



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

December 14, 2020

Jeremy Deuto  
Aggregate Industries – WCR, Inc.  
1687 Cole Blvd.  
Golden, CO 80401

**RE: Lyons Quarry, Permit No. M-1977-141, Technical Revision No. 4 (TR-04), Adequacy Review No. 2, Bond Estimate**

Mr. Deuto:

The Division of Reclamation, Mining and Safety (Division) has completed its adequacy review of your response submitted on December 2, 2020 for Technical Revision No. 4 (TR-04). The Division has calculated a reclamation bond (see enclosed estimate) for the reclamation plan proposed for Reclamation Area 2 in TR-04.

Please review the enclosed estimate and submit any comments at your earliest convenience. If the Division receives no comments from you by the TR-04 decision date of **December 16, 2020**, and no extension has been requested by that time, TR-04 will be approved and a notice of surety increase will be issued to you in the amount of \$540,577.00. You will have 60 days from the date of the notice to post the additional required financial warranty.

If you have any questions, you may contact me by telephone at (303) 866-3567, ext. 8129, or by email at [amy.eschberger@state.co.us](mailto:amy.eschberger@state.co.us).

Sincerely,

Amy Eschberger  
Environmental Protection Specialist

Encl: Division's bond estimate

Cc: Chance Allen, Aggregate Industries - WCR, Inc.  
Michael Cunningham, DRMS



## COST SUMMARY WORK

Task description: Cost Summary

Site: Lyons Quarry

Permit Action: TR-4 2020

Permit/Job#: M1977141

### PROJECT IDENTIFICATION

Task #: 000

State: Colorado

Abbreviation: None

Date: 12/11/2020

County: Boulder

Filename: M141-000

User: AME

Agency or organization name: DRMS

### TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Project safety plan	NA	0	8.00	\$8,316
002	Erosion control	NA	0	8.00	\$41,582
003	Site survey	NA	0	8.00	\$12,475
004	Debris removal (10 tons/load) 5 loads x \$1,600 load	NA	1	8.00	\$8,000
005	Excavate/transport material from LQRA2 to Quarry 2	TRUCK1	1	10.66	\$9,859
006	Excavate/transport material from LQRA3 to Quarry 2	TRUCK1	1	22.07	\$23,349
007	Excavate/transport material from LQRA4 to Quarry 2	TRUCK1	1	41.84	\$44,266
008	Excavate/transport material from LQRA5 to Quarry 2	TRUCK1	1	22.39	\$23,684
009	Transport soil riprap to LQRA4	LOADER	1	116.27	\$15,354
010	Backfill LQRA4 below grade with soil riprap	EXCAVATE	1	19.76	\$2,994
011	Transport soil riprap to LQRA5	LOADER	1	50.22	\$6,632
012	Backfill LQRA5 below grade with soil riprap	EXCAVATE	1	7.50	\$1,137
013	Place (Type M) riprap adjacent to creek channel	EXCAVATE	1	0.67	\$102
014	Final grading	DOZER	2	11.50	\$4,282
015	Soil test plots	NA	0	16.00	\$50,600
016	Replace topsoil on LQRA2	SCRAPER1	1	0.44	\$327
017	Replace topsoil on LQRA3	SCRAPER1	1	1.88	\$1,389
018	Replace topsoil on LQRA4	SCRAPER1	1	4.74	\$3,506
019	Replace topsoil on LQRA5	SCRAPER1	1	2.24	\$1,658
020	Import 2,260 cy topsoil	NA	1	8.00	\$41,160
021	Revegetate 5 acres (flatter slopes)	REVEGE	1	10.00	\$16,052
022	Revegetate 0.15 acres (steeper slopes)	REVEGE	1	10.00	\$482
023	Mobilization/Demobilization	MOBILIZE	1	29.68	\$96,099
<b><u>SUBTOTALS:</u></b>				<b>417.86</b>	<b>\$413,305</b>

### INDIRECT COSTS

#### OVERHEAD AND PROFIT:

Liability insurance: 2.02  
Performance bond: 1.05  
Job superintendent: 190.00  
Profit: 10.00

Total = \$8,349

Total = \$4,340

Total = \$13,214

Total = \$41,330

TOTAL O & P =	<u>\$67,233</u>
CONTRACT AMOUNT (direct + O & P) =	<u>\$480,538</u>

## LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	<u>\$500</u>	Total =	<u>\$500</u>
Engineering work and/or contract/bid preparation:	<u>7.39</u>	Total =	<u>\$35,512</u>
Reclamation management and/or administration:	<u>5.00</u>		<u>\$24,027</u>

CONTINGENCY:	0.00	Total =	<u>\$0</u>
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TOTAL INDIRECT COST =	<u>\$127,272</u>
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<b>TOTAL BOND AMOUNT (direct + indirect) =</b>	<b><u>\$540,577</u></b>
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**TRUCK/LOADER TEAM WORK**Task description: Excavate/transport material from LQRA2 to Quarry 2Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 005State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-005User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Cat 730
-Loader:	CAT 966H
Support Equipment -Load Area:	NA
-Dump Area:	Cat D7R DS XR Series II
Road Maintenance -Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

**Cost Breakdown:****Truck/Loader Team****Support Equipment****Maintenance Equipment**

	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
% Utilization-machine:	100	100	NA	100	100	100
Ownership cost/hour:	\$58.32	\$42.87	NA	\$74.64	\$55.79	\$14.71
Operating cost/hour:	\$49.78	\$53.22	NA	\$71.55	\$60.08	\$30.58
% Utilization-ripper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Operator cost/hour:	\$24.82	\$35.97	NA	\$40.04	\$46.87	\$0.00
Unit Subtotals:	\$132.93	\$132.05	NA	\$186.22	\$162.74	\$45.29
Number of Units:	3	1	0	1	1	1
Group Subtotals:	Work: \$530.84		Support: \$186.22		Maint: \$208.03	

Total work team cost/hour: \$925.09**MATERIAL QUANTITIES**Initial volume: 2,130

CCY

Swell factor: 1.125Loose volume: 2,396

LCY

Source of estimated volume: TR-4Source of estimated swell factor: Cat HandbookMaterial Purchase Cost: \$0.00Total Cost: \$0.00**HOURLY PRODUCTION****Truck Capacity:**Truck Payload (weight) Basis:Material weight: 2,650

Pounds/LCY

Description: Decomposed rock - 25% Rock, 75% EarthRated Payload: 62,000

Pounds

Payload Capacity: 23.40

LCY

**Truck Bed (volume) Basis:**

Struck Volume:	17.10	LCY
Heaped Volume:	22.10	LCY
Average Volume:	19.60	LCY
Adjusted Volume:	22.10	LCY

Final Truck Volume Based on Number of Loader Passes: 22.00 LCY

**Loading Tool Capacity**

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.100	Other - rock/dirt mixtures (100-120%) 1.100
Adjusted Capacity:	<b>5.500</b>	LCY

**Job Condition Corrections:**

Site Altitude (ft.): 5500 feet

	<b>Truck</b>	<b>Loader</b>	<b>Source</b>
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	<b>0.830</b>	<b>0.830</b>	

**Loading Tool Cycle Time:** Number of Loading Tool Passes Required to Fill Truck: 4 passes

**Excavators and Front Shovels:**

Machine Cycle Time vs. Job Condition Rating: NA  
 Selected Value within this Basic Rating: NA

Track Loaders – Material Description: \_\_\_\_\_

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Mixed material 0.02	0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders -0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.040	minutes
Adjusted Loader Cycle Time:		<b>0.460</b>	minutes
Net Load Time per Truck:		<b>1.480</b>	minutes

**Truck Cycle Time:**

Truck Exchange Time:	0.60	Minutes	Adjusted for site altitude:	0.600	Minutes
Truck Load Time:	1.480	Minutes	Adjusted for site altitude:	1.480	Minutes
Truck Maneuver and Dump Time:	1.00	Minutes	Adjusted for site altitude:	1.000	Minutes

**Truck Travel (Haul & Return) Time:**  
maintained 3.0

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered,

## Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2900.00	20.00	3.00	23.00	320	9.067

Haul Time: **9.067** minutes

## Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2900.00	-20.00	3.00	-17.00	1225	2.471

Return Time: **2.471** minutesTotal Truck Cycle Time: **14.618** minutes

## Loading Tool unit

Production	<u>634.62</u>	LCY/Hour	Adjusted for job efficiency:	<u>526.73</u>	LCY/Hour
Truck Unit Production	<u>90.30</u>	LCY/Hour	Adjusted for job efficiency:	<u>74.95</u>	LCY/Hour

Optimal No. of Trucks:	<u>7</u>	Truck(s)	Selected Number of Trucks:	<u>3</u>	Truck(s)
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Adjusted hourly truck team production:	<u>224.85</u>	LCY/Hour
Adjusted single truck/loader team production:	<u>224.85</u>	LCY/Hour
Adjusted multiple truck/loader team production:	<b><u>224.85</u></b>	LCY/Hour

**JOB TIME AND COST**

Fleet size:	<u>1</u>	Team(s)	Total job time:	<b><u>10.66</u></b>	Hours
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Unit cost:	<u>\$4.114</u>	/LCY	Total job cost:	<b><u>\$9,859</u></b>
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**TRUCK/LOADER TEAM WORK**Task description: Excavate/transport material from LQRA3 to Quarry 2Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 006State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-006User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Cat 730
-Loader:	CAT 966H
Support Equipment -Load Area:	NA
-Dump Area:	Cat D7R DS XR Series II
Road Maintenance -Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

**Cost Breakdown:****Truck/Loader Team****Support Equipment****Maintenance Equipment**

	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
% Utilization-machine:	100	100	NA	100	100	100
Ownership cost/hour:	\$58.32	\$42.87	NA	\$74.64	\$55.79	\$14.71
Operating cost/hour:	\$49.78	\$53.22	NA	\$71.55	\$60.08	\$30.58
% Utilization-ripper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Operator cost/hour:	\$24.82	\$35.97	NA	\$40.04	\$46.87	\$0.00
Unit Subtotals:	\$132.93	\$132.05	NA	\$186.22	\$162.74	\$45.29
Number of Units:	4	1	0	1	1	1
Group Subtotals:	Work: \$663.77		Support: \$186.22		Maint: \$208.03	

Total work team cost/hour: **\$1,058.02****MATERIAL QUANTITIES**Initial volume: 7,240

CCY

Swell factor: 1.125Loose volume: **8,145**

LCY

Source of estimated volume: TR-4 (9,340 cy total - 2,100 cy topsoil = 7,240 cy)Source of estimated swell factor: Cat HandbookMaterial Purchase Cost: \$0.00Total Cost: \$0.00**HOURLY PRODUCTION****Truck Capacity:**Truck Payload (weight) Basis:Material weight: 2,650

Pounds/LCY

Description: Decomposed rock - 25% Rock, 75% EarthRated Payload: 62,000

Pounds

Payload Capacity: 23.40

LCY

**Truck Bed (volume) Basis:**

Struck Volume:	17.10	LCY
Heaped Volume:	22.10	LCY
Average Volume:	19.60	LCY
Adjusted Volume:	22.10	LCY

Final Truck Volume Based on Number of Loader Passes: 22.00 LCY

**Loading Tool Capacity**

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.100	Other - rock/dirt mixtures (100-120%) 1.100
Adjusted Capacity:	<b>5.500</b>	LCY

**Job Condition Corrections:**

Site Altitude (ft.): 5500 feet

	<b>Truck</b>	<b>Loader</b>	<b>Source</b>
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	<b>0.830</b>	<b>0.830</b>	

**Loading Tool Cycle Time:** Number of Loading Tool Passes Required to Fill Truck: 4 passes

**Excavators and Front Shovels:**

Machine Cycle Time vs. Job Condition Rating: NA  
 Selected Value within this Basic Rating: NA

Track Loaders – Material Description: \_\_\_\_\_

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Mixed material 0.02	0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders -0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.040	minutes
Adjusted Loader Cycle Time:		<b>0.460</b>	minutes
Net Load Time per Truck:		<b>1.480</b>	minutes

**Truck Cycle Time:**

Truck Exchange Time:	0.60	Minutes	Adjusted for site altitude:	0.600	Minutes
Truck Load Time:	1.480	Minutes	Adjusted for site altitude:	1.480	Minutes
Truck Maneuver and Dump Time:	1.00	Minutes	Adjusted for site altitude:	1.000	Minutes

**Truck Travel (Haul & Return) Time:**  
maintained 3.0

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered,



## Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2200.00	20.00	3.00	23.00	320	6.879

Haul Time: **6.879** minutes

## Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2200.00	-20.00	3.00	-17.00	1225	1.915

Return Time: **1.915** minutesTotal Truck Cycle Time: **11.874** minutes

## Loading Tool unit

Production	<u>634.62</u>	LCY/Hour	Adjusted for job efficiency:	<u>526.73</u>	LCY/Hour
Truck Unit Production	<u>111.17</u>	LCY/Hour	Adjusted for job efficiency:	<u>92.27</u>	LCY/Hour

Optimal No. of Trucks:	<u>6</u>	Truck(s)	Selected Number of Trucks:	<u>4</u>	Truck(s)
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Adjusted hourly truck team production:	<u>369.08</u>	LCY/Hour
Adjusted single truck/loader team production:	<u>369.08</u>	LCY/Hour
Adjusted multiple truck/loader team production:	<b><u>369.08</u></b>	LCY/Hour

**JOB TIME AND COST**

Fleet size:	<u>1</u>	Team(s)	Total job time:	<b><u>22.07</u></b>	Hours
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Unit cost:	<u>\$2.867</u>	/LCY	Total job cost:	<b><u>\$23,349</u></b>
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**TRUCK/LOADER TEAM WORK**Task description: Excavate/transport material from LQRA4 to Quarry 2Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 007State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-007User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Shift basis: 1 per day

Equipment Description	
Truck Loader Team -Truck:	Cat 730
-Loader:	CAT 966H
Support Equipment -Load Area:	NA
-Dump Area:	Cat D7R DS XR Series II
Road Maintenance -Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

**Cost Breakdown:****Truck/Loader Team****Support Equipment****Maintenance Equipment**

	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
% Utilization-machine:	100	100	NA	100	100	100
Ownership cost/hour:	\$58.32	\$42.87	NA	\$74.64	\$55.79	\$14.71
Operating cost/hour:	\$49.78	\$53.22	NA	\$71.55	\$60.08	\$30.58
% Utilization-ripper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Operator cost/hour:	\$24.82	\$35.97	NA	\$40.04	\$46.87	\$0.00
Unit Subtotals:	\$132.93	\$132.05	NA	\$186.22	\$162.74	\$45.29
Number of Units:	4	1	0	1	1	1
Group Subtotals:	Work: \$663.77		Support: \$186.22		Maint: \$208.03	

Total work team cost/hour: **\$1,058.02****MATERIAL QUANTITIES**Initial volume: 13,610

CCY

Swell factor: 1.165Loose volume: **15,856**

LCY

Source of estimated volume: TR-4Source of estimated swell factor: Cat HandbookMaterial Purchase Cost: \$0.00Total Cost: \$0.00**HOURLY PRODUCTION****Truck Capacity:**Truck Payload (weight) Basis:Material weight: 2,900 Pounds/LCYDescription: Decomposed rock - 50% Rock, 50% EarthRated Payload: 62,000 PoundsPayload Capacity: 21.38 LCY

**Truck Bed (volume) Basis:**

Struck Volume:	17.10	LCY
Heaped Volume:	22.10	LCY
Average Volume:	19.60	LCY
Adjusted Volume:	21.38	LCY

Final Truck Volume Based on Number of Loader Passes: 16.50 LCY

**Loading Tool Capacity**

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.100	Other - rock/dirt mixtures (100-120%) 1.100
Adjusted Capacity:	<b>5.500</b>	LCY

**Job Condition Corrections:**

Site Altitude (ft.): 5500 feet

	<b>Truck</b>	<b>Loader</b>	<b>Source</b>
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	<b>0.830</b>	<b>0.830</b>	

**Loading Tool Cycle Time:** Number of Loading Tool Passes Required to Fill Truck: 3 passes

**Excavators and Front Shovels:**

Machine Cycle Time vs. Job Condition Rating: NA  
 Selected Value within this Basic Rating: NA

Track Loaders – Material Description: \_\_\_\_\_

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Material up to 1/8" diameter 0.02	0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders -0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.040	minutes
Adjusted Loader Cycle Time:		<b>0.460</b>	minutes
Net Load Time per Truck:		<b>1.020</b>	minutes

**Truck Cycle Time:**

Truck Exchange Time:	0.60	Minutes	Adjusted for site altitude:	0.600	Minutes
Truck Load Time:	1.020	Minutes	Adjusted for site altitude:	1.020	Minutes
Truck Maneuver and Dump Time:	1.00	Minutes	Adjusted for site altitude:	1.000	Minutes

**Truck Travel (Haul & Return) Time:**  
maintained 3.0

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered,

## Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	1500.00	20.00	3.00	23.00	320	4.692

Haul Time: **4.692** minutes

## Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	1500.00	-20.00	3.00	-17.00	1225	1.361

Return Time: **1.361** minutesTotal Truck Cycle Time: **8.673** minutes

Loading Tool unit  
 Production 611.11 LCY/Hour      Adjusted for job efficiency: 507.22 LCY/Hour  
 Truck Unit Production  
114.15 LCY/Hour      Adjusted for job efficiency: 94.74 LCY/Hour  
 Optimal No. of Trucks: 5 Truck(s)      Selected Number of Trucks: 4 Truck(s)

Adjusted hourly truck team production: 378.97 LCY/Hour  
 Adjusted single truck/loader team production: 378.97 LCY/Hour  
 Adjusted multiple truck/loader team production: **378.97** LCY/Hour

**JOB TIME AND COST**Fleet size: 1 Team(s)      Total job time: **41.84** HoursUnit cost: \$2.792 /LCY      Total job cost: **\$44,266**

**TRUCK/LOADER TEAM WORK**Task description: Excavate/transport material from LQRA5 to Quarry 2Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 008State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-008User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Cat 730
-Loader:	CAT 966H
Support Equipment -Load Area:	NA
-Dump Area:	Cat D7R DS XR Series II
Road Maintenance -Motor Grader:	CAT 16M
-Water Truck:	Water Tanker, 3,500 Gal.

**Cost Breakdown:****Truck/Loader Team****Support Equipment****Maintenance Equipment**

	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
% Utilization-machine:	100	100	NA	100	100	100
Ownership cost/hour:	\$58.32	\$42.87	NA	\$74.64	\$55.79	\$14.71
Operating cost/hour:	\$49.78	\$53.22	NA	\$71.55	\$60.08	\$30.58
% Utilization-ripper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Operator cost/hour:	\$24.82	\$35.97	NA	\$40.04	\$46.87	\$0.00
Unit Subtotals:	\$132.93	\$132.05	NA	\$186.22	\$162.74	\$45.29
Number of Units:	4	1	0	1	1	1
Group Subtotals:	Work: \$663.77		Support: \$186.22		Maint: \$208.03	

Total work team cost/hour: **\$1,058.02****MATERIAL QUANTITIES**Initial volume: 5,730

CCY

Swell factor: 1.165Loose volume: **6,675**

LCY

Source of estimated volume: TR-4Source of estimated swell factor: Cat HandbookMaterial Purchase Cost: \$0.00Total Cost: \$0.00**HOURLY PRODUCTION****Truck Capacity:**Truck Payload (weight) Basis:Material weight: 2,900

Pounds/LCY

Description: Decomposed rock - 50% Rock, 50% EarthRated Payload: 62,000

Pounds

Payload Capacity: 21.38

LCY

Truck Bed (volume) Basis:

Struck Volume:	17.10	LCY
Heaped Volume:	22.10	LCY
Average Volume:	19.60	LCY
Adjusted Volume:	21.38	LCY

Final Truck Volume Based on Number of Loader Passes: 16.50 LCY

Loading Tool Capacity

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.100	Other - rock/dirt mixtures (100-120%) 1.100
Adjusted Capacity:	<b>5.500</b>	LCY

Job Condition Corrections:

Site Altitude (ft.): 5500 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	<b>0.830</b>	<b>0.830</b>	

Loading Tool Cycle Time: Number of Loading Tool Passes Required to Fill Truck: 3 passes

Excavators and Front Shovels:

Machine Cycle Time vs. Job Condition Rating: NA  
 Selected Value within this Basic Rating: NA

Track Loaders – Material Description: \_\_\_\_\_

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Material up to 1/8" diameter 0.02	0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders -0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.040	minutes
Adjusted Loader Cycle Time:		<b>0.460</b>	minutes
Net Load Time per Truck:		<b>1.020</b>	minutes

Truck Cycle Time:

Truck Exchange Time:	0.60	Minutes	Adjusted for site altitude:	0.600	Minutes
Truck Load Time:	1.020	Minutes	Adjusted for site altitude:	1.020	Minutes
Truck Maneuver and Dump Time:	1.00	Minutes	Adjusted for site altitude:	1.000	Minutes

Truck Travel (Haul & Return) Time:  
maintained 3.0

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered.

## Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2100.00	20.00	3.00	23.00	320	6.567

Haul Time: **6.567** minutes

## Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2100.00	-20.00	3.00	-17.00	1225	1.835

Return Time: **1.835** minutesTotal Truck Cycle Time: **11.022** minutes

## Loading Tool unit

Production	<u>611.11</u>	LCY/Hour	Adjusted for job efficiency:	<u>507.22</u>	LCY/Hour
Truck Unit Production	<u>89.82</u>	LCY/Hour	Adjusted for job efficiency:	<u>74.55</u>	LCY/Hour

Optimal No. of Trucks:	<u>7</u>	Truck(s)	Selected Number of Trucks:	<u>4</u>	Truck(s)
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Adjusted hourly truck team production:	<u>298.20</u>	LCY/Hour
Adjusted single truck/loader team production:	<u>298.20</u>	LCY/Hour
Adjusted multiple truck/loader team production:	<b><u>298.20</u></b>	LCY/Hour

**JOB TIME AND COST**

Fleet size:	<u>1</u>	Team(s)	Total job time:	<b><u>22.39</u></b>	Hours
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Unit cost:	<u>\$3.548</u>	/LCY	Total job cost:	<b><u>\$23,684</u></b>
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**WHEEL LOADER – LOAD AND CARRY WORK**Task description: Transport soil riprap to LQRA4Site: Lyons Quarry Permit Action: TR-4 2020 Permit/Job#: M1977141**PROJECT IDENTIFICATION**

Task #: 009 State: Colorado Abbreviation: None  
 Date: 12/11/2020 County: Boulder Filename: M141-009  
 User: AME

Agency or organization name: DRMS**HOURLY EQUIPMENT COST**

Basic Machine: CAT 966H Horsepower: 262  
 Attachment 1: ROPS Cab Shift Basis: 1 per day  
 Data Source: (CRG)

**Cost Breakdown:**

		Utilization %
Ownership Cost/Hour:	\$42.87	NA
Operating Cost/Hour:	\$53.22	100
Operator Cost/Hour:	\$35.97	NA
Total Unit Cost/Hour:	\$132.05	
Total Fleet Cost/Hour:	\$132.05	

**MATERIAL QUANTITIES**

Initial volume: 11,597 CCY Swell factor: 1.215  
 Loose volume: 14,090 LCY

Source of estimated volume: TR-4 (16,227 cy total - 4,630 LQRA5)  
 Source of estimated swell factor: Cat Handbook

**HOURLY PRODUCTION**Loader Cycle Time: Unadjusted Basic Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Mixed material 0.02	0.020	(Cat HB)
Stockpile:	Conveyor or dozer piled 10 ft. high or less 0.01	0.010	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders -0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.050	minutes
Adjusted Basic Cycle Time:		0.450	minutes

**Rolling Resistance – Road Conditions**

Haul: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0  
 Return: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0

**Haul and Return Time**

	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	1000	3.00	3.00	6.00	0.9928	(Cat HB)
Return Route:	1000	-3.00	3.00	0.00	0.6634	(Cat HB)



Total Travel Time: 1.6562 minutes  
 Total Cycle Time: 2.1062 minutes

Load Bucket Capacity

Rated Capacity: 5.00 LCY (heaped)  
 Bucket Fill Factor: 1.025 Rock - Earth Mixture (100%-105%) 1.025  
 Adjusted Capacity: 5.13 LCY

Job Condition Correction Factors

Site Altitude: 5500 feet

		Source
Altitude Adj:	<u>1.00</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.83</u>	multiplier

Unadjusted Hourly Unit Production: 146.00 LCY/Hour  
 Adjusted Hourly Unit Production: 121.18 LCY/Hour  
 Adjusted Hourly Fleet Production: 121.18 LCY/Hour

JOB TIME AND COST

Fleet size:	<u>1</u>	Loader(s)	Total job time:	<u>116.28</u>	Hours
Unit cost:	<u>\$1.090</u>	/LCY	Total job cost:	<u>\$15,354</u>	

## HYDRAULIC EXCAVATOR WORK

Task description: Backfill LQRA4 below grade with soil riprap

Site: Lyons Quarry

Permit Action: TR-4 2020

Permit/Job#: M1977141

### PROJECT IDENTIFICATION

Task #: 010

State: Colorado

Abbreviation: None

Date: 12/11/2020

County: Boulder

Filename: M141-010

User: AME

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: Cat 324D L 9'-8" Stick

Attachment 1: ROPS Cab

Horsepower: 194

Weight (MT): 24.85

Shift Basis: 1 per day

Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$50.59	NA
Operating Cost/Hour:	\$54.04	100
Operator Cost/Hour:	\$46.87	NA
Total Unit Cost/Hour:	\$151.51	
Total Fleet Cost/Hour:	\$151.51	

### MATERIAL QUANTITIES

Initial volume: 11,597

CCY

Swell factor: 1.000

Loose volume: 11,597

LCY

Source of estimated volume: TR-4 (16,227 cy total - 4,630 cy LQRA5)

Source of estimated swell factor: Cat Handbook

### HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: EXCELLENT

Secondary Job Condition within Basic Description: EXCELLENT

Cycle Time Value: 0.187 minutes

#### Load Bucket Capacity

Bucket Size Class: Medium

Rated Capacity: 2.26 LCY (heaped)

Bucket Fill Factor: 0.975 Sand and gravel (95% - 100%) 0.975

Adjusted Capacity: 2.20 LCY

#### Job Condition Correction Factors

Site Altitude: 5500 feet

		Source
Altitude Adj:	<u>1.00</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.83</u>	multiplier

Unadjusted Hourly Unit Production: 707.01 LCY/Hour

Adjusted Hourly Unit Production: 586.81 LCY/Hour

Adjusted Hourly Fleet Production: 586.81 LCY/Hour

### JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 19.76 Hours

Unit cost: \$0.258 /LCY Total job cost: \$2,994

**WHEEL LOADER – LOAD AND CARRY WORK**Task description: Transport soil riprap to LQRA5Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 011State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-011User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Basic Machine: CAT 966HAttachment 1: ROPS CabHorsepower: 262Shift Basis: 1 per dayData Source: (CRG)**Cost Breakdown:**

		Utilization %
Ownership Cost/Hour:	\$42.87	NA
Operating Cost/Hour:	\$53.22	100
Operator Cost/Hour:	\$35.97	NA
Total Unit Cost/Hour:	\$132.05	
Total Fleet Cost/Hour:	\$132.05	

**MATERIAL QUANTITIES**Initial volume: 4,630

CCY

Swell factor: 1.000Loose volume: 4,630

LCY

Source of estimated volume: TR-4 (16,227 cy total - 11,597 LQRA4)Source of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Loader Cycle Time: Unadjusted Basic Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Mixed material 0.02	0.020	(Cat HB)
Stockpile:	Conveyor or dozer piled 10 ft. high or less 0.01	0.010	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders -0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.050	minutes
Adjusted Basic Cycle Time:		0.450	minutes

**Rolling Resistance – Road Conditions**Haul: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Return: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0**Haul and Return Time**

	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	1400	3.00	3.00	6.00	1.3899	(Cat HB)
Return Route:	1400	-3.00	3.00	0.00	0.9288	(Cat HB)

Total Travel Time: 2.3187 minutes  
 Total Cycle Time: 2.7687 minutes

Load Bucket Capacity

Rated Capacity:	<u>5.00</u>	LCY (heaped)
Bucket Fill Factor:	<u>1.025</u>	Rock - Earth Mixture (100%-105%) 1.025
Adjusted Capacity:	<u>5.13</u>	LCY

Job Condition Correction FactorsSite Altitude: 5500 feet

		Source
Altitude Adj:	<u>1.00</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.83</u>	multiplier

Unadjusted Hourly Unit Production:	<u>111.06</u>	LCY/Hour
Adjusted Hourly Unit Production:	<u>92.18</u>	LCY/Hour
Adjusted Hourly Fleet Production:	<u>92.18</u>	LCY/Hour

JOB TIME AND COST

Fleet size:	<u>1</u>	Loader(s)	Total job time:	<u>50.23</u>	Hours
Unit cost:	<u>\$1.433</u>	/LCY	Total job cost:	<u>\$6,632</u>	

## HYDRAULIC EXCAVATOR WORK

Task description: Backfill LQRA5 below grade with soil riprap

Site: Lyons Quarry Permit Action: TR-4 2020 Permit/Job#: M1977141

### PROJECT IDENTIFICATION

Task #: 012 State: Colorado Abbreviation: None  
Date: 12/11/2020 County: Boulder Filename: M141-012  
User: AME

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: Cat 324D L 9'-8" Stick Horsepower: 194  
Attachment 1: ROPS Cab Weight (MT): 24.85  
Shift Basis: 1 per day  
Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	<u>\$50.59</u>	<u>NA</u>
Operating Cost/Hour:	<u>\$54.04</u>	<u>100</u>
Operator Cost/Hour:	<u>\$46.87</u>	<u>NA</u>
Total Unit Cost/Hour:	<u>\$151.51</u>	
Total Fleet Cost/Hour:	<u>\$151.51</u>	

### MATERIAL QUANTITIES

Initial volume: 4,630 CCY Swell factor: 1.000  
Loose volume: 4,630 LCY

Source of estimated volume: TR-4 (16,227 cy total - 11,597 cy LQRA5)  
Source of estimated swell factor: Cat Handbook

### HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: EXCELLENT  
Secondary Job Condition within Basic Description: EXCELLENT  
Cycle Time Value: 0.187 minutes

#### Load Bucket Capacity

Rated Capacity: 2.26 LCY (heaped) Bucket Size Class: Medium  
Bucket Fill Factor: 1.025 Rock - Earth Mixture (100%-105%) 1.025  
Adjusted Capacity: 2.32 LCY

#### Job Condition Correction Factors

Site Altitude: 5500 feet

		Source
Altitude Adj:	<u>1.00</u>	<u>(CAT HB)</u>
Job Efficiency:	<u>0.83</u>	<u>(1 shift/day)</u>
Net Correction:	<u>0.83</u>	<u>multiplier</u>

Unadjusted Hourly Unit Production: 743.26 LCY/Hour  
Adjusted Hourly Unit Production: 616.91 LCY/Hour  
Adjusted Hourly Fleet Production: 616.91 LCY/Hour

### JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 7.51 Hours  
Unit cost: \$0.246 /LCY Total job cost: \$1,137

## HYDRAULIC EXCAVATOR WORK

Task description: Place (Type M) riprap adjacent to creek channel

Site: Lyons Quarry

Permit Action: TR-4 2020

Permit/Job#: M1977141

### PROJECT IDENTIFICATION

Task #: 013

State: Colorado

Abbreviation: None

Date: 12/11/2020

County: Boulder

Filename: M141-013

User: AME

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: Cat 324D L 9'-8" Stick

Attachment 1: ROPS Cab

Horsepower: 194

Weight (MT): 24.85

Shift Basis: 1 per day

Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	<u>\$50.59</u>	<u>NA</u>
Operating Cost/Hour:	<u>\$54.04</u>	<u>100</u>
Operator Cost/Hour:	<u>\$46.87</u>	<u>NA</u>
Total Unit Cost/Hour:	<u>\$151.51</u>	
Total Fleet Cost/Hour:	<u>\$151.51</u>	

### MATERIAL QUANTITIES

Initial volume: 405

CCY

Swell factor: 1.000

Loose volume: 405

LCY

Source of estimated volume: TR-4 (0.25 acre x 12 in thick)

Source of estimated swell factor: Cat Handbook

### HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: EXCELLENT

Secondary Job Condition within Basic Description: EXCELLENT

Cycle Time Value: 0.187 minutes

#### Load Bucket Capacity

Bucket Size Class: Medium

Rated Capacity: 2.26 LCY (heaped)

Bucket Fill Factor: 1.000 Rock - Well Blasted (95%-105%) 1.000

Adjusted Capacity: 2.26 LCY

#### Job Condition Correction Factors

Site Altitude: 5500 feet

		Source
Altitude Adj:	<u>1.00</u>	<u>(CAT HB)</u>
Job Efficiency:	<u>0.83</u>	<u>(1 shift/day)</u>
Net Correction:	<u>0.83</u>	<u>multiplier</u>

Unadjusted Hourly Unit Production: 725.13 LCY/Hour

Adjusted Hourly Unit Production: 601.86 LCY/Hour

Adjusted Hourly Fleet Production: 601.86 LCY/Hour

### JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 0.67 Hours

Unit cost: \$0.252 /LCY Total job cost: \$102

**BULLDOZER WORK**Task description: **Final grading**Site: **Lyons Quarry** Permit Action: **TR-4 2020** Permit/Job#: **M1977141****PROJECT IDENTIFICATION**

Task #: **014** State: **Colorado** Abbreviation: **None**  
 Date: **12/11/2020** County: **Boulder** Filename: **M141-014**  
 User: **AME**

Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**

Basic Machine: **Cat D7R DS XR Series II**  
 Horsepower: **240**  
 Blade Type: **Semi-Universal**  
 Attachment: **NA**  
 Shift Basis: **1 per day**  
 Data Source: **(CRG)**

**Cost Breakdown:**

		<u>Utilization %</u>
Ownership Cost/Hour:	\$74.64	NA
Operating Cost/Hour:	\$71.55	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$40.04	NA

Total unit Cost/Hour: **\$186.22**  
 Total Fleet Cost/Hour: **\$372.45**

**MATERIAL QUANTITIES**

Initial Volume: **8,712**  
 Swell factor: **1.000**  
 Loose volume: **8,712 LCY**

Source of estimated volume: **TR-4 (5.4 acres x 1 ft)**  
 Source of estimated swell factor: **Cat Handbook**

**HOURLY PRODUCTION**

Average push distance: **120 feet**  
 Unadjusted hourly production: **622.9 LCY/hr**

Materials consistency description: **Loose stockpile 1.2**

Average push gradient: **0 %**  
 Average site altitude: **5,500 feet**

Material weight: **2,900 lbs/LCY**Weight description: **Decomposed rock - 50% Rock, 50% Earth****Job Condition Correction Factor**

		<u>Source</u>
Operator Skill:	1.000	(EXCL.)
Material consistency:	1.200	(CAT HB)
Dozing method:	1.100	(50% SL)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)

Spoil pile:	0.700	(FND-MF)
Push gradient:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.793	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.6082

Adjusted unit production: 378.85 LCY/hr

Adjusted fleet production: **757.7** LCY/hr

### **JOB TIME AND COST**

Fleet size: 2 Dozer(s)

Unit cost: \$0.492/LCY

Total job time: **11.50** Hours

Total job cost: **\$4,282**



**SCRAPER TEAM WORK**Task description: **Replace topsoil on LQRA2**Site: **Lyons Quarry**Permit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 016State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-016User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D7R DS XR Series II
-Dump Area:	NA
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	NA	100	NA	100	100
Ownership cost/hour:	\$144.75	NA	\$74.64	NA	\$55.79	\$14.71
Operating cost/hour:	\$145.83	NA	\$71.55	NA	\$60.08	\$30.58
%Utilization-ripper:	NA	NA	NA	NA	50	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$4.83	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$2.20	\$0.00
Operator cost/hour:	\$47.07	NA	\$40.04	NA	\$46.87	\$0.00
Unit Subtotals:	\$337.64	NA	\$186.22	NA	\$169.77	\$45.29
Number of Units:	1	0	1	0	1	1
Group Subtotals:	Work: \$337.64		Support: \$186.22		Maint: \$215.06	

Total work team cost/hour: **\$738.92****MATERIAL QUANTITIES**Initial volume: 194

CCY

Swell factor: 1.215Loose volume: **236**

LCY

Source of estimated volume: TR-4 (0.24 ac x 6 in depth)Source of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

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

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

Site Altitude: 5500 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	3.00	3.00	6.00	1069	0.79

Haul Time: 0.79 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	-3.00	3.00	0.00	2937	0.42

Return Time: 0.42 minutesTotal Scraper team cycle time: 2.71 minutesAdjusted for job conditions: 532.92 LCY/HourSelected Number of Scrapers: 1 Scraper(s)Adjusted single scraper team (unit) hourly production: 532.92 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 532.92 LCY/HourUnadjusted 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: 0.44 HoursUnit cost: \$1.387 /LCYTotal job cost: \$327

**SCRAPER TEAM WORK**Task description: **Replace topsoil on LQRA3**Site: **Lyons Quarry**Permit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 017State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-017User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D7R DS XR Series II
-Dump Area:	NA
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	NA	100	NA	100	100
Ownership cost/hour:	\$144.75	NA	\$74.64	NA	\$55.79	\$14.71
Operating cost/hour:	\$145.83	NA	\$71.55	NA	\$60.08	\$30.58
%Utilization-ripper:	NA	NA	NA	NA	50	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$4.83	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$2.20	\$0.00
Operator cost/hour:	\$47.07	NA	\$40.04	NA	\$46.87	\$0.00
Unit Subtotals:	\$337.64	NA	\$186.22	NA	\$169.77	\$45.29
Number of Units:	1	0	1	0	1	1
Group Subtotals:	Work: \$337.64		Support: \$186.22		Maint: \$169.77	\$45.29

Total work team cost/hour: **\$738.92****MATERIAL QUANTITIES**Initial volume: 1,049

CCY

Swell factor: 1.215Loose volume: **1,275**

LCY

Source of estimated volume: TR-4 (1.3 ac x 6 in depth)Source of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

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

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

Site Altitude: 5500 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	350.00	3.00	3.00	6.00	1069	0.37

Haul Time: 0.37 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	350.00	-3.00	3.00	0.00	2937	0.26

Return Time: 0.26 minutesTotal Scraper team cycle time: 2.13 minutesAdjusted for job conditions: 678.03 LCY/HourSelected Number of Scrapers: 1 Scraper(s)Adjusted single scraper team (unit) hourly production: 678.03 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 678.03 LCY/HourUnadjusted unit production/hour: 816.90 LCY/Hour

Optimal Number of Scrapers per push dozer: \_\_\_\_\_

**JOB TIME AND COST**Fleet size: 1 Team(s)Total job time: 1.88 HoursUnit cost: \$1.090 /LCYTotal job cost: \$1,389

**SCRAPER TEAM WORK**Task description: **Replace topsoil on LQRA4**Site: **Lyons Quarry**Permit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 018State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-018User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D7R DS XR Series II
-Dump Area:	NA
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	NA	100	NA	100	100
Ownership cost/hour:	\$144.75	NA	\$74.64	NA	\$55.79	\$14.71
Operating cost/hour:	\$145.83	NA	\$71.55	NA	\$60.08	\$30.58
%Utilization-ripper:	NA	NA	NA	NA	50	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$4.83	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$2.20	\$0.00
Operator cost/hour:	\$47.07	NA	\$40.04	NA	\$46.87	\$0.00
Unit Subtotals:	\$337.64	NA	\$186.22	NA	\$169.77	\$45.29
Number of Units:	1	0	1	0	1	1
Group Subtotals:	Work: \$337.64		Support: \$186.22		Maint: \$169.77	\$45.29

Total work team cost/hour: **\$738.92****MATERIAL QUANTITIES**Initial volume: 2,081

CCY

Swell factor: 1.215Loose volume: **2,528**

LCY

Source of estimated volume: TR-4 (2.58 ac x 6 in depth)Source of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

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

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

Site Altitude: 5500 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	3.00	3.00	6.00	1069	0.79

Haul Time: 0.79 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	-3.00	3.00	0.00	2937	0.42

Return Time: 0.42 minutesTotal Scraper team cycle time: 2.71 minutesAdjusted for job conditions: 532.92 LCY/HourSelected Number of Scrapers: 1 Scraper(s)Adjusted single scraper team (unit) hourly production: 532.92 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 532.92 LCY/HourUnadjusted 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: 4.74 HoursUnit cost: \$1.387 /LCYTotal job cost: \$3,506

**SCRAPER TEAM WORK**Task description: **Replace topsoil on LQRA5**Site: **Lyons Quarry**Permit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 019State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-019User: AMEAgency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 631G
-Dozer:	NA
Support Equipment -Load Area:	Cat D7R DS XR Series II
-Dump Area:	NA
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	NA	100	NA	100	100
Ownership cost/hour:	\$144.75	NA	\$74.64	NA	\$55.79	\$14.71
Operating cost/hour:	\$145.83	NA	\$71.55	NA	\$60.08	\$30.58
%Utilization-ripper:	NA	NA	NA	NA	50	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$4.83	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$2.20	\$0.00
Operator cost/hour:	\$47.07	NA	\$40.04	NA	\$46.87	\$0.00
Unit Subtotals:	\$337.64	NA	\$186.22	NA	\$169.77	\$45.29
Number of Units:	1	0	1	0	1	1
Group Subtotals:	Work: \$337.64		Support: \$186.22		Maint: \$169.77	\$45.29

Total work team cost/hour: **\$738.92****MATERIAL QUANTITIES**Initial volume: 831

CCY

Swell factor: 1.215Loose volume: **1,010**

LCY

Source of estimated volume: TR-4 (1.03 ac x 6 in depth)Source of estimated swell factor: Cat Handbook**HOURLY PRODUCTION****Scraper Bowl (volume) Basis:**

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

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

Site Altitude: 5500 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	1200.00	3.00	3.00	6.00	1069	1.16

Haul Time: 1.16 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	1200.00	-3.00	3.00	0.00	2937	0.55

Return Time: 0.55 minutesTotal Scraper team cycle time: 3.21 minutesAdjusted for job conditions: 449.91 LCY/HourSelected Number of Scrapers: 1 Scraper(s)Adjusted single scraper team (unit) hourly production: 449.91 LCY/HourAdjusted multiple scraper team (fleet) hourly production: 449.91 LCY/HourUnadjusted unit production/hour: 542.06 LCY/Hour

Optimal Number of Scrapers per push dozer: \_\_\_\_\_

**JOB TIME AND COST**Fleet size: 1 Team(s)Total job time: 2.24 HoursUnit cost: \$1.642 /LCYTotal job cost: \$1,658



**REVEGETATION WORK**Task description: Revegetate 5 acres (flatter slopes)Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 021State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-021User: AMEAgency or organization name: DRMS**FERTILIZING****Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Ammonium nitrate, 33-0-0	99.00	pound	\$0.34	\$33.17
Triple superphosphate, 0-46-0	23.00	pound	\$0.43	\$9.78
			<b>Total Fertilizer Materials Cost/Acre</b>	<b>\$42.94</b>

**Application**

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	\$37.03
<b>Total Fertilizer Application Cost/Acre</b>	<b>\$37.03</b>

**TILLING**

Description	Cost /Acre
Subsoil scarification, (MEANS 32 91 13.23 3100)	\$185.57
Weed control spraying (MEANS 31 31 16.13 3100)	\$193.60
<b>Total Tilling Cost/Acre</b>	<b>\$379.17</b>

**SEEDING**

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Switchgrass - Blackwell	0.81	7.23	\$9.32
Aster, Engleman's	0.20	0.95	\$38.80
Blue Grama - Native	0.59	9.63	\$8.10
Canada Wildrye	3.64	9.61	\$39.46
Beeplant, Rocky Mountain	2.12	5.45	\$57.24
Sandberg Bluegrass - VNS	0.38	8.07	\$3.19
Foxtail Barley	4.36	15.01	\$937.40
Slender Wheatgrass - San Luis	2.19	7.99	\$9.31
Thickspike Wheatgrass - Critana	2.26	7.99	\$15.54

Rabbitbrush, Rubber	0.61	9.09	\$39.22
Needlegrass, Green - Lodorm	1.54	6.40	\$18.13
Sage, Fringed	0.03	2.51	\$1.23
<b>Totals Seed Mix</b>	<b>18.73</b>	<b>89.94</b>	<b>\$1,176.93</b>

**Application**

<b>Description</b>	<b>Cost /Acre</b>
Broadcast seeding [DMG]	\$267.22
<b>Total Seed Application Cost/Acre</b>	<b>\$267.22</b>

**MULCHING and MISCELLANEOUS****Materials**

<b>Description</b>	<b>Units / Acre</b>	<b>Unit</b>	<b>Cost / Unit</b>	<b>Cost /Acre</b>
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	\$301.00	\$602.00
<b>Total Mulch Materials Cost/Acre</b>				<b>\$602.00</b>

**Application**

<b>Description</b>	<b>Cost /Acre</b>
Crimping, with tractor {DMG survey data}	\$70.17
<b>Total Mulch Application Cost/Acre</b>	<b>\$70.17</b>

**NURSERY STOCK PLANTING**

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

**JOB TIME AND COST**

No. of Acres: 5 Cost /Acre: \$2,575.46  
 Estimated Failure Rate: 30% Cost /Acre\*: \$2,116.32  
 \*Selected Replanting Work Items: SEEDING,MULCHING  
 Initial Job Cost: \$12,877.30  
 Reseeding Job Cost: \$3,174.48  
 Total Job Cost: \$16,052  
 Job Hours: 10.00

**REVEGETATION WORK**Task description: Revegetate 0.15 acres (steeper slopes)Site: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 022State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-022User: AMEAgency or organization name: DRMS**FERTILIZING****Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Ammonium nitrate, 33-0-0	99.00	pound	\$0.34	\$33.17
Triple superphosphate, 0-46-0	23.00	pound	\$0.43	\$9.78
			<b>Total Fertilizer Materials Cost/Acre</b>	<b>\$42.94</b>

**Application**

Description	Cost /Acre
Push rotary spreader (MEANS 32 01 90.13 0110)	\$104.98
<b>Total Fertilizer Application Cost/Acre</b>	<b>\$104.98</b>

**TILLING**

Description	Cost /Acre
Subsoil scarification, (MEANS 32 91 13.23 3100)	\$185.57
Weed control spraying (MEANS 31 31 16.13 3100)	\$193.60
<b>Total Tilling Cost/Acre</b>	<b>\$379.17</b>

**SEEDING**

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Switchgrass - Blackwell	0.81	7.23	\$9.32
Aster, Engleman's	0.20	0.95	\$38.80
Blue Grama - Native	0.59	9.63	\$8.10
Canada Wildrye	3.64	9.61	\$39.46
Beeplant, Rocky Mountain	2.12	5.45	\$57.24
Sandberg Bluegrass - VNS	0.38	8.07	\$3.19
Foxtail Barley	4.36	15.01	\$937.40
Slender Wheatgrass - San Luis	2.19	7.99	\$9.31
Thickspike Wheatgrass - Critana	2.26	7.99	\$15.54

Rabbitbrush, Rubber	0.61	9.09	\$39.22
Needlegrass, Green - Lodorm	1.54	6.40	\$18.13
Sage, Fringed	0.03	2.51	\$1.23
<b>Totals Seed Mix</b>	<b>18.73</b>	<b>89.94</b>	<b>\$1,176.93</b>

**Application**

<b>Description</b>	<b>Cost /Acre</b>
Broadcast seeding [DMG]	\$267.22
<b>Total Seed Application Cost/Acre</b>	<b>\$267.22</b>

**MULCHING and MISCELLANEOUS****Materials**

<b>Description</b>	<b>Units / Acre</b>	<b>Unit</b>	<b>Cost / Unit</b>	<b>Cost /Acre</b>
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	\$301.00	\$602.00
<b>Total Mulch Materials Cost/Acre</b>				<b>\$602.00</b>

**Application**

<b>Description</b>	<b>Cost /Acre</b>
Jute mesh #2 (MEANS 31 25 14.16 0300)	\$1,984.40
<b>Total Mulch Application Cost/Acre</b>	<b>\$1,984.40</b>

**NURSERY STOCK PLANTING**

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

**JOB TIME AND COST**

No. of Acres: 0.15 Cost /Acre: \$4,557.64  
 Estimated Failure Rate: 30% Cost /Acre\*: \$4,030.55  
 \*Selected Replanting Work Items: SEEDING,MULCHING  
 Initial Job Cost: **\$683.65**  
 Reseeding Job Cost: **\$181.37**  
 Total Job Cost: **\$865**  
 Job Hours: **10.00**

**EQUIPMENT MOBILIZATION/DEMOBILIZATION**Task description: Mobilization/DemobilizationSite: Lyons QuarryPermit Action: TR-4 2020Permit/Job#: M1977141**PROJECT IDENTIFICATION**Task #: 023State: ColoradoAbbreviation: NoneDate: 12/11/2020County: BoulderFilename: M141-023User: AMEAgency or organization name: DRMS**EQUIPMENT TRANSPORT RIG COST**Shift basis: 1 per dayCost Data Source: CRG DataTruck 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:**

<b>Available Rig Capacities</b>	<b>0-25 Tons</b>	<b>26-50 Tons</b>	<b>51+ Tons</b>
Ownership Cost/Hour:	\$17.20	\$29.63	\$38.69
Operating Cost/Hour:	\$26.56	\$47.02	\$55.69
Operator Cost/Hour:	\$23.63	\$23.63	\$23.63
Helper Cost/Hour:	\$0.00	\$23.53	\$23.53
Total Unit Cost/Hour:	\$67.39	\$123.81	\$141.54

**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 966H	25.80	\$42.87	\$67.39	2	\$220.52	\$134.78	\$1,000.00
Cat D7R DS XR Series II	32.01	\$74.64	\$123.81	4	\$793.80	\$495.24	\$1,000.00
CAT 16M	28.73	\$60.62	\$123.81	2	\$368.86	\$247.62	\$1,000.00
Cat 324D L 9'-8" Stick	27.33	\$50.59	\$123.81	2	\$348.80	\$247.62	\$500.00
Cat 631G	52.50	\$144.75	\$141.54	2	\$572.58	\$283.08	\$500.00
Drill/Broadcast Seeder with Tractor	25.00	\$6.72	\$67.39	1	\$74.11	\$67.39	\$250.00
Cat 730	25.19	\$58.32	\$67.39	4	\$502.84	\$269.56	\$2,000.00

Subtotals: **\$2,881.51** **\$1,745.29** **\$6,250.00****ROADABLE EQUIPMENT:**

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Water Tanker, 3,500 Gal.	\$45.29	2	\$90.58	\$90.58

Subtotals: **\$90.58** **\$90.58**

**EQUIPMENT HAUL DISTANCE and Time**

Nearest Major City or Town within project area region:	<u>FORT COLLINS</u>	
Total one-way travel distance:	<u>46.00</u>	miles
Average Travel Speed:	<u>50.00</u>	mph

Total Non-Roadable Mob/Demob Cost *	<u>\$95,932.57</u>
'* two round trips with haul rig:	
Total Roadable Mob/Demob Cost **	<u>\$166.67</u>
** one round trip, no haul rig:	

**Transportation Cycle Time:**

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.92	0.92
Return Time (Hours):	0.92	0.92
Loading Time (Hours):	6.50	NA
Unloading Time (Hours):	6.50	NA
Subtotals:	14.84	1.84

**JOB TIME AND COST**

Total job time:	<u>29.68</u>	Hours
Total job cost:	<u>\$96,099</u>	