STATE OF COLORADO

Eschberger - DNR, Amy <amy.eschberger@state.co.us>

Amendment #2 Application Package

DPollock@nedmining.com <DPollock@nedmining.com> Tue, May 25, 2021 at 1:37 PM
To: "Eschberger - DNR, Amy" <amy.eschberger@state.co.us>

Amy,

Attached is the revised Amendment #2 Application Package. A hard copy is being mailed to your attention.

Please confirm receipt of this email and the document.

Thank you,

Daniel Pollock

Director of Regulations and Permitting

Grand Island Resources

Nederland Mining Consultants

720.207.5154 – Office

312.342.6145 – Cell

Revised GIR Permit Application 5-25-2021v2-3.pdf
18083K

Grand Island Resources
Cross Mine (M1977-410) Amendment #2

Issue Date:
May 25, 2021

Prepared by:

Global Resource Engineering, Ltd.

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GRAND ISLAND
RESOURCES

P.O. Box 3395
Nederland, CO 80466
May 24, 2021

May 24, 2021

Amy Eschberger
Environmental Protection Specialist
Colorado Department of Natural Resources
Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

RE: File No. M1977-410-110(2) Limited Impact Permit Amendment Application

Ms Eschberger,

Enclosed for your review is Grand Island Resources, LLC (GIR) revised 110(2) Limited Impact Permit Amendment Application. This revised application is in response to the Preliminary Adequacy Review received from the Department of Reclamation, Mining and Safety (DRMS) on February 24, 2021. Due to the substantial number of deficiencies in the original application, GIR engaged Global Resource Engineering (GRE) to assist in assembling a new application package.

The purpose of this resubmission application remains the same:

- To increase the approved permit area from 8.96 to 9.99 acres and add additional independent parcels, namely the Petosi Shaft and Caribou 300 Level.
- As described in the Boulder County Development Agreement (dated August 22, 2011), GIR will be adding an internal property road between the Cross Gold Mine and the Consolidated Caribou Mine.
- Increase and include the Mine Reclamation Plan for the newly included/created areas.

Please note:
The original application submitted on January 6, 2021 mentioned operations at the Caribou Mine as associated with the opening of the Idaho Tunnel. GIR understands that this may have been misleading and/or confusing and wants to clarify that there are to be no mining operations at the Caribou Mine. Opening of the Idaho Tunnel is only to support the exploratory drill program to take place July 2021.

All other aspects of the mining operation will remain the same. Total annual production of ore and waste rock will not exceed 70,000 tons per year.

1. **The application date is:**

   Tuesday, May 25, 2021

P.O. Box 3395
Nederland, CO 80466
May 24, 2021

2. The owner(s) of the property:

Grand Island Resources, LLC
4415 Caribou Road
Nederland, CO 80466
Phone: (720) 893-3749

3. The owner(s) of the substance to be mined:

Grand Island Resources, LLC
4415 Caribou Road
Nederland, CO 80466
Phone: (720) 893-3749

4. Name, address and phone number of the Applicant/Owner:

Grand Island Resources, LLC
4415 Caribou Road
Nederland, CO 80466
Phone: (720) 893-3749

The Applicant and Owner are the same.

5. The authorized representative of the Applicant/Operator:

Vice President of Operations
Richard Mittasch
PO Box 3395
Nederland, CO 80466
Phone: (515) 582-0833
Email: rmittasch@nedmining.com

6. The name of the mining operation:

The name of the operation is Grand Island Resources, LLC - Cross Gold Mine.

7. Type of Mining operation and substance to be mined:

The mining operation will consist of one underground hard rock mine. The materials to be mined are gold, silver, lead and zinc.

8. Site Location:

The site is located approximately 4.5 miles west of Nederland, Colorado, adjacent to the Roosevelt National Forest, at an elevation of 9,700' MSL.

GRAND ISLAND
RESOURCES

P.O. Box 3395
Nederland, CO 80466
May 24, 2021

9. **Legal description:**

   The general location is parcels of land in Section 9, Township 1 South, Range 73 West of the 6th Principal Meridian, County of Boulder, State of Colorado.

10. **Acres Permitted:**

    8.96

11. **Acres affected:**

    8.96

12. **Estimated life of the operation:**

    50 years.

13. **Mine site access:**

    Mine access is off Boulder county Road 128, also known as Caribou Road.

This project will not substantially modify the intent, purpose or spirit of the land use policy that is currently in effect. The Cross Mine will be reclaimed in accordance with DRMS permit requirements and will return the area to industrial use in accordance with Boulder County. This amendment is not proposing any changes to the current operational methods previously approved, other than the increase of the approved permit boundary, addition of the internal road and inclusion of the Mine Reclamation plan for the added parcels.

Sincerely,

Daniel V Pollock

Daniel Pollock
Regulations and Permitting
Grand Island Resources, LLC

STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY
Department of Natural Resources

1313 Sherman St., Room 215
Denver, Colorado 80203
Phone: (303) 866-3567
FAX: (303) 832-8106

COLORADO DIVISION OF RECLAMATION MINING & SAFETY

LIMITED IMPACT OPERATION (110(2))

RECLAMATION PERMIT

APPLICATION FORM

CHECK ONE: ☐ New Application (Rule 1.4) ☑ Conversion Application (Rule 1.11)

Permit # M-1977-410 (provide for conversions of existing permits)

The application for a Limited Impact Designated Mining Operation Reclamation Permit contains three major parts: (1) the application form; (2) Exhibits A-J, any required sections of Exhibit S and Geotechnical Stability Exhibit, as required by the Office, and outlined in Rules 6.1, 6.2, 6.3, 6.4.19 and 6.5; and (3) the application fee. When you submit your application, be sure to include one (1) signed and notarized original and one (1) copy of the application form, two (2) copies of Exhibits A-J, appropriate sections of 6.4.19 Exhibit S and 6.5 (Geotechnical Stability Exhibit), as required, and a check for the application fee described under (4) below. Exhibits should not be bound or in a 3-ring binder; maps should be folded to 8 1/2" X 11" or 8 1/2" X 14" size. To expedite processing, please provide the information in the format and order described in this form.

GENERAL OPERATION INFORMATION

Type or print clearly, in the space provided, all information described below

1. **Applicant/operator or company name (name to be used on the permit):** Grand Island Resources, LLC (GIR)
   - 1.1 Type of organization (corporation, partnership, etc.): Partnership
2. **Operation name (pit, mine or site name):** Cross Gold Mine
3. **Permitted acreage (new or existing site):** 9.99 permitted acres
4. **Fees:**
   - 4.1 New Application — **$1,006.00** application fee
   - 4.2 Amendment Application (from 1.10(2))
   - 4.3 Conversion Fee (from 110d to 110(2), (Rule 1.11.2(2)) — **$1,725.00** conversion fee
5. **Primary commodity(s) to be mined:** Gold and Silver
6. **Name of owner to the surface of affected land:** Grand Island Resources, LLC
7. **Name of owner to the subsurface rights of affected land:** Grand Island Resources, LLC
8. **Type of mining operation:** ☐ Surface ☑ Underground ☐ In-situ

9. **Correspondence Information:**

APPLICANT/OPERATOR (name, address, and phone of name to be used on permit):

Contact's Name: Alfred F. Gerriets II Title: CEO

Company Name: Grand Island Resources, LLC

Street: 65 Arikaree Cir. P.O. Box: 3395

City: Nederland

State: CO Zip Code: 80466

Telephone Number: (212) - 920-1941

Fax Number: ( ) -

PERMITTING CONTACT (if different from applicant/operator above):

Contact's Name: Richard Mittasch Title: VP of Operations

Company Name: Grand Island Resources, LLC

Street: 34 Mitchell Ave P.O. Box:

City: Plainview

State: NY Zip Code: 11803

Telephone Number: (516) - 582-0833

Fax Number: ( ) -

INSPECTION CONTACT:

Contact's Name: Daniel V. Pollock Title: Director of Regulations and Permitting

Company Name: Grand Island Resources, LLC

Street: 300 Spruce Way P.O. Box: 0441

City: Nederland

State: CO Zip Code: 80466

Telephone Number: (720) - 207-5154

Fax Number: ( ) -

CC: STATE OR FEDERAL LANDOWNER (if any):

Agency:

Street:

City:

State: Zip Code:

Telephone Number: ( ) -

CC: STATE OR FEDERAL LANDOWNER (if any):

Agency:

Street:

City:

State: Zip Code:

Telephone Number: ( ) -

10. **Location information:** The center of the area where the majority of mining will occur lies in:

COUNTY: Boulder

PRINCIPAL MERIDIAN (check one): [✓] 6th (Colorado) [ ] 10th (New Mexico) [ ] Ute

SECTION (write number): S 9

TOWNSHIP (write number and check direction): T 1 [ ] North [✓] South

RANGE (write number and check direction): R 73 [ ] East [✓] West

QUARTER SECTION (check one): [ ] NE [✓] NW [ ] SE [ ] SW

QUARTER/QUARTER SECTION (check one): [ ] NE [ ] NW [ ] SE [✓] SW

GENERAL DESCRIPTION (miles and direction from nearest town and approximate elevation):

The mine is located 4.5 miles from the town of Nederland, Co the portal is located at an elevation of 9800 feet

11. **Primary Mine Entrance Location** (report in either Latitude/Longitude OR UTM):

Latitude/Longitude:

Example: (N) 39° 44′ 12.98″
(W) 104° 59′ 3.87″

Latitude (N): deg 39 min 58 sec 41.1168 (2 decimal places)

Longitude (W): deg 105 min 34 sec 31.572353 (2 decimal places)

OR

Example: (N) 39.73691°
(W) -104.98449°

Latitude (N) 39.978088 (5 decimal places)

Longitude (W) -105.572353 (5 decimal places)

OR

Universal Tranverse Mercator (UTM)

Example: 201336.3 E NAD27 Zone 13
4398351.2 N

UTM Datum (specify NAD27, NAD83 or WGS 84) WGS 84 Zone 13

Easting 451128.356716 M

Northing 376390.124416 M

12. **Primary future (Post-mining) land use (check one):**

- [ ] Cropland(CR)
- [ ] Rangeland(RL)
- [ ] Residential(RS)
- [ ] Developed Water Resources(WR)
- [ ] Pastureland(PL)
- [✓] Forestry(FR)
- [ ] Recreation(RC)
- [ ] General Agriculture(GA)
- [ ] Wildlife Habitat(WL)
- [ ] Industrial/Commercial(IC)
- [ ] Solid Waste Disposal(WD)

13. **Primary present land use (check one):**

- [ ] Cropland(CR)
- [ ] Rangeland(RL)
- [ ] Residential(RS)
- [ ] Developed Water Resources(WR)
- [ ] Pastureland(PL)
- [ ] Forestry(FR)
- [ ] Recreation(RC)
- [ ] General Agriculture(GA)
- [ ] Wildlife Habitat(WL)
- [ ] Industrial/Commercial(IC)
- [✓] Mining(MN)

14. If this operation will use designated chemicals, or will result, or presently has acid mine drainage - you cannot use this application form. You must submit a either a 110d or 112d application form for Designated Mining Operations. In either case, you must list any acidic or toxic-forming materials, exposed or disturbed as a result of the mining operation, and whether the operation will result in or presently has acid mine drainage:

N/A

15. **Description of Conversion:** If you are converting an existing operation, provide a brief narrative describing the proposed change(s):

The changes incurred in this Amendment encompass the following:
An increase in the approved disturbance zone from 8.96 to 8.99 acres.
The addition of a road between the Cross Mine and the Caribou Mine.
Updated ground support and reclamation plan for the Idaho Tunnel Portal at the Caribou mine site.

16. **Maps & Exhibits:** Submit **two (2) complete, unbound copies** of the following application exhibits:

6.3.1 EXHIBIT A - Legal Description and Location Map

6.3.2 EXHIBIT B - Site Description

6.3.3 EXHIBIT C - Mining Plan

6.3.4 EXHIBIT D - Reclamation Plan

6.3.5 EXHIBIT E - Map

6.3.6 EXHIBIT F - List of Other Permits and Licenses Required

6.3.7 EXHIBIT G - Source of Legal Right-to-Enter

6.3.8 EXHIBIT H - Municipalities Within a Two-mile Radius

6.3.9 EXHIBIT I - Proof of Filing with County Clerk

6.3.10 EXHIBIT J - Proof of Mailing Notices of Permit Application

6.3.12 EXHIBIT L - Permanent Man-Made Structures

6.4.19 EXHIBIT S - (as required)

6.5 Geotechnical Stability Exhibit (as required)

Responsibilities as a Permittee:

Upon application approval and permit issuance, this application becomes a legally binding document. Therefore, there are a number of important requirements which you, as a permittee, should fully understand. These requirements are listed below. Please read and initial each requirement, in the space provided, to acknowledge that you understand your obligations. If you do not understand these obligations then please contact this Office for a full explanation.

DST 1. Your obligation to reclaim the site is not limited to the amount of the financial warranty. You assume legal liability for all reasonable expenses which the Board or the Office may incur to reclaim the affected lands associated with your mining operation in the event your permit is revoked and financial warranty is forfeited;

DST 2. The Board may suspend or revoke this permit, or assess a civil penalty, upon a finding that the permittee violated the terms or conditions of this permit, the Act, the Mineral Rules and Regulations, or that information contained in the application or your permit misrepresent important material facts;

DST 3. If your mining and reclamation operations affect areas beyond the boundaries of an approved permit boundary, substantial civil penalties, to you as permittee can result;

DST 4. Any modification to the approved mining and reclamation plan from those described in your approved application requires you to submit a permit modification and obtain approval from the Board or Office;

DST 5. It is your responsibility to notify the Office of any changes in your address or phone number;

DST 6. Upon permit issuance and prior to beginning on-site mining activity, you must post a sign at the entrance of the mine site, which shall be clearly visible from the access road, with the following information (Rule 3.1.12):

a. the name of the operator;

b. a statement that a reclamation permit for the operation has been issued by the Colorado Mined Land Reclamation Board; and,

c. the permit number.

DST 7. The boundaries of the permit boundary area must be marked by monuments or other markers that are clearly visible and adequate to delineate such boundaries prior to site disturbance;

DST 8. It is a provision of this permit that the operations will be conducted in accordance with the terms and conditions listed in your application, as well as with the provisions of the Act and the Mineral Rules and Regulations in effect at the time the permit is issued.

DJT 9. Annually, on the anniversary date of permit issuance, you must submit an annual fee (**$259**), and an annual report which includes a map describing the acreage affected and the acreage reclaimed to date (if there are changes from the previous year), any monitoring required by the Reclamation or Environmental Protection Plans to be submitted annually on the anniversary date of the permit approval. Annual fees are for the previous year a permit is held. For example, a permit with the anniversary date of July 1, 1995, the annual fee is for the period of July 1, 1994 through June 30, 1995. Failure to submit your annual fee and report by the permit anniversary date may result in a civil penalty, revocation of your permit, and forfeiture of your financial warranty. It is your responsibility, as an operator, to continue to pay your annual fee to the Office until the Board releases you from your total reclamation responsibility.

DJT 10. For joint venture/partnership operators: the signing representative is authorized to sign this document and a power of attorney (provided by the partner(s)) authorizing the signature of the representative is attached to this application.

NOTE TO COMMENTORS/OBJECTORS:

It is likely there will be additions, changes, and deletions to this document prior to final decision by the Office. Therefore, if you have any comments or concerns you must contact the applicant or the Office prior to the decision date so that you will know what changes may have been made to the application document.

The Office is not allowed to consider comments, unless they are written, and received prior to the end of the public comment period. You should contact the applicant for the final date of the public comment period.

If you have questions about the Mined Land Reclamation Board and Office review and decision or appeals process, you may contact the Office at (303) 866-3567.

Certification:

As an authorized representative of the applicant, I hereby certify that the operation described has met the minimum requirements of the following terms and conditions:

1. All necessary approvals from local government have been applied for (Rule 1.6.2(1) and (2));

2. This entire mining operation will not extract more than 70,000 tons of mineral, overburden, or combination thereof in any calendar year (defined in **C.R.S. 34-32-110(2)(a)**);

3. This mining operation will not adversely affect the stability of any significant, valuable and permanent man-made structure(s) located within two hundred (200) feet of the affected lands. (However, where there is an agreement between the applicant/operator and the persons having an interest in the structure that damage to the structure is to be compensated for by the applicant/operator (Section 34-32-115(4)(d), C.R.S. 1984, as amended), then mining may occur within 200 feet. Proof of an agreement must be submitted to the Office prior to the decision date.)

4. No mining operation will be located on lands where such operations are prohibited by law (Section 34-32-115(4)(f), C.R.S. 1984, as amended);

5. As the applicant/operator, I do not have any mining/prospecting operations in this state of Colorado currently in violation of the provisions of the Mined Land Reclamation Act (Section 34-32-120, C.R.S. 1984, as amended) as determined through a Board finding.

6. I understand that statements in the application are being made under penalty of perjury and that false statements made herein are punishable as a Class 1 misdemeanor pursuant to Section 18-8-503, C.R.S 1984, as amended.

This form has been approved by the Mined Land Reclamation Board pursuant to section 34-32-110,C.R.S., of the Mined Land Reclamation Act. Any alteration or modification of this form shall result in voiding any permit issued on the altered or modified form and subject the operator to cease and desist orders and civil penalties for operating without a permit pursuant to section 34-32-123, C.R.S.

Signed and dated this 9 day of December, 2020.

Grand Island Resources, LLC (GIR)
Applicant/Operator

If Corporation Attest (Seal)

By: _____

Title: Executive V.P.

By: _____
Corporate Secretary or Equivalent
Town/City/County Clerk

State of Colorado)
) ss.
County of Boulder)

The foregoing instrument was acknowledged before me this 9th day of December, 2020,
by Daniel Takami as Executive V.P. of Grand Island Resources, LLC.

Carrie Jo Lake
Notary Public
My Commission expires: 8/25/2023

Carrie Jo Lake
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20154033631
MY COMMISSION EXPIRES August 25, 2023

SIGNATURES MUST BE IN BLUE INK

Exhibit A

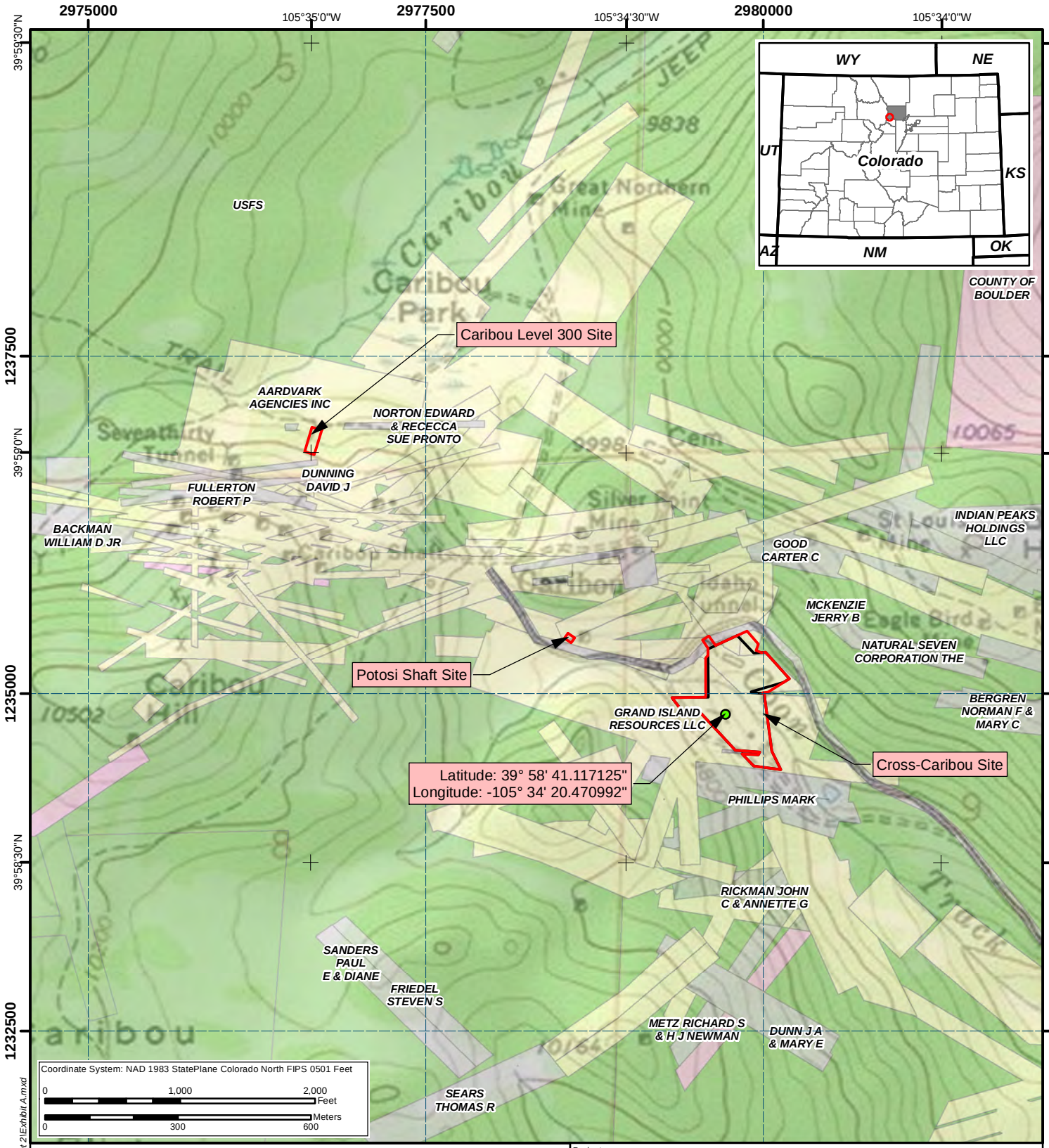
1 LEGAL DESCRIPTION AND LOCATION MAP (RULE 6.3.1)

1.1 Cross-Caribou Coordinates

The location is a parcel of land in Sections 8 and 9, Township 1S, Range 73 W of the 6th Principal Meridian, Boulder County, State of Colorado, more particularly described as follows and shown on Map 1:

Starting at the Point of Bearing:

Cross-Caribou			
Line No.		**Length**	**Direction**
L1	**POB**	**204.414**	**N 82° 18’ 56.87” W**
L2	**Thence**	**126.268**	**N 43° 00’ 52.78” W**
L3	**Thence**	**121.461**	**S 85° 35’ 51.79” E**
L4	**Thence**	**22.479**	**N 20° 31’ 56.22” E**
L5	**Thence**	**177.625**	**N 85° 47’ 58.79” W**
L6	**Thence**	**383.792**	**N 42° 47’ 11.84” W**
L7	**Thence**	**126.053**	**S 89° 40’ 40.12” W**
L8	**Thence**	**139.869**	**N 37° 45’ 56.90 W**
L9	**Thence**	**251.135**	**N 89° 40’ 40.11” E**
L10	**Thence**	**291.427**	**N 00° 19’ 19.88” W**
L11	**Thence**	**26.840**	**N 44° 40’ 40.12” E**
L12	**Thence**	**55.221**	**N 00° 19’ 19.88” W**
L13	**Thence**	**69.704**	**N 34° 50’ 24.47” W**
L14	**Thence**	**56.697**	**N 55° 09’ 35.53” E**
L15	**Thence**	**88.561**	**S 34° 50’ 24.46” E**
L16	**Thence**	**254.498**	**N 65° 15’ 13.12” E**
L17	**Thence**	**126.268**	**S 41° 46’ 28.81” E**
L18	**Thence**	**48.527**	**S 18° 59’ 37.69” W**
L19	**Thence**	**43.650**	**S 65° 26’ 48.35” E**
L20	**Thence**	**31.020**	**N 85° 04’ 40.17” E**
L21	**Thence**	**262.951**	**S 41° 46’ 28.81” E**
L22	**Thence**	**188.212**	**S 57° 55’ 06.21” W**
L23	**Thence**	**36.387**	**S 86° 49’ 33.08” W**
L24	**Thence**	**8.319**	**S 10° 01’ 04.02” W**
L25	**Thence**	**11.830**	**S 85° 30’ 30.81” E**
L26	**Thence**	**430.712**	**S 07° 39’ 42.79” E**
L27	**Thence**	**152.299**	**S 25° 58’ 47.74” E**



Legend

- Permit Boundary - Modified (9.99 ac)
- Permit Boundary - Current (8.95 ac)

Assessor Data

- Grand Island Resources
- Private Land Owners
- Boulder County
- US Forest Service

Project: DRMS Amendment 2

Title: **Proposed Permit Boundary Modifications**

Project No. 0801			File No.	
GIS:	JST	01/25/21	Scale As Shown	Rev 0
Check:	JST	01/25/21	**Exhibit A, Figure 1**	
Review:	DP	01/25/21		

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Exhibit A.mxd

Back to Point of Beginning (POB) totaling approximately 9.60 acres.

The average elevation of the mine site is 9,700’ MSL.

1.2 Pit Entry Coordinates

1.2.1 Potosi Shaft

The location is a parcel of land in Sections 8 and 9, Township 1S, Range 73 W of the 6th Principal Meridian, Boulder County, State of Colorado, more particularly described as follows and shown on Map 1:

Starting at the Point of Bearing:

Entrance: Access is from Boulder County Road 128 (Caribou Road) at two locations:

UTM Future access #1 N 4,425,947.4 meters; E 450,580.1 meters, Zone 13, NAD 83

Future access #1 N 4,425,190.2 meters, E451,649.9 meters, Zone 13, NAD 83

(These are the approximate locations of the main entrances to the GIR mining operations and are shown on Map 2.)

Potosi Shaft			
Line No.		**Length**	**Direction**
L1	**POB**	**60.000**	**N 56° 16' 17.96" W**
L2	**Thence**	**45.000**	**N 33° 43' 42.04" E**
L3	**Thence**	**60.000**	**S 56° 16' 17.96" E**
L4	**Thence**	**45.000**	**S 33° 43' 42.04" W**

Back to Point of Beginning (POB) totaling approximately 0.06 acres.

The average elevation of the mine site is 9,700’ MSL.

Pit Entry Coordinates

Entrance: Access is from Boulder County Road 128 (Caribou Road) at two locations:

UTM Future access #1 N 4,425,947.4 meters; E 450,580.1 meters, Zone 13, NAD 83

Future access #1 N 4,425,190.2 meters, E451,649.9 meters, Zone 13, NAD 83

(These are the approximate locations of the main entrances to the GIR mining operations and are shown on Map 2.)

1.2.2 Caribou 300 Level Portal

The location is a parcel of land in Sections 8 and 9, Township 1S, Range 73 W of the 6th Principal Meridian, Boulder County, State of Colorado, more particularly described as follows and shown on Map 1:

Starting at the Point of Bearing:

Caribou 300 Level Portal			
Line No.		**Length**	**Direction**
L1	**POB**	**75.000**	**N 72° 40’ 24.50” W**
L2	**Thence**	**190.000**	**N 17° 19’ 35.50” E**
L3	**Thence**	**75.000**	**S 72° 40’ 24.50 E**
L4	**Thence**	**190.000**	**S 17° 19’ 35.50 W**

Back to Point of Beginning (POB) totaling approximately 0.33 acres.

The average elevation of the mine site is 9,700’ MSL.

Pit Entry Coordinates

Entrance: Access is from Boulder County Road 128 (Caribou Road) at two locations:

UTM Future access #1 N 4,425,947.4 meters; E 450,580.1 meters, Zone 13, NAD 83

Future access #1 N 4,425,190.2 meters, E451,649.9 meters, Zone 13, NAD 83

(These are the approximate locations of the main entrances to the GIR mining operations and are shown on Maps 2, 3, and 4.)

Exhibit B

1 Site Description (Rule 6.3.2)

The site is an active gold and silver mine (Colorado Division of Reclamation, Mining, and Safety 110(2) Permit M1977-410, issued 11/3/1980), located 3 miles west of Nederland, Colorado on lands adjacent to the Roosevelt National Forest, at an elevation of 9700 feet, Mean Sea Level (MSL). The proposed expanded permit boundary will be on private property owned or controlled by GIR. Please see Exhibit E, Maps 2, 3, and 4.

1.1 Vegetation and Soil Characteristics

1.2 Vegetation

The following vegetation information is taken from the "Cross Mine Vegetation Ecological Site Survey and Assessment" prepared by Walsh Environmental Scientists and Engineers, LLC, March 12, 2008 (Walsh 2008a).

This study was conducted to identify, delineate, and describe the plant communities at the Cross Mine, Boulder County, Colorado. The Cross Mine is located five miles west of Nederland, Colorado adjacent to the Roosevelt National Forest, at an elevation of approximately 9,700 ft., MSL. The site is bisected by Coon Track Creek, a tributary of Beaver Creek which flows into Middle Boulder Creek before delivering flows to Barker Reservoir.

Methods

Walsh ecologists were familiarized with the project site at a kick-off meeting on May 24, 2006. Additional site visits were conducted on June 12 and October 5, 2006.

Initial plant community identifications were made from a recent aerial photograph of the site. The site was traversed on foot and these identifications were confirmed or modified with additional observations and information. Confirmed community boundaries were drawn over the aerial photo image and digitized. A brief description of each community was composed, including a list of dominant plant species.

Thirteen plant communities (comprising 25.1 acres) were described and mapped. These include 11 upland and two wetland communities. Each community is described below and illustrated in Figure 1 and Exhibit E, Map 5.

14520500 105°34'25"W 1480000 105°34'20"W 14520000 1480500 105°34'15"W 105°34'10"W 1481000 14519500 105°34'5"W 1481500

1479500 14520500

39°58'50"N

14520000

1479000

39°58'45"N

39°58'40"N 1481500 14519000 105°34'5"W 39°58'35"N 14518500 1481000 105°34'10"W

Coordinate System: NAD 1983 UTM Zone 13N

0 150 300 Feet

0 50 100 Meters

Legend

- Permit Boundary - Modified (9.60 ac)
- Permit Boundary - Current (8.95 ac)
- Wetland

Vegetation

- Coon Track Creek
- Aspen Woodland
- Aspen/Lodgepole Pine Woodland
- Developed
- Disturbed Upland Meadow
- Limber/Lodgepole Pine Parkland
- Lodgepole Pine Parkland
- Planted Grasses
- Pond (Open Water)
- Rock Outcrop
- Spruce/Fir Woodland
- Upland Meadow
- Willow/Spruce/Fir Woodland
- Willow Woodland

Project

DRMS Amendment 2

Title

EXHIBIT B

Plant Communities
Cross-Caribou Site

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.	
GIS:	JST	05/17/21	Scale As Shown	Rev 0
Check:	BG	05/17/21	**Figure 1**	
Review:	BG	05/17/21		

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 5 - Plant Communities - Cross-Caribou.mxd

Upland Plant Communities

Aspen Woodland

Aspen woodland is the most widespread plant community on the site, comprising three individual polygons and representing 7.33 acres (29.2 percent) of the site. This community is dominated by a relatively closed quaking aspen (*Populus tremuloides*) canopy. A few scattered limber coniferous species contribute a minor component to this canopy and include limber pine (*Pinus flexilis*) and lodgepole pine (*Pinus contorta*) as well as subalpine fir (*Abies bifolia*), Engelmann spruce (*Picea engelmannii*) and blue spruce (*Picea glauca*). A lush understory is dominated by graminoids including mountain brome (*Bromus marginatus*), Timothy (*Phleum pratense*), and bluegrasses (*Poa spp.*) Wood's rose (*Rosa woodsii*) and shrubby cinquefoil (*Pentaphylloides floribunda*) represent a limited shrub stratum. A diverse forb component is dominated by Alsike clover (*Trifolium hybridum*), yarrow (*Achillea lanulosa*), wild strawberry (*Fragaria vesca*), silver lupine (*Lupinus argenteus*), and black-eyed Susan (*Rudbeckia hirta*).

Limber/Lodgepole Pine Parkland

The limber/lodgepole pine parkland includes three polygons comprising 5.44 acres (21.7 percent) of the site. Parklands refer to areas of scattered trees with canopy cover of 50 percent or less. In these areas, limber and lodgepole pine trees are scattered amidst meadows comprising the same species found in the upland meadow community.

Aspen/Lodgepole Pine Parkland

Aspen/lodgepole pine parkland includes less than a half-acre (1.1 percent) of the site. Aspen and lodgepole pine trees are scattered throughout open meadows with an herbaceous component comprising essentially the same species as found in the upland meadows.

This portion of the site represents areas not having vegetation due to on-going mining activities.

Disturbed Upland Meadow

The second-most extensive community of the project site, the disturbed upland meadow area, comprises 4.3 acres (17.3 percent) of the site. It appears that this community more closely resembles the upland meadow areas. However, the plant community has been modified in response to surface disturbances caused by human activities such as livestock grazing and construction. Fewer native species occur in these areas, which are notably dominated by planted pasture or reclamation grasses such as smooth brome, Timothy, and Kentucky bluegrass (*Poa pratensis*).

Lodgepole Pine Parkland

The lodgepole pine parkland comprises less than an acre (2.7 percent) of the site. This parkland community is named for the lodgepole pine scattered throughout a generally upland meadow herbaceous community dominated by Timothy and smooth brome, intermixed with yarrow and wild

strawberry. Common juniper, shrubby cinquefoil, and mountain snowberry (*Symphoricarpos oreophilus*) represent a scattered shrub story.

Planted Grasses

This community comprises less than an acre (1.8 percent) of the site. These areas appear to be locations where the native plant community has been completely removed during human activities and replaced by planted pasture and reclamation grasses such as smooth brome, mountain brome, Timothy, and Kentucky bluegrass.

Rocky Outcrop

A rock outcrop includes approximately a tenth of an acre (0.6 percent) in the north portion of the site. This feature supports a few trees and shrubs including subalpine fir, Englemann spruce, lodgepole, limber pine, and broom huckleberry (*Vaccinium scoparium*). Forbs such as pussytoes and golden banner (*Thermopsis montana*) were also present

Spruce/Fir Woodland

Limited spruce/fir woodland occurs in the north part of the site, comprising approximately a third of an acre (1.5 percent of land). This community is characterized by a dense Englemann spruce and subalpine fir canopy with a sparse understory of shrubs including broom huckleberry, twinberry honeysuckle (*Lonicera involucrata*), fireweed (*Chamerion danielsii*), whisk broom parsley (*Harbouria trachypleura*), and heartleaf arnica (*Arnica cordifolia*).

Upland Meadow

The upland meadow comprises a small portion of the northern part of the site and accounts for less than an acre (2.9 percent of the site). The area is characterized by Kentucky bluegrass and prairie sagewort forb (*Artemisia ludoviciana*) as co-dominants in a species-rich herbaceous community. Other common grasses include smooth brome (*Bromopsis inermis*), Timothy, Canada bluegrass (*Poa compressa*), and sun sedge (*Carex pensylvanica subsp. heliophila*). The most common forbs include sedum (*Amerosedum lanceolatum*), pussytoes (*Antennaria parviflora*), fringed sage (*Artemisia frigida)*, wild geranium (*Geranium richardsonii* and *G. viscossisimum*), yarrow (*Achillea lanulosa*), fringed thistle (*Cirsium centaureae*) and wild strawberry. The only weed noted includes scattered small populations of Canada thistle (*Breea arvensis*) at the community edges where it grades into more mesic areas. (This amendment includes a commitment to control noxious weeds which may occur within the proposed permit area.)

Scattered, low-growing shrubs include Wood's rose, shrubby cinquefoil, broom huckleberry and common juniper (*Juniperus communis*). Occasional clumps of Scouler's willow (*Salix scouleriana*) also occur in the upland meadow.

Willow/Spruce/Fir Woodland

The willow/spruce/fir woodland represents an intermediate community that grades into both the spruce/fir woodland as well as the willow woodland. This community represents slightly more than an acre (4.1 percent) of the site. The canopy is dominated by a number of willow species including Geyer (*Salix geyeriana*), plane-leaf (*S. planifolia*), mountain (*S. montana*), and sandbar (*S. exigua*) intermixed with Colorado blue spruce (*Picea pungens*) and subalpine fir. This community also supports a diverse shrub story with dense stands of thin-leaf alder (*Alnus incana subsp. Tenuifolia*) and bog birch (*Betula pumila*) as well as wax currant (*Ribes cereum*), prickly currant (*R. lacustre*), twinberry honeysuckle and Wood's rose. A lush herbaceous understory includes wild strawberry, wild geranium, large-leaved avens (*Geum macrophyllum*), yellow bedstraw (*Galium verum*), bluebells (*Mertensia ciliata*), dandelion (*Taraxacum officinale*), clover (*Trifolium spp.*), and death camas (*Zigadenus venenosus*).

Willow Woodland, A Wetland Plant Community

The willow woodland community occurs adjacent to the creek channel, in the most mesic portion of the site. This woodland comprises almost a half-acre (1.7 percent) of the site. The area is characterized by a dense willow canopy composed of the same species found in the willow/spruce/fir woodland. The same dense shrub and lush herbaceous components that are present in the willow/spruce/fir woodland also occur in this community.

1.2.1 Soil

The NRCS Soil Report is shown below.

1.2.2 Permanent, Man-Made Structures

As shown in Exhibit E, Map the only permanent man-made structures within 200 feet of the affected area are listed in the table below.

Table 1 Permanent, Man-Made Structures Within 200 Feet of the Area	
Structure	**Owner**
County Road 128	**Boulder County**
Power Line	**Xcel Energy**
Phone Line	**Qwest**

Boulder County, County Road 128 and an Excel power line which supplies power to the mine site and runs somewhat east and west from the site toward Nederland and up onto U.S. Forest Service property. In addition, there is a Qwest phone line on the south side of the proposed permit boundary which runs somewhat east and west. These structures have been a feature on and around the mine site for many years during its periods of activity and in-activity.

Permanent, man-made structures within 200 feet of the affected lands are shown on Maps 2, 3, 4, and 6.

Arapaho-Roosevelt National Forest Area, Colorado, Parts of Boulder, Clear Creek, Gilpin, Grand, Park and Larimer Counties

6102A--Gateview family-Cryaquolls complex. 0 to 15 percent slopes

Map Unit Setting

Elevation: 8,000 to 9,500 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-tree period: 30 to 70 days

Map Unit Composition

Gateview family and similar soils: 60 percent

Cryaquolls and similar soils: 25 percent

Description of Gateview Family Setting

Landform: Alluvial fans. terraces
Parentmaterial: Gravelly alluvium and/or gravelly glaciofluvial deposits derived from igneous. metamorphic and sedimentary rock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage Class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: Mora than 80 inches
Frequency flooding: None
Frequency of *ponding:* None
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Other vegetative classification: Quaking aspen/Thurber's fescue (POTR5/FE1H) (00503), Quaking aspen/Fendler's meadowrue (POTR5/THFE) (00512)

Typical profile

0 to 3 inches: Loam
3 to 11 inches: Gravelly sandy loam
11 to 22 inches: Gravelly sandy loam
22 to 34 inches: Very gravelly sandy loam
34 to 54 inches: Extremely gravelly sandy loam
54 to 62 inches: Extremely gravelly sandy day loam

Description of Cryaquolls

Setting

Landform: Flood plains

Parent material: Gravelly alluvium and/or gravelly glaciofluvial deposits derived from igneous, metamorphic, and sedimentary rock.

Properties and qualities

Slope: 0 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm}

Available water capacity: High (about 11.1 inches)

Interpretive groups

Other vegetative classification: Booth's willow-willow/reedgrass (SAB02-SALIX/ CALAM) (S1498}, Geyer's willow-willow/reedgrass (SAGE2-SAUX/CALAM) (S1495), Geyer's willow-willow/Northwest Territory sedge (SAGE2-SALIX/ CAUT) (S1413)

Typical profile

0 to *4 inches:* Moderately decomposed plant material

4 to 16 inches: Silt loam

16 to 24 inches: Silt loam

24 to 30 inches: Silt loam

30 to 40 inches: Sandy loam

40 to 64 inches: Silt loam

7700B-leighcan family, 5 to 40 percent slopes

Map Unit Setting

Elevation: 9,000 to 11,200 feet

Mean annual precipitation: 20 to 40 inches

Mean annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 50 days

Map Unit Composition

Leighcan family and similar soils: 85 percent

Description of Leighcan Family

Setting

Landform: Mountain slopes

Parent material: Colluvrium over residuum weathered from igneous and metamorphic rock

Properties and qualities

Slope: 5 to 40 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity. Very low (about 2.7 inches)

Interpretive groups

Other vegetative classification: Subalpine fir - Engelmann spruce/moss (ABLA- PIEN/MOSS) (C0311), Subalpine fