: 16 ac total disturbance - 2 ac pit floor - 0.3 ac pond

HOURLY PRODUCTION

Seismic:

Seismic Velocity: NA feet/second

Area:

Average Ripping Depth: 2.56 feet/pass
Average Ripping Width: 7.08 feet/pass
Average Ripping Length: 350.00 feet/pass
Average Dozer Speed: 88.00 feet/minute
Average Maneuver Time: 0.25 minutes/pass
Production per unit area: 0.807 acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production: 0.807 Acres/hr
Site Altitude: 6,150 feet
Altitude Adj: 1.00 (CAT HB)
Job Efficiency: 0.83 (1 shift/day)
Net Correction: 0.83 multiplier

Adjusted Hourly Unit Production: 0.67 Acres/hr
Adjusted Hourly Fleet Production: **0.67** Acres/hr

JOB TIME AND COST

Fleet size: 1 Grader(s) Total job time: **20.44** Hours

Unit cost: \$668.730 Per acre Total job cost: **\$9,162**

SCRAPER TEAM WORKTask description: **Retopsoil pit area**Site: **Navajo Clay Pit**Permit Action: **Tr-03**Permit/Job#: **M1993004****PROJECT IDENTIFICATION**Task #: **007**State: **Colorado**Abbreviation: **None**Date: **1/18/2024**
2:35:28 PMCounty: **Elbert**Filename: **M004-007**User: **JR2**Agency or organization name: **DRMS****HOURLY EQUIPMENT**COSTShift basis: **1 per day**

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D6T LGP
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 140M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:**Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	50	NA	50	50
Ownership cost/hour:	\$341.67	NA	\$127.53	NA	\$83.57	\$11.35
Operating cost/hour:	\$285.26	NA	\$41.57	NA	\$28.78	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$657.83	NA	\$210.40	NA	\$140.90	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,315.66		Support: \$210.40		Maint: \$163.71	

Total work team cost/hour: **\$1,689.77****MATERIAL QUANTITIES**Initial volume: **5,163**

CCY

Swell factor: **1.215**Loose volume: **6,273**

LCY

Source of estimated volume: **Pit area = 4.8 ac x 8 in depth**Source of estimated swell factor: **Cat Handbook****HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

Material weight: **1,600 lbs/LCY**
 Material description: **Top Soil**
 Rated Payload: **81,600 pounds**
 Payload Capacity: **51.00 LCY**

Struck Volume: **24.00** LCY
 Heaped Volume: **34.00** LCY
 Average Volume: **29.00** LCY
 Adjusted Capacity: **29.00** LCY

Cycle Time:Scraper Loading Time: 0.80 MinutesManeuver and Spread Time: 0.70 MinutesJob Condition Correction:

Site Altitude: 6150 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	900.00	5.00	3.00	8.00	783	1.17

Haul Time: 1.17 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	900.00	-5.00	3.00	-2.00	2920	0.38

Return Time: 0.38 minutesTotal Scraper team cycle time: 3.05 minutesAdjusted for job conditions: 473.51 LCY/HourSelected Number of Scrapers: 2 Scraper(s)Adjusted single scraper team (unit) hourly production: 947.02 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 947.02 LCY/HourUnadjusted unit production/hour: 570.49 LCY/Hour

Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COSTFleet size: 1 Team(s)Total job time: 6.62 HoursUnit cost: \$1.784 /LCYTotal job cost: \$11,193

SCRAPER TEAM WORKTask description: Retopsoil stockpile areaSite: Navajo Clay PitPermit Action: Tr-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 008State: ColoradoAbbreviation: NoneDate: 1/18/2024
2:36:36 PMCounty: ElbertFilename: M004-008User: JR2Agency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D6T LGP
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 140M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:**Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	50	NA	50	50
Ownership cost/hour:	\$341.67	NA	\$127.53	NA	\$83.57	\$11.35
Operating cost/hour:	\$285.26	NA	\$41.57	NA	\$28.78	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$657.83	NA	\$210.40	NA	\$140.90	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,315.66		Support: \$210.40		Maint: \$163.71	

Total work team cost/hour: \$1,689.77**MATERIAL QUANTITIES**Initial volume: 5,001

CCY

Swell factor: 1.215Loose volume: 6,076

LCY

Source of estimated volume: Stockpile area = (6.5 ac - 0.3 ac pond) x 6 in depthSource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

Material weight: 1,600 lbs/LCY
 Material description: Top Soil
 Rated Payload: 81,600 pounds
 Payload Capacity: 51.00 LCY

Struck Volume: 24.00 LCY
 Heaped Volume: 34.00 LCY
 Average Volume: 29.00 LCY
 Adjusted Capacity: 29.00 LCY

Cycle Time:Scraper Loading Time: 0.80 MinutesManeuver and Spread Time: 0.70 MinutesJob Condition Correction:

Site Altitude: 6150 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	200.00	1.00	3.00	4.00	1667	0.23

Haul Time: 0.23 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	200.00	-1.00	3.00	2.00	2914	0.26

Return Time: 0.26 minutesTotal Scraper team cycle time: 1.99 minutesAdjusted for job conditions: 725.73 LCY/HourSelected Number of Scrapers: 2 Scraper(s)Adjusted single scraper team (unit) hourly production: 1,451.46 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 1,451.46 LCY/HourUnadjusted unit production/hour: 874.37 LCY/Hour

Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COSTFleet size: 1 Team(s)Total job time: 4.19 HoursUnit cost: \$1.164 /LCYTotal job cost: \$7,074

SCRAPER TEAM WORKTask description: **Retopsoil access road**Site: **Navajo Clay Pit**Permit Action: **Tr-03**Permit/Job#: **M1993004****PROJECT IDENTIFICATION**Task #: **009**State: **Colorado**Abbreviation: **None**Date: **1/18/2024
2:37:24 PM**County: **Elbert**Filename: **M004-009**User: **JR2**Agency or organization name: **DRMS****HOURLY EQUIPMENT**COSTShift basis: **1 per day**

Equipment Description	
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D6T LGP
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 140M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:**Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	50	NA	50	50
Ownership cost/hour:	\$341.67	NA	\$127.53	NA	\$83.57	\$11.35
Operating cost/hour:	\$285.26	NA	\$41.57	NA	\$28.78	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$657.83	NA	\$210.40	NA	\$140.90	\$22.81
Number of Units:	1	0	1	0	1	1
Group Subtotals:	Work: \$657.83		Support: \$210.40		Maint: \$140.90	\$22.81

Total work team cost/hour: **\$1,031.94****MATERIAL QUANTITIES**Initial volume: **2,581**

CCY

Swell factor: **1.215**Loose volume: **3,136**

LCY

Source of estimated volume: **Access road = 3.2 ac x 6 in depth**Source of estimated swell factor: **Cat Handbook****HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

Material weight:	1,600 lbs/LCY	Struck Volume:	24.00	LCY
Material description:	Top Soil	Heaped Volume:	34.00	LCY
Rated Payload:	81,600 pounds	Average Volume:	29.00	LCY
Payload Capacity:	51.00 LCY	Adjusted Capacity:	29.00	LCY

Cycle Time:Scraper Loading Time: 0.80 MinutesManeuver and Spread Time: 0.70 MinutesJob Condition Correction:

Site Altitude: 6150 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	200.00	1.00	3.00	4.00	1667	0.23

Haul Time: 0.23 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	200.00	-1.00	3.00	2.00	2914	0.26

Return Time: 0.26 minutesTotal Scraper team cycle time: 1.99 minutesAdjusted for job conditions: 725.73 LCY/HourSelected Number of Scrapers: 1 Scraper(s)Adjusted single scraper team (unit) hourly production: 725.73 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 725.73 LCY/HourUnadjusted unit production/hour: 874.37 LCY/Hour

Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COSTFleet size: 1 Team(s)Total job time: 4.32 HoursUnit cost: \$1.422 /LCYTotal job cost: \$4,459

REVEGETATION WORKTask description: Revegetate 25 acresSite: Navajo Clay PitPermit Action: TR-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 010State: ColoradoAbbreviation: NoneDate: 1/18/2024County: ElbertFilename: M004-0102:38:31 PMUser: JR2Agency or organization name: DRMS**FERTILIZING****Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Potassium nitrate, 13-46-0	40.00	pound	\$0.68	\$27.20
			Total Fertilizer Materials Cost/Acre	\$27.20

Application

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	\$41.82
Total Fertilizer Application Cost/Acre	\$41.82

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	\$112.82
Weed control spraying (MEANS 31 31 16.13 3100)	\$338.80
Total Tilling Cost/Acre	\$451.62

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Switchgrass - Blackwell	1.35	12.06	\$15.53
Blue Grama - Lovington	0.30	4.90	\$4.79
Sideoats Grama - Vaughn	0.90	2.95	\$7.54
Western Wheatgrass - Arriba	3.20	8.08	\$20.80
Prairie Sandreed - Goshen	1.95	12.22	\$20.18
Totals Seed Mix	7.70	40.21	\$68.84

Application

Description	Cost /Acre
Drill Seeding (DRMS Survey Cost)	\$232.00
Total Seed Application Cost/Acre	\$232.00

MULCHING and MISCELLANEOUS**Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Hay, delivered {MEANS 31 25 14.16 1200}	2.00	TON	\$429.79	\$859.57
Total Mulch Materials Cost/Acre				\$859.57

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	\$74.46
Weed spray, hand, aquatic area, annuals [DMG]	\$119.47
Total Mulch Application Cost/Acre	\$193.93

NURSERY STOCK PLANTING

Common Name	No / Acre	Type and Size	Planting Cost	Fertilizer Pellet Cost	Cost /Acre
					\$
Totals Nursery Stock Cost / Acre					\$0.00

JOB TIME AND COST

No. of Acres:	<u>25</u>	Cost /Acre:	<u>\$1,874.98</u>
Estimated Failure Rate:	<u>25%</u>	Cost /Acre*:	<u>\$300.84</u>
*Selected Replanting Work Items:	<u>SEEDING</u>		
Initial Job Cost:	<u>\$46,874.50</u>		
Reseeding Job Cost:	<u>\$1,880.25</u>		
Total Job Cost:	<u>\$48,755</u>		
Job Hours:	<u>25.00</u>		

EQUIPMENT MOBILIZATION/DEMOBILIZATIONTask description: Mobilization/demobilization of equipmentSite: Navajo Clay PitPermit Action: TR-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**

Task #: 011 State: Colorado Abbreviation: None
 Date: 1/18/2024 County: Elbert Filename: M004-011
2:39:16 PM
 User: JR2

Agency or organization name: DRMS**EQUIPMENT TRANSPORT RIG COST**

Shift basis: 1 per day
 Cost Data Source: CRG Data

Truck Tractor Description: GENERIC ON-HIGHWAY TRUCK TRACTOR, 6X4, DIESEL POWERED, 400 HP (2ND HALF, 2006)Truck Trailer Description: GENERIC FOLDING GOOSENECK, DROP DECK EQUIPMENT TRAILER (25T, 50T, AND 100T)**Cost Breakdown:**

Available Rig Capacities	0-25 Tons	26-50 Tons	51+ Tons
Ownership Cost/Hour:	\$20.26	\$36.04	\$47.05
Operating Cost/Hour:	\$39.51	\$76.08	\$82.85
Operator Cost/Hour:	\$22.52	\$22.52	\$22.52
Helper Cost/Hour:	\$0.00	\$23.53	\$23.53
Total Unit Cost/Hour:	\$82.29	\$158.17	\$175.95

NON ROADABLE EQUIPMENT:

Machine Description	Weight/ Unit (TONS)	Owner ship Cost/hr/ unit	Haul Rig Cost/hr/unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet	DOT Permit Cost/ fleet
Cat D8T - 8SU	53.08	\$255.49	\$175.95	1	\$431.44	\$175.95	\$250.00
Drill/Broadcast Seeder with Tractor	25.00	\$6.73	\$82.29	1	\$89.02	\$82.29	\$250.00
Cat 631G	52.50	\$341.67	\$175.95	2	\$1,035.24	\$351.90	\$500.00
CAT 140M	16.68	\$83.57	\$82.29	1	\$165.86	\$82.29	\$250.00
Cat D6T LGP	26.87	\$127.53	\$158.17	1	\$285.70	\$158.17	\$250.00

Subtotals: **\$2,007.26** **\$850.60** **\$1,500.00****ROADABLE EQUIPMENT:**

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Light Duty Pickup, 4x4, 3/4 T.	\$15.83	1	\$15.83	\$15.83
Water Tanker, 2,500 Gal.	\$34.27	1	\$34.27	\$34.27

Subtotals: **\$50.10** **\$50.10**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region: AURORA
 Total one-way travel distance: 40.00 miles
 Average Travel Speed: 50.00 mph

Total Non-Roadable Mob/Demob Cost * \$17,608.88
 ** two round trips with haul rig:
 Total Roadable Mob/Demob Cost ** \$80.16
 ** one round trip, no haul rig:

Transportation Cycle Time:

	Non- Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.80	0.80
Return Time (Hours):	0.80	0.80
Loading Time (Hours):	1.25	NA
Unloading Time (Hours):	1.25	NA
Subtotals:	4.10	1.60

JOB TIME AND COST

Total job time: 8.20 Hours

Total job cost: \$17,689