COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

August 15, 2024

Phillip Courtney
Martin Marietta Materials, Inc.
1627 Cole Boulevard, Suite 200
Lakewood, CO 80401

Re: Thunderbird Sand and Gravel – File No. M-2023-032
Martin Marietta Materials, Inc.
112c Construction Materials
Reclamation Application

Dear Phillip Courtney:

On August 15, 2024 the Division of Reclamation, Mining and Safety concluded its review of the Construction Materials Reclamation Permit Application submitted to the Division on September 6, 2023. The decision reached by the Division is: Awaiting warranty. The amount of financial warranty set by the Division for this operation is $8,188,152.00. You must submit a financial warranty in this amount and a performance warranty in order for us to issue a permit. In the event you have requested a financial warranty form, we will provide you with the applicable form. If you have not, please select a type of financial warranty from Rule 4.3, and then contact us so that we can provide you with the appropriate warranty form. We have enclosed a performance warranty form with this letter for your use.

PLEASE NOTE THAT MINING OPERATIONS MAY NOT COMMENCE UNTIL A PERMIT HAS BEEN ISSUED BY THE DIVISION AFTER RECEIPT OF YOUR FINANCIAL AND PERFORMANCE WARRANTIES. A PERMIT CANNOT BE ISSUED UNTIL WE HAVE VERIFIED THE ADEQUACY OF YOUR FINANCIAL AND PERFORMANCE WARRANTIES.

M-2023-032: Approved Surety and Acreage	
Reclamation Liability (Required Surety):	$8,188,152.00
Approved Permit Acreage:	543.50
Approved Affected Acreage:	543.50

If you have any questions, please contact me by telephone at (720) 812-2002, or by email at Joel.renfro@state.co.us

Sincerely,

Joel Renfro

Joel Renfro
Environmental Protection Specialist

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

PERFORMANCE WARRANTY

Permittee/Operator: Martin Marietta Materials, Inc.
Operation known as: Thunderbird Sand and Gravel

Permit Number: M-2023-032

This form is approved by the Colorado Mined Land Reclamation Board ("Board") pursuant to C.R.S. 34-32-117 of the Colorado Mined Land Reclamation Act and C.R.S. 34-32.5-117 of the Colorado Land Reclamation Act for the Extraction of Construction Materials.

All parties are on Notice from this Document that:

The above listed Operator provides this warranty to the Board in conjunction with a reclamation Permit to conduct the above described mining operation on certain lands in Colorado. The "Affected Lands" are described in the above listed reclamation Permit, and include any Permit Amendment(s) approved by the Division of Reclamation Mining and Safety ("Division").

The Colorado Mined Land Reclamation Act, C.R.S. 34-32-101 et seq. ("Hard Rock Act"), and the Colorado Land Reclamation Act for the Extraction of Construction Materials, C.R.S. 34-32.5-101 et seq. ("Construction Materials Act"), both require a permit issued by the Board to include a written promise by the Operator to comply with all requirements of the Hard Rock and Construction Materials Acts (referred to herein together as "Acts").

Through the terms and conditions of this performance warranty and Permit, the Operator agrees to be bound by all requirements of the Acts and all Mineral Rules and Regulations of the Board for Hard Rock, Metal, and Designated Mining Operations (2 C.C.R. 407-1) and all Mineral Rules and Regulations of the Board for the Extraction of Construction Materials (2 C.C.R. 407-4) (referred to herein together as "Rules").

The Operator hereby provides the Board warranties of performance pursuant to C.R.S. 34-32-117(2), (3), and (4)/C.R.S. 34-32.5-117(2), (3), and (4), and promises the Board it will comply with all applicable requirements of the Acts and Rules.

The Operator hereby promises the Board it will comply with all of the terms of the reclamation Permit, including any Permit Amendment(s) approved by the Division. This performance warranty obligation of the Operator shall continue until the Operator's liability is released by the Board.

The Operator promises to be responsible for reclamation costs up to the amount established by the Board and incorporates its financial warranty to this performance warranty. The Operator agrees to maintain a financial warranty (or warranties) in good standing for the reclamation costs for the entire life of the Permit. The amount of the financial warranty shall be sufficient to assure the completion of reclamation of affected lands if the Division has to complete such reclamation due to forfeiture. If the Board determines the Operator is in default under this performance warranty and the Operator fails to cure such default, the Operator's financial warranty shall be subject to forfeiture pursuant to C.R.S. 34-32-118/34-32.5-118.

This performance warranty by the Operator is perpetual and shall remain in full force and effect until all obligations have been met and all associated financial warranty is released by the Board. Any release of liability in a succession of Operators shall comply with C.R.S. 34-32-119/34-32.5-119.

The provisions hereof shall bind and inure to the benefit of the parties hereto and their successors and assigns.

SIGNED, SEALED AND DATED this ________ day of __________________________ , __________
(date) (month) (year)

Operator: Martin Marietta Materials, Inc.

Signature: ____

Name: ____

Title: ____

NOTARIZATION OF OPERATOR'S ACKNOWLEDGEMENT

STATE OF ______________________________)
) ss.
COUNTY OF ______________________________)

The foregoing instrument was acknowledged before me this ____________ day of ____________________________ , __________
(date) (month) (year)

by: ________________________ as ______________________ of Martin Marietta Materials, Inc.
(name) (title) (Operator)

Notary Public: ___________________________

My Commission Expires ___________________________

APPROVED:
State of Colorado
Mined Land Reclamation Board
Division of Reclamation, Mining and Safety

By: Michael A. Cunningham ______________________________ Date Executed: _______________
Division Director

COST SUMMARY WORK

Task description: **New Application Cost Estimate**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 000
Date: 8/14/2024
User: JR2

State: Colorado
County: Pueblo

Abbreviation: None
Filename: M032-000

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Phase 1 Demolition	DEMOLISH	1	372.00	$244,683
002	Phase 1 - Backfill Primary Silt Ponds	SCRAPER1	1	78.40	$308,985
003	Phase 1 - Backfill Secondary Silt Ponds	SCRAPER1	1	80.52	$317,336
004	Phase 1 - Scarify Ground	RIPPER	2	27.55	$19,041
005	Phase 1 - Spread 6" Topsoil	SCRAPER1	1	9.58	$37,741
006	Phase 1 - Upland Revegetation	REVEGE	1	66.15	$52,330
007	Phase 1 - Wetland Revegetation	REVEGE	1	1.00	$578
008	Phase 2 - Demolition	DEMOLISH	1	21.32	$4,639
009	Phase 2 - Slurry Wall Construction	NA	1	150.00	$2,464,150
010	Phase 2 - Backfill Slopes 3H:1V	SCRAPER1	1	234.62	$924,728
011	Phase 2 - Scarify Ground	RIPPER	2	17.23	$11,913
012	Phase 2 - Spread 6" Topsoil	SCRAPER1	1	14.65	$57,746
013	Phase 2 - Upland Revegetation	REVEGE	1	39.20	$34,567
014	Phase 2 - Wetland Revegetation	REVEGE	1	2.60	$2,344
015	Phase 3 - Slurry Wall Construction	NA	1	75.00	$1,287,936
016	Phase 3 - Backfill Slopes 3H:1V	SCRAPER1	1	151.07	$595,423
017	Phase 3 - Scarify Ground	RIPPER	2	7.42	$5,134
018	Phase 3 - Spread 6" Topsoil	SCRAPER1	1	6.31	$24,885
019	Phase 3 - Upland Revegetation	REVEGE	1	16.80	$13,290
020	Phase 3 - Wetland Revegetation	REVEGE	1	1.15	$1,205
021	Plug and Abandon Monitoring Wells	BOREHOLE	1	1.90	$1,745
022	Mob/Demob	MOBILIZE	1	1.66	$13,477
			SUBTOTALS:	**1376.13**	**$6,423,876**

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	$129,762
Performance bond:	1.05	Total =	$67,451
Job superintendent:	688.06	Total =	$54,543
Profit:	10.00	Total =	$642,388
		TOTAL O & P =	$894,143
		CONTRACT AMOUNT (direct + O & P) =	$7,318,019

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	$500	Total =	$500
Engineering work and/or contract/bid preparation:	4.25	Total =	$311,016
Reclamation management and/or administration:	5.00		$365,901
CONTINGENCY:	3.00	Total =	$192,716
		TOTAL INDIRECT COST =	$1,764,276
		TOTAL BOND AMOUNT (direct + indirect) =	**$8,188,152**

DEMOLITION WORK

Task description: **Phase 1 Demolition**

Site: **Thunderbird Sand and Gravel**   Permit Action: New Application   Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 001   State: Colorado   Abbreviation: None
Date: 8/6/2024   County: Pueblo   Filename: M032-001
User: JR2

Agency or organization name: DRMS

UNIT COSTS   **Location adjustment: 87.70 %**

Structure or Item Description	Dimensions	Demolition Menu Selection	Quantity	Unit	Unit Cost	Total Cost
12" Concrete Pad for Wash Plant	40'x12'	Floor, concrete, demolition only, average reinforcing - 12 in. thick	480.00	SF	$2.21	$1,058.50
Demolish and remove Shop	100'x200'x30'	Bldg. (SN) demo./off-site disposal in approved landfill - Max. 15 mile haul	600,000.00	CF	$0.42	$252,540.00
Remove Concrete Footings for Shop	25 CY	Footing, concrete, average reinforcing - 1.0 ft. x 2 ft.	337.50	LF	$4.41	$1,488.51
Remove Scale Trailer	NA	USER PROVIDED ITEM	1.00	EA	$2,000.00	$2,000.00
Remove 2.5' Concrete Scale Base	60'x35'	Floor, concrete, demolition only, average reinforcing - 12 in. thick	5,280.00	SF	$2.21	$11,643.46
Remove Culvert	16'x6'x10'	Pipe, reinforced concrete (RCP) - 96 in. diameter pipe	20.00	LF	$117.98	$2,359.51
Haul Concrete Material off Site to Dump	361 CY	Hauling only, per mile, 12-18 CY truck - 30 mph average speed	780.00	MI	$10.14	$7,910.29

Job Hours: **372.00**   **Subtotal (unadjusted)**: **$279,000.27**   **Total Cost (adjusted for location)**: **$244,683.24**

SCRAPER TEAM WORK

Task description: **Phase 1 - Backfill Primary Silt Ponds**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 002 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-002
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 111,000 CCY Swell factor: 1.125
Loose volume: **124,875** LCY

Source of estimated volume: Operator Estimate (60% of total backfill volume)
Source 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 LCY   Adjusted Capacity: **29.00** LCY

Cycle Time:

Scraper Loading Time: 0.80 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:

Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	2.00	7.00	962	0.88

Haul Time: **0.88** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.72** minutes
Adjusted for job conditions: 530.96 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,592.87 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,592.87** LCY/Hour

Unadjusted unit production/hour: 639.71 LCY/Hour
Optimal Number of Scrapers per push dozer: ________

JOB TIME AND COST

Fleet size: 1 Team(s)   Total job time: **78.40** Hours

Unit cost: $2.474 /LCY   Total job cost: **$308,985**

SCRAPER TEAM WORK

Task description: **Phase 1 - Backfill Secondary Silt Ponds**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 003 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-003
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 114,000 CCY Swell factor: 1.125
Loose volume: **128,250** LCY

Source of estimated volume: Operator Estimate (60% of total fill volume)
Source 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 LCY Adjusted Capacity: **29.00** LCY

Cycle Time:

Scraper Loading Time: 0.80 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:
Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	2.00	7.00	962	0.88

Haul Time: **0.88** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.72** minutes
Adjusted for job conditions: 530.96 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,592.87 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,592.87** LCY/Hour

Unadjusted unit production/hour: 639.71 LCY/Hour
Optimal Number of Scrapers per push dozer: ________

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **80.52** Hours

Unit cost: $2.474 /LCY Total job cost: **$317,336**

BULLDOZER RIPPING WORK

Task description: **Phase 1 - Scarify Ground**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #:	004	State:	Colorado	Abbreviation:	None
Date:	8/12/2024	County:	Pueblo	Filename:	M032-004
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:	$173.32	NA
Operating Cost/Hour:	$109.71	100
Ripper Ownership Cost/Hour:	$14.53	NA
Ripper Operating Cost/Hour:	$7.95	100
Operator Cost/Hour:	$40.04	NA
Total Unit Cost/Hour:	$345.55	

Total Fleet Cost/Hour: **$691.09**

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic:	NA		Bank Volume:	NA	BCY	NA	
Area:	38.20	acres	Rip Depth (ft):	1.50	Volume:	92,444	BCY or CCY

Source of estimated quantity: Reclamation Plan

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:	800.00	feet/pass
Average Dozer Speed:	88.00	feet/minute
Average Maneuver Time:	0.25	minutes/pass
Production per unit area:	0.835	acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production:	0.835	Acres/hr
Site Altitude:	4,570	feet
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.83	multiplier
Adjusted Hourly Unit Production:	0.69	Acres/hr
Adjusted Hourly Fleet Production:	**1.39**	Acres/hr

JOB TIME AND COST

Fleet size:	2	Grader(s)	Total job time:	**27.55**	Hours
Unit cost:	$498.466	Per acre	Total job cost:	**$19,041**	

SCRAPER TEAM WORK

Task description: **Phase 1 - Spread 6" Topsoil**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 005 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-005
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 12,600 CCY Swell factor: 1.215
Loose volume: **15,309** LCY

Source of estimated volume: Operator Estimate
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

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

Scraper Bowl (volume) Basis:

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 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:
Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	2.00	7.00	962	0.87

Haul Time: **0.87** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.71** minutes
Adjusted for job conditions: 532.92 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,598.75 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,598.75** LCY/Hour

Unadjusted unit production/hour: 642.07 LCY/Hour
Optimal Number of Scrapers per push dozer: ____________

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **9.58** Hours

Unit cost: $2.465 /LCY Total job cost: **$37,741**

REVEGETATION WORK

Task description: **Phase 1 - Upland Revegetation**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 006 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-006
User: JR2

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			$	$
			Total Fertilizer Materials Cost/Acre	**$0.00**

Application

Description	Cost /Acre
	$
Total Fertilizer Application Cost/Acre	**$0.00**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Weed control spraying (MEANS 31 31 16.13 3100)	$338.80
Total Tilling Cost/Acre	**$456.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Blue Grama - Lovington	1.50	24.48	$41.63
Alkaligrass, Fult's	1.25	34.44	$9.18
Switchgrass - Nebraska 28	1.00	8.93	$11.13
Sand Dropseed	0.25	29.84	$3.25
Sideoats Grama - Butte	2.25	7.39	$54.35
Smooth Brome - Lincoln	2.00	6.66	$9.71
Ryegrass, Perennial - Forage-Fusta	0.75	4.25	$1.49
Slender Wheatgrass - San Luis	2.50	9.13	$15.09

Western Wheatgrass - Rosanna	2.50	6.31	$21.94
Totals Seed Mix	14.00	131.43	**$167.78**

Application

Description	**Cost /Acre**
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	**Units / Acre**	**Unit**	**Cost / Unit**	**Cost /Acre**
Hay, delivered {MEANS 31 25 14.16 1200}	0.60	TON	$492.78	$295.67
Total Mulch Materials Cost/Acre				**$295.67**

Application

Description	**Cost /Acre**
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

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: 37.8 Cost /Acre: $1,241.87
Estimated Failure Rate: 35% Cost /Acre*: $860.83
*Selected Replanting Work Items: TILLING,SEEDING

Initial Job Cost: **$46,942.69**
Reseeding Job Cost: **$11,388.78**
Total Job Cost: **$58,331**
Job Hours: **66.15**

REVEGETATION WORK

Task description: **Phase 1 - Wetland Revegetation**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 007 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-007
User: JR2

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			$	$
			Total Fertilizer Materials Cost/Acre	**$0.00**

Application

Description	Cost /Acre
	$
Total Fertilizer Application Cost/Acre	**$0.00**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Weed control spraying (MEANS 31 31 16.13 3100)	$338.80
Total Tilling Cost/Acre	**$456.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Baltic Rush	0.08	22.48	$15.08
Alkali Bulrush	0.08	0.79	$5.12
Creeping Spike Rush	0.08	1.14	$11.65
Switchgrass - Nebraska 28	0.96	8.57	$10.68
Canada Wildrye	1.20	3.17	$12.28
Softstem Bulrush	0.08	1.01	$9.42
Hardstem Bulrush	0.08	0.74	$12.94
Torrey's Rush	0.08	19.20	$22.15

Three Square Bulrush	0.32	2.20	$48.77
Cordgrass, Prairie	0.68	2.86	$63.14
Nebraska Sedge	0.32	6.70	$46.95
Woolly Sedge	0.04	0.30	$8.54
Mannagrass, Northwest	0.08	0.67	$1.24
Slough Grass	0.96	24.24	$31.98
Totals Seed Mix	5.04	94.07	**$299.94**

Application

Description	**Cost /Acre**
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	**Units / Acre**	**Unit**	**Cost / Unit**	**Cost /Acre**
Hay, delivered {MEANS 31 25 14.16 1200}	0.60	TON	$492.78	$295.67
Total Mulch Materials Cost/Acre				**$295.67**

Application

Description	**Cost /Acre**
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

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: 0.4
Cost /Acre: $1,374.03
Estimated Failure Rate: 35%
Cost /Acre*: $992.99
*Selected Replanting Work Items: TILLING,SEEDING

Initial Job Cost: **$549.61**
Reseeding Job Cost: **$139.02**
Total Job Cost: **$689**
Job Hours: **1.00**

DEMOLITION WORK

Task description: **Phase 2 - Demolition**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 008
Date: 8/12/2024
User: JR2

State: Colorado
County: Pueblo

Abbreviation: None
Filename: M032-008

Agency or organization name: DRMS

UNIT COSTS

Location adjustment: 87.70 %

Structure or Item Description	Dimensions	Demolition Menu Selection	Quantity	Unit	Unit Cost	Total Cost
Remove Conveyor Footings	4 Sections 40'x10'1.5' ea	Footing, concrete, average reinforcing - 1.5 ft. x 3 ft.	533.00	LF	$9.92	$5,289.17

Job Hours: **21.32**

Subtotal (unadjusted): **$5,289.17**

Total Cost (adjusted for location): **$4,638.60**

Slurry Wall

Task description: **Phase 2 – Slurry Wall Construction**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 009

Date: 8/12/2024

User: JR2

State: Colorado

County: Pueblo

Abbreviation: None

Filename: M032-009

Agency or organization name: DRMS

UNIT COSTS

Activity	Quantity	Unit	Unit Cost	Cost
Phase 2 Slurry Wall 11,150 LF, Avg Depth 34 Ft	**379,100**	**SF**	**$6.50**	**$2,464,150**

Job Hours: 150

Total Cost: **$2,464,150**

SCRAPER TEAM WORK

Task description: **Phase 2 - Backfill Slopes 3H:1V**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 010 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-010
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 332,200 CCY Swell factor: 1.125
Loose volume: **373,725** LCY

Source of estimated volume: Operator Estimate
Source 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 LCY   Adjusted Capacity: **29.00** LCY

Cycle Time:

Scraper Loading Time: 0.80 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:

Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	2.00	7.00	962	0.88

Haul Time: **0.88** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.72** minutes
Adjusted for job conditions: 530.96 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,592.87 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,592.87** LCY/Hour

Unadjusted unit production/hour: 639.71 LCY/Hour
Optimal Number of Scrapers per push dozer: ______

JOB TIME AND COST

Fleet size: 1 Team(s)   Total job time: **234.62** Hours

Unit cost: $2.474 /LCY   Total job cost: **$924,728**

BULLDOZER RIPPING WORK

Task description: **Phase 2 - Scarify Ground**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #:	011	State:	Colorado	Abbreviation:	None
Date:	8/12/2024	County:	Pueblo	Filename:	M032-011
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:	$173.32	NA
Operating Cost/Hour:	$109.71	100
Ripper Ownership Cost/Hour:	$14.53	NA
Ripper Operating Cost/Hour:	$7.95	100
Operator Cost/Hour:	$40.04	NA
Total Unit Cost/Hour:	$345.55	

Total Fleet Cost/Hour: **$691.09**

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic:	NA		Bank Volume:	NA	BCY	NA
Area:	23.90	acres	Rip Depth (ft):	15.00	Volume:	578,380 BCY or CCY

Source of estimated quantity: Reclamation Plan

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:	800.00	feet/pass
Average Dozer Speed:	88.00	feet/minute
Average Maneuver Time:	0.25	minutes/pass
Production per unit area:	0.835	acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production:	0.835	Acres/hr
Site Altitude:	4,570	feet
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.83	multiplier
Adjusted Hourly Unit Production:	0.69	Acres/hr
Adjusted Hourly Fleet Production:	**1.39**	Acres/hr

JOB TIME AND COST

Fleet size:	2	Grader(s)	Total job time:	**17.24**	Hours
Unit cost:	$498.466	Per acre	Total job cost:	**$11,913**	

SCRAPER TEAM WORK

Task description: **Phase 2 - Spread 6" Topsoil**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 012 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-012
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 19,279 CCY Swell factor: 1.215
Loose volume: **23,424** LCY

Source of estimated volume: Operator Estimate
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 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:
Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	2.00	7.00	962	0.87

Haul Time: **0.87** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.71** minutes
Adjusted for job conditions: 532.92 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,598.75 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,598.75** LCY/Hour

Unadjusted unit production/hour: 642.07 LCY/Hour
Optimal Number of Scrapers per push dozer: ____

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **14.65** Hours

Unit cost: $2.465 /LCY Total job cost: **$57,746**

REVEGETATION WORK

Task description: **Phase 2 - Upland Revegetation**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 013 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-013
User: JR2

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			$	$
			Total Fertilizer Materials Cost/Acre	**$0.00**

Application

Description	Cost /Acre
	$
Total Fertilizer Application Cost/Acre	**$0.00**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Weed control spraying (MEANS 31 31 16.13 3100)	$338.80
Total Tilling Cost/Acre	**$456.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Blue Grama - Lovington	1.50	24.48	$41.63
Alkaligrass, Fult's	1.25	34.44	$9.18
Switchgrass - Nebraska 28	1.00	8.93	$11.13
Sand Dropseed	0.25	29.84	$3.25
Sideoats Grama - Butte	2.25	7.39	$54.35
Smooth Brome - Lincoln	2.00	6.66	$9.71
Ryegrass, Perennial - Forage-Fusta	0.75	4.25	$1.49
Slender Wheatgrass - San Luis	2.50	9.13	$15.09

Western Wheatgrass - Rosanna	2.50	6.31	$21.94
Totals Seed Mix	14.00	131.43	**$167.78**

Application

Description	**Cost /Acre**
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	**Units / Acre**	**Unit**	**Cost / Unit**	**Cost /Acre**
Hay, delivered {MEANS 31 25 14.16 1200}	0.60	TON	$492.78	$295.67
Total Mulch Materials Cost/Acre				**$295.67**

Application

Description	**Cost /Acre**
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

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: 22.4 Cost /Acre: $1,241.87
Estimated Failure Rate: 35% Cost /Acre*: $860.83
*Selected Replanting Work Items: TILLING,SEEDING

Initial Job Cost: **$27,817.89**
Reseeding Job Cost: **$6,748.91**
Total Job Cost: **$34,567**
Job Hours: **39.20**

REVEGETATION WORK

Task description: **Phase 2 - Wetland Revegetation**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 014 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-014
User: JR2

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			$	$
			Total Fertilizer Materials Cost/Acre	**$0.00**

Application

Description	Cost /Acre
	$
Total Fertilizer Application Cost/Acre	**$0.00**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Weed control spraying (MEANS 31 31 16.13 3100)	$338.80
Total Tilling Cost/Acre	**$456.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Baltic Rush	0.08	22.48	$15.08
Alkali Bulrush	0.08	0.79	$5.12
Creeping Spike Rush	0.08	1.14	$11.65
Switchgrass - Nebraska 28	0.96	8.57	$10.68
Canada Wildrye	1.20	3.17	$12.28
Softstem Bulrush	0.08	1.01	$9.42
Hardstem Bulrush	0.08	0.74	$12.94
Torrey's Rush	0.08	19.20	$22.15

Three Square Bulrush	0.32	2.20	$48.77
Cordgrass, Prairie	0.68	2.86	$63.14
Nebraska Sedge	0.32	6.70	$46.95
Woolly Sedge	0.04	0.30	$8.54
Mannagrass, Northwest	0.08	0.67	$1.24
Slough Grass	0.96	24.24	$31.98
Totals Seed Mix	5.04	94.07	**$299.94**

Application

Description	**Cost /Acre**
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	**Units / Acre**	**Unit**	**Cost / Unit**	**Cost /Acre**
Hay, delivered {MEANS 31 25 14.16 1200}	0.60	TON	$492.78	$295.67
Total Mulch Materials Cost/Acre				**$295.67**

Application

Description	**Cost /Acre**
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

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: 1.5
Estimated Failure Rate: 35%
*Selected Replanting Work Items: TILLING,SEEDING

Cost /Acre: $1,374.03
Cost /Acre*: $992.99

Initial Job Cost: **$2,061.05**
Reseeding Job Cost: **$521.32**
Total Job Cost: **$2,582**
Job Hours: **2.60**

Slurry Wall

Task description: **Phase 3 – Slurry Wall Construction**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 015
Date: 8/12/2024
User: JR2

State: Colorado
County: Pueblo

Abbreviation: None
Filename: M032-015

Agency or organization name: DRMS

UNIT COSTS

Activity	Quantity	Unit	Unit Cost	Cost
Phase 3 Slurry Wall 6,192 LF, Avg Depth 32 Ft	**198,144**	**SF**	**$6.50**	**$1,287,936**

Job Hours: 75

Total Cost: **$1,287,936**

SCRAPER TEAM WORK

Task description: **Phase 3 - Backfill Slopes 3H:1V**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 016 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-016
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 213,900 CCY Swell factor: 1.125
Loose volume: **240,638** LCY

Source of estimated volume: Operator Estimate
Source 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 LCY Adjusted Capacity: **29.00** LCY

Cycle Time:

Scraper Loading Time: 0.80 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:

Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	**Haul Distance (Ft)**	**Grade (%)**	**Roll. Res (%)**	**Total Res (%)**	**Velocity (fpm)**	**Travel Time (min)**
1	800.00	5.00	2.00	7.00	962	0.88

Haul Time: **0.88** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.72** minutes
Adjusted for job conditions: 530.96 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,592.87 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,592.87** LCY/Hour

Unadjusted unit production/hour: 639.71 LCY/Hour
Optimal Number of Scrapers per push dozer: ____________

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **151.07** Hours

Unit cost: $2.474 /LCY Total job cost: **$595,423**

BULLDOZER RIPPING WORK

Task description: **Phase 3 - Scarify Ground**

Site: **Thunderbird Sand and Gravel**   Permit Action: New Application   Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #:	017	State:	Colorado	Abbreviation:	None
Date:	8/12/2024	County:	Pueblo	Filename:	M032-017
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:	$173.32	NA
Operating Cost/Hour:	$109.71	100
Ripper Ownership Cost/Hour:	$14.53	NA
Ripper Operating Cost/Hour:	$7.95	100
Operator Cost/Hour:	$40.04	NA
Total Unit Cost/Hour:	$345.55	

Total Fleet Cost/Hour: **$691.09**

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic:	NA		Bank Volume:	NA	BCY	NA	
Area:	10.30	acres	Rip Depth (ft):	1.50	Volume:	24,926	BCY or CCY

Source of estimated quantity: Reclamation Plan

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:	800.00	feet/pass
Average Dozer Speed:	88.00	feet/minute
Average Maneuver Time:	0.25	minutes/pass
Production per unit area:	0.835	acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production:	0.835	Acres/hr
Site Altitude:	4,570	feet
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.83	multiplier
Adjusted Hourly Unit Production:	0.69	Acres/hr
Adjusted Hourly Fleet Production:	**1.39**	Acres/hr

JOB TIME AND COST

Fleet size:	2	Grader(s)	Total job time:	**7.43**	Hours
Unit cost:	$498.466	Per acre	Total job cost:	**$5,134**	

SCRAPER TEAM WORK

Task description: **Phase 3 - Spread 6" Topsoil**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 018 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-018
User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 631G
-Dozer:	Cat D8T - 8SU
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	Cat D8T - 8SU
Road Maintenance –Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	100	100	100	50
Ownership cost/hour:	$442.19	$173.32	$173.32	$173.32	$179.39	$17.11
Operating cost/hour:	$252.89	$109.71	$109.71	$109.71	$119.64	$18.40
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Ripper op. cost/hour:	NA	$0.00	$0.00	$0.00	$0.00	$0.00
Operator cost/hour:	$57.52	$40.04	$40.04	$40.04	$56.70	$0.00
Unit Subtotals:	$752.60	$323.07	$323.07	$323.07	$355.73	$35.51
Number of Units:	3	2	1	1	1	1
Group Subtotals:	Work:	$2,903.94	Support:	$646.14	Maint:	$391.24

Total work team cost/hour: **$3,941.32**

MATERIAL QUANTITIES

Initial volume: 8,308 CCY Swell factor: 1.215
Loose volume: **10,094** LCY

Source of estimated volume: Operator Estimate
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 Minutes
Maneuver and Spread Time: 0.70 Minutes

Job Condition Correction: Site Altitude: 4570 feet

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

Travel Time:
Road Condition: Hard, smooth, stabilized, surfaced, watered, maintained 2.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	5.00	2.00	7.00	962	0.87

Haul Time: **0.87** minutes

Return Route:

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

Return Time: **0.34** minutes

Total Scraper team cycle time: **2.71** minutes
Adjusted for job conditions: 532.92 LCY/Hour
Selected Number of Scrapers: 3 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,598.75 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,598.75** LCY/Hour

Unadjusted unit production/hour: 642.07 LCY/Hour
Optimal Number of Scrapers per push dozer: ____________

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **6.31** Hours

Unit cost: $2.465 /LCY Total job cost: **$24,885**

REVEGETATION WORK

Task description: **Phase 3 - Upland Revegetation**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 019 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-019
User: JR2

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			$	$
			Total Fertilizer Materials Cost/Acre	**$0.00**

Application

Description	Cost /Acre
	$
Total Fertilizer Application Cost/Acre	**$0.00**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Weed control spraying (MEANS 31 31 16.13 3100)	$338.80
Total Tilling Cost/Acre	**$456.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Blue Grama - Lovington	1.50	24.48	$41.63
Alkaligrass, Fult's	1.25	34.44	$9.18
Switchgrass - Nebraska 28	1.00	8.93	$11.13
Sand Dropseed	0.25	29.84	$3.25
Sideoats Grama - Butte	2.25	7.39	$54.35
Smooth Brome - Lincoln	2.00	6.66	$9.71
Ryegrass, Perennial - Forage-Fusta	0.75	4.25	$1.49
Slender Wheatgrass - San Luis	2.50	9.13	$15.09

Western Wheatgrass - Rosanna	2.50	6.31	$21.94
Totals Seed Mix	14.00	131.43	**$167.78**

Application

Description	Cost /Acre
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Hay, delivered {MEANS 31 25 14.16 1200}	0.60	TON	$492.78	$295.67
Total Mulch Materials Cost/Acre				**$295.67**

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

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: 9.6
Estimated Failure Rate: 35%
*Selected Replanting Work Items: TILLING,SEEDING

Cost /Acre: $1,241.87
Cost /Acre*: $860.83

Initial Job Cost: **$11,921.95**
Reseeding Job Cost: **$2,892.39**
Total Job Cost: **$14,814**
Job Hours: **16.80**

REVEGETATION WORK

Task description: **Phase 3 - Wetland Revegetation**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 020 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-020
User: JR2

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			$	$
			Total Fertilizer Materials Cost/Acre	**$0.00**

Application

Description	Cost /Acre
	$
Total Fertilizer Application Cost/Acre	**$0.00**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Weed control spraying (MEANS 31 31 16.13 3100)	$338.80
Total Tilling Cost/Acre	**$456.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Baltic Rush	0.08	22.48	$15.08
Alkali Bulrush	0.08	0.79	$5.12
Creeping Spike Rush	0.08	1.14	$11.65
Switchgrass - Nebraska 28	0.96	8.57	$10.68
Canada Wildrye	1.20	3.17	$12.28
Softstem Bulrush	0.08	1.01	$9.42
Hardstem Bulrush	0.08	0.74	$12.94
Torrey's Rush	0.08	19.20	$22.15

Three Square Bulrush	0.32	2.20	$48.77
Cordgrass, Prairie	0.68	2.86	$63.14
Nebraska Sedge	0.32	6.70	$46.95
Woolly Sedge	0.04	0.30	$8.54
Mannagrass, Northwest	0.08	0.67	$1.24
Slough Grass	0.96	24.24	$31.98
Totals Seed Mix	5.04	94.07	**$299.94**

Application

Description	Cost /Acre
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Hay, delivered {MEANS 31 25 14.16 1200}	0.60	TON	$492.78	$295.67
Total Mulch Materials Cost/Acre				**$295.67**

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

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: 0.7
Estimated Failure Rate: 35%
*Selected Replanting Work Items: TILLING,SEEDING

Cost /Acre: $1,374.03
Cost /Acre*: $992.99

Initial Job Cost: **$961.82**
Reseeding Job Cost: **$243.28**
Total Job Cost: **$1,205**
Job Hours: **1.15**

BOREHOLE SEALING WORK

Task description: **Plug and Abandon Monitoring Wells**

Site: **Thunderbird Sand and Gravel**

Permit Action: New Application

Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 021

Date: 8/12/2024

User: JR2

State: Colorado

County: Pueblo

Abbreviation: None

Filename: M032-021

Agency or organization name: DRMS

UNIT COSTS

Borehole Description	Sealing/Item Method	Diameter	Length	Quantity	Unit	Unit Cost	Total Cost
Plug and abandon 6 monitoring wells	Portland cement grout (Bag, material cost only...94 lb. bag)	4	30	13.00	bag	$22.00	$286.00
Drill Rig	SCHRAMM T450WS	NA	NA	1.90	EA	$569.63	$1,082.30
Crew Truck + Water Tank	Light Duty Pickup, 4x4, 1 T. Crew	NA	NA	1.90	EA	$52.83	$100.38
Borehole Marker	Borehole location/identification marker (EA, material cost only)	NA	NA	6.00	EA	$46.00	$276.00

Job Hours: **1.90**

Total Cost: **$1,745.00**

EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: **Mob/Demob**

Site: **Thunderbird Sand and Gravel** Permit Action: New Application Permit/Job#: M2023032

PROJECT IDENTIFICATION

Task #: 022 State: Colorado Abbreviation: None
Date: 8/12/2024 County: Pueblo Filename: M032-022
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:	$10.44	$22.18	$23.94
Operating Cost/Hour:	$26.48	$54.55	$55.65
Operator Cost/Hour:	$22.52	$22.52	$22.52
Helper Cost/Hour:	$0.00	$23.53	$23.53
Total Unit Cost/Hour:	$59.44	$122.78	$125.64

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 631G	52.50	$442.19	$125.64	3	$1,703.49	$376.92	$750.00
Cat D8T - 8SU	47.71	$173.32	$122.78	2	$592.20	$245.56	$500.00
CAT 16M	28.73	$179.39	$122.78	1	$302.17	$122.78	$250.00
Water Tanker, 3,500 Gal.	6.25	$17.11	$59.44	1	$76.55	$59.44	$250.00
Drill/Broadcast Seeder with Tractor	25.00	$41.02	$59.44	2	$200.92	$118.88	$250.00
SCHRAMM T450WS	0.00	$281.20	$59.44	1	$340.64	$59.44	$250.00
Cat 320D L 9'-6" Stick	23.70	$244.29	$59.44	1	$303.73	$59.44	$250.00
Cat 315D L 8'-6" Stick	19.05	$244.29	$59.44	1	$303.73	$59.44	$250.00
CAT 963D	22.29	$83.68	$59.44	1	$143.12	$59.44	$250.00
Grove RT890E, 142', 81.60 MT	54.55	$222.11	$125.64	1	$347.75	$125.64	$250.00
Power Mulcher (Bowie LD-90)	6.00	$27.21	$59.44	2	$173.30	$118.88	$500.00
				Subtotals:	**$4,487.60**	**$1,405.86**	**$3,750.00**

ROADABLE EQUIPMENT:

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Light Duty Pickup, 4x4, 1 T. Crew	$24.60	2	$49.20	$49.20
Generic 10-12 cy, 6x4	$107.70	2	$215.40	$215.40
		Subtotals:	**$264.60**	**$264.60**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region:	PUEBLO	
Total one-way travel distance:	12.00	miles
Average Travel Speed:	45.00	mph
Total Non-Roadable Mob/Demob Cost * ‘* two round trips with haul rig:	$13,335.74	
Total Roadable Mob/Demob Cost ** ** one round trip, no haul rig:	$141.12	

Transportation Cycle Time:

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.27	0.27
Return Time (Hours):	0.27	0.27
Loading Time (Hours):	0.15	NA
Unloading Time (Hours):	0.15	NA
Subtotals:	0.83	0.53

JOB TIME AND COST

Total job time:	**1.67**	Hours
Total job cost:	**$13,477**	