

## COST SUMMARY WORK

Task description: Cost Summary

Site: Goodrich Pit Permit Action: 112c Application Permit/Job#: M2019005

### PROJECT IDENTIFICATION

Task #: 000 State: Colorado Abbreviation: None  
Date: 2/21/2019 County: Las Animas Filename: M005-000  
User: JLE

Agency or organization name: DRMS

### TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Drill and Blast Highwall	BLASTING	1	54.54	\$23,751.00
001b	Grade blasted highwall material to 3H:1V slope.	DOZER	1	6.44	\$1,408.00
002	Rip the affected land	RIPPER	2	56.71	\$25,544.00
003	Spread topsoil	LOADER	2	189.27	\$47,762.00
004	Revegetation	REVEGE	1	80.00	\$102,838.00
005	Mobilization	MOBILIZE	1	9.32	\$15,145.00
<b><u>SUBTOTALS:</u></b>				<b>396.28</b>	<b>\$216,448</b>

### INDIRECT COSTS

#### OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	\$4,372.25
Performance bond:	1.05	Total =	\$2,272.70
Job superintendent:	198.14	Total =	\$14,474.13
Profit:	10.00	Total =	\$21,644.80
		TOTAL O & P =	\$42,763.88
		CONTRACT AMOUNT (direct + O & P) =	\$259,211.88

#### LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	0.00	Total =	0.00
Engineering work and/or contract/bid preparation:	4.25	Total =	\$11,016.50
Reclamation management and/or administration:	5.00		\$12,960.59
CONTINGENCY:	0.00	Total =	\$0.00

TOTAL INDIRECT COST = \$66,740.98

**TOTAL BOND AMOUNT (direct + indirect) = \$283,188.98**

## SURFACE BLASTING WORK

Task description: **Drill and Blast Highwall**

Site: **Goodrich Pit** Permit Action: **112c Application** Permit/Job#: **M2019005**

### PROJECT IDENTIFICATION

Task #: **001** State: **Colorado** Abbreviation: **None**  
Date: **2/21/2019** County: **Las Animas** Filename: **M005-001**  
User: **JLE**

Agency or organization name: **DRMS**

### BLAST AREA DIMENSIONS

	QUANTITY	UNIT
Blast Area Configuration:	Wedge-shaped mass (highwall reduction using balanced cut/fill)	
Blasting Method Description:	Cast blast (fragmentation + lateral movement)	
Highwall or Bench Face Angle:	0.75	h:1v
Regraded Slope Angle:	3.00	h:1v
Highwall or Bench Length:	1,200	feet
Highwall or Bench Width:	34	feet
Highwall or Bench Height:	30.0	feet
Depth to Base of Cut at Highwall:	11.3	feet

### BLAST AREA VOLUMES

	QUANTITY	UNIT
Total Volume of Dimensional Mass to be Shot:	6,385	cubic yards
Blast Volume to Subdrill Grade and Blast Pattern Lines:	4,635	cubic yards
Blast Volume to Finish Grade and Blast Pattern Lines:	4,635	cubic yards
Remaining Volume Required to be Re-Shot or Ripped:	1,750	cubic yards

### BLAST AREA DESIGN

	QUANTITY	UNIT
Recommended Blasthole Diameter:	1.507	inches
Selected Blasthole Diameter:	7.000	inches
Subdrilling Allowance:	0.0	feet
Blasthole Depth:	6.5	feet
Density of Rock:	Cast blasting (ANFO Basis)	rock density
Burden to Charge Diameter Ratio:	20	times diameter
Burden:	12.0	feet
Spacing to Burden Ratio:	1.1	times burden
Spacing:	13.0	feet
Cubic Yards of Rock per Blasthole:	25.19	cubic yards
Powder Factor Description:	Medium	rock strength
Powder Factor:	0.575	pounds/cu. yd.
Density of Blasting Agent:	0.85	grams/cc
Quantity of Explosives per Blasthole:	14.48	POUNDS
Height of Powder Column:	1.02	feet
Height of Stemming per Blasthole:	5.45	feet
Stemming to Burden Ratio:	0.45	times burden
Quantity of Stemming per Blasthole:	0.0540	cubic yards
Number of Rows:	2	rows
Number of Blastholes per Row:	92	holes per row
Total Number of Blastholes:	184	holes
Total Length of all Blastholes:	1,191	feet

**BLASTING MATERIALS QUANTITIES**

	QUANTITY	UNIT
Total Quantity of Stemming Required:	9.93	cubic yards
Total Quantity of Explosives Required:	2,665	pounds
Total Quantity of det. cord/fuse/wire Required:	3,968	linear feet
Quantity of Blasting Caps per Blasthole:	1	cap(s)
Total Quantity of Blasting Caps Required:	184	caps
Quantity of Primers per Blasthole:	1	primer(s)
Total Quantity of Primers Required:	184	primers
Quantity of Delays per Blasthole:	1	delay(s)
Total Quantity of Delays Required:	186	delays

**HOURLY EQUIPMENT COST**Shift basis: 1 per day

	Description
Drilling Equipment - Drill:	SCHRAMM T450WS
-Drill Pad Preparation:	Cat D8T - 8SU
Misc. Drill Support Equipment:	NA
Misc. Explosives Support Equipment:	NA
Explosives Delivery -Bulk Truck:	ANFO Bulk Delivery Truck
-Cap Truck:	Cap Delivery Truck

<b><u>Cost Breakdown:</u></b>	Drilling Equipment	Drill Pad Preparation	Misc. Drill Support	Misc. Expl. Support	Explosives Delivery Bulk Truck	Explosives Delivery Cap Truck
	Drilling	Dozer			MiscTruck	MiscTruck
%Utilization-machine:	100	25	NA	NA	25	25
Ownership cost/hour:	\$97.88	\$93.62	NA	NA	\$79.36	\$4.55
Operating cost/hour:	\$141.00	\$18.34	NA	NA	\$28.62	\$5.44
%Utilization-ripper:	NA	15	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$8.93	NA	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$1.17	NA	NA	\$0.00	\$0.00
Operator cost/hour:	\$74.33	\$41.52	NA	NA	\$27.69	\$27.69
Unit Subtotals:	\$313.21	\$163.57	\$0.00	\$0.00	\$135.67	\$37.68
Number of Units:	1	1	0	0	1	1
Group Subtotals:	\$313.21	\$163.57	\$0.00	\$0.00	\$135.67	\$37.68

Total work team cost/hour: **\$650.13****MATERIALS COST**

	Description	Unit	Unit Cost	Quantity	Total Cost
Blasting Agent:	Bulk ANFO nom. density ( 7,900-15,000 fps )	Pound	\$0.240	2665.082	\$639.62
Primers or Boosters:	Cast primer, 1.0 lb (electric or non-electric system)	Each	\$3.450	184.000	\$634.80
Blasting Caps:	Non-electric cap, delay (non-electric systems)	Each	\$3.650	184.000	\$671.60
Det. Cord, fuse, or wire:	Detonating cord, 45 gr./ft. (non-electric systems)	Linear foot	\$0.160	3968.140	\$634.90
Delays:	1,000 MS delays (non-electric systems)	Each	\$19.060	186.000	\$3,545.16
Miscellaneous:	NO MISCELLANEOUS MATERIALS REQUIRED	NA	\$0.000	0.000	\$0.00
Drill bits:	Bit life = 1,750	Linear feet	\$1,825.64	0.681	\$1,242.90

**Total Materials Cost: \$7,368.98**

## **DRILLING AND EXPLOSIVES PREPARATION TIME**

Total Drilling Length:	<u>1,191</u>	linear feet
Unadjusted Drilling Rate:	<u>82.00</u>	feet/hour
Drilling Time:	<u>22.83</u>	hours

### **Job Condition Corrections:**

Site Altitude:	<u>6,100</u>	feet
Altitude Adjustment:	<u>0.95</u>	(DRMS est.)
Job Efficiency Factor:	<u>0.67</u>	(CH. Exc. HB)
Adjusted Drilling Rate:	<u><b>52.19</b></u>	feet/hour
Explosives Prep. Time:	<u>31.72</u>	hours

## **JOB TIME AND COST**

	Total Job Time:	<u><b>54.55</b></u>	Hours
Unit cost: <u>\$5.124</u> per cu. yd.	Total Job Cost:	<u><b>\$23,751</b></u>	

## BULLDOZER WORK

Task description: Grade blasted highwall material to 3H:1V slope.

Site: Goodrich Pit

Permit Action: 112c Application

Permit/Job#: M2019005

### PROJECT IDENTIFICATION

Task #: 001B

State: Colorado

Abbreviation: None

Date: 2/21/2019

County: Las Animas

Filename: M005-001b

User: JLE

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: Cat D8T - 8SU

Horsepower: 310

Blade Type: Semi-Universal

Attachment: 3-shank ripper

Shift Basis: 1 per day

Data Source: (CRG)

#### Cost Breakdown:

		<u>Utilization %</u>
Ownership Cost/Hour:	\$93.62	NA
Operating Cost/Hour:	\$73.35	100
Ripper own. Cost/Hour:	\$8.93	NA
Ripper op. Cost/Hour:	\$1.17	15
Operator Cost/Hour:	\$41.52	NA
Total unit Cost/Hour:	\$218.59	
Total Fleet Cost/Hour:	<b>\$218.59</b>	

### MATERIAL QUANTITIES

Initial Volume: 4,211

Swell factor: 1.000

Loose volume: **4,211** LCY

Source of estimated volume: Blasted Highwall Surface area, 2.61 acres, Push 1 foot depth

Source of estimated swell factor: Cat Handbook

### HOURLY PRODUCTION

Average push distance: 50 feet

Unadjusted hourly production: 1,400.0 LCY/hr

Materials consistency description: Rock, avg. ripped or blasted 0.7

Average push gradient: -30 %

Average site altitude: 6,100 feet

Material weight: 3,300 lbs/LCY

Weight description: Basalt

#### Job Condition Correction Factor

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

Dozing method:	1.200	(SLOT)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.800	(FND-RF)
Push gradient:	1.601	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.697	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4668

Adjusted unit  
production: 653.52 LCY/hr

Adjusted fleet  
production: **653.52** LCY/hr

### **JOB TIME AND COST**

Fleet size: 1 Dozer(s)

Unit cost: \$0.334/LCY

Total job time: **6.44** Hours

Total job cost: **\$1,408**

## BULLDOZER RIPPING WORK

Task description: Rip the affected land

Site: Goodrich Pit

Permit Action: 112c Application

Permit/Job#: M2019005

### PROJECT IDENTIFICATION

Task #: 002

State: Colorado

Abbreviation: None

Date: 2/21/2019

County: Las Animas

Filename: M005-002

User: JLE

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:	\$93.62	NA
Operating Cost/Hour:	\$73.35	100
Ripper Ownership Cost/Hour:	\$8.93	NA
Ripper Operating Cost/Hour:	\$7.78	100
Operator Cost/Hour:	\$41.52	NA
Total Unit Cost/Hour:	\$225.20	
Total Fleet Cost/Hour:	<b>\$450.40</b>	

### MATERIAL QUANTITIES

Selected estimating method: Area

#### Alternate Methods:

Seismic: NA

Bank Volume: NA

BCY NA

Area: 77.39 acres

Rip Depth (ft): 2.00

Volume: 249,712

BCY or CCY

Source of estimated quantity: 80 acres less 2.61 acres

### HOURLY PRODUCTION

#### Seismic:

Seismic Velocity: NA feet/second

#### Area:

Average Ripping Depth:	<u>2.56</u>	mph
Average Ripping Width:	<u>7.08</u>	degrees
Average Ripping Length:	<u>500.00</u>	feet
Average Dozer Speed:	<u>88.00</u>	feet
Average Maneuver Time:	<u>0.25</u>	feet
Production per unit area:	<u>0.822</u>	acres/hour

#### Job Condition Correction Factors

Unadjusted Hourly Unit Production: 0.822 Acres/hr

Site Altitude: 6,100 feet

Altitude Adj: 1.00 (CAT HB)

Job Efficiency: 0.83 (1 shift/day)

Net Correction: 0.83 multiplier

Adjusted Hourly Unit Production: 0.68 Acres/hr

Adjusted Hourly Fleet Production: **1.36** Acres/hr

### JOB TIME AND COST

Fleet size: 2

Grader(s)

Total job time: **56.72**

Hours

Unit cost: \$330.074

Per acre

Total job cost: **\$25,544**

## WHEEL LOADER – LOAD AND CARRY WORK

Task description: Spread topsoil

Site: Goodrich Pit

Permit Action: 112c Application

Permit/Job#: M2019005

### PROJECT IDENTIFICATION

Task #: 003

State: Colorado

Abbreviation: None

Date: 2/21/2019

County: Las Animas

Filename: M005-003c

User: JLE

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: CAT 966H

Attachment 1: ROPS Cab

Horsepower: 262

Shift Basis: 1 per day

Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$39.42	NA
Operating Cost/Hour:	\$45.86	100
Operator Cost/Hour:	\$40.90	NA
Total Unit Cost/Hour:	\$126.18	
Total Fleet Cost/Hour:	\$252.35	

### MATERIAL QUANTITIES

Initial volume: 64,533

CCY

Swell factor: 1.000

Loose volume: 64,533

LCY

Source of estimated volume: 80 Acres, 6" deep

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:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	Common ownership of trucks and loaders - 0.04	-0.040	(Cat HB)
Operation:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		0.000	minutes
Adjusted Basic Cycle Time:		0.500	minutes

#### Rolling Resistance – Road Conditions

Haul: Rutted dirt, little maintenance, no water, 1" tire penetration 4.0

Return: Rutted dirt, little maintenance, no water, 1" tire penetration 4.0

#### Haul and Return Time



	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	500	0.00	4.00	4.00	0.4222	(Cat HB)
Return Route:	500	0.00	4.00	4.00	0.3923	(Cat HB)

Total Travel Time: 0.8145 minutes  
Total Cycle Time: 1.3145 minutes

#### Load Bucket Capacity

Rated Capacity: 5.00 LCY (heaped)  
Bucket Fill Factor: 0.900 Other - soil, boulders, roots (80 -100%) 0.900  
Adjusted Capacity: 4.50 LCY

#### Job Condition Correction Factors

Site Altitude: 6100 feet

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

Unadjusted Hourly Unit Production: 205.40 LCY/Hour  
Adjusted Hourly Unit Production: 170.48 LCY/Hour  
Adjusted Hourly Fleet Production: 340.96 LCY/Hour

#### JOB TIME AND COST

Fleet size: 2 Loader(s) Total job time: 189.27 Hours  
Unit cost: \$0.740 /LCY Total job cost: \$47,762

## REVEGETATION WORK

Task description: Revegetation

Site: Goodrich Pit Permit Action: 112c Application Permit/Job#: M2019005

### PROJECT IDENTIFICATION

Task #: 004 State: Colorado Abbreviation: None  
Date: 2/21/2019 County: Las Animas Filename: M005-004  
User: JLE

Agency or organization name: DRMS

### FERTILIZING

#### Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			\$	\$
			<b>Total Fertilizer Materials Cost/Acre</b>	<b>\$0.00</b>

#### Application

Description	Cost /Acre
	\$
<b>Total Fertilizer Application Cost/Acre</b>	<b>\$0.00</b>

### TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	\$106.29
<b>Total Tilling Cost/Acre</b>	<b>\$106.29</b>

### SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Blue Grama - Hachita	0.75	12.24	\$12.50
Prairie Clover, Purple - Kaneb	0.32	2.19	\$18.52
Sideoats Grama - Butte	1.37	4.50	\$13.56
Little Bluestem - Pastura	1.01	6.03	\$17.41
Western Wheatgrass - Arriba	4.00	10.10	\$33.12
Needle and Thread	0.55	1.45	\$23.38
Needlegrass, Green - Lodorm	0.48	1.99	\$2.39
Winter Fat	0.02	0.05	\$0.42
<b>Totals Seed Mix</b>	<b>8.50</b>	<b>38.55</b>	<b>\$121.30</b>

**Application**

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

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

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	\$288.00	\$576.00
<b>Total Mulch Materials Cost/Acre</b>				<b>\$576.00</b>

**Application**

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	\$68.78
Power mulcher (MEANS 32 91 13.16 0350)	\$92.78
<b>Total Mulch Application Cost/Acre</b>	<b>\$161.56</b>

**NURSERY STOCK PLANTING**

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

**JOB TIME AND COST**

No. of Acres:	80	Cost /Acre:	\$1,197.15
Estimated Failure Rate:	25%	Cost /Acre*:	\$353.30
*Selected Replanting Work Items:	SEEDING		

Initial Job Cost:	<b>\$95,772.00</b>
Reseeding Job Cost:	<b>\$7,066.00</b>
Total Job Cost:	<b>\$102,838</b>
Job Hours:	<b>80.00</b>

## EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: Mobilization

Site: Goodrich Pit

Permit Action: 112c Application

Permit/Job#: M2019005

### PROJECT IDENTIFICATION

Task #: 005

State: Colorado

Abbreviation: None

Date: 2/21/2019

County: Las Animas

Filename: M005-005

User: JLE

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:	\$16.63	\$18.37	\$22.33
Operating Cost/Hour:	\$44.38	\$46.13	\$50.07
Operator Cost/Hour:	\$27.66	\$27.66	\$27.66
Helper Cost/Hour:	\$0.00	\$25.39	\$25.39
Total Unit Cost/Hour:	\$88.67	\$117.55	\$125.45

### 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
SCHRAMM T450WS	0.00	\$97.88	\$88.67	1	\$186.55	\$88.67	\$250.00
Cat D8T - 8SU	53.08	\$102.55	\$125.45	2	\$456.00	\$250.90	\$500.00
CAT 966H	25.80	\$39.42	\$88.67	2	\$256.18	\$177.34	\$500.00
Drill/Broadcast Seeder with Tractor	25.00	\$15.54	\$88.67	2	\$208.42	\$177.34	\$500.00
Power Mulcher (Bowie LD-90)	6.00	\$8.33	\$88.67	1	\$97.00	\$88.67	\$250.00

Subtotals: **\$1,204.15** **\$782.92** **\$2,000.00**

### ROADABLE EQUIPMENT:

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
ANFO Bulk Delivery Truck	\$221.54	1	\$221.54	\$221.54
Cap Delivery Truck	\$54.00	1	\$54.00	\$54.00
Light Duty Pickup, 4x4, 1 T. Crew	\$47.19	1	\$47.19	\$47.19
Fuel Tanker, 6x4, 210 HP	\$59.64	1	\$59.64	\$59.64

Subtotals: **\$382.37** **\$382.37**

**EQUIPMENT HAUL DISTANCE and Time**

Nearest Major City or Town within project area region:	TRINIDAD	
Total one-way travel distance:	65.00	miles
Average Travel Speed:	65.00	mph

Total Non-Roadable Mob/Demob Cost *	\$14,380.22
* two round trips with haul rig:	
Total Roadable Mob/Demob Cost **	\$764.74
** one round trip, no haul rig:	

**Transportation Cycle Time:**

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	1.00	1.00
Return Time (Hours):	1.00	1.00
Loading Time (Hours):	1.33	NA
Unloading Time (Hours):	1.33	NA
Subtotals:	4.66	2.00

**JOB TIME AND COST**

Total job time: 9.32 Hours

Total job cost: \$15,145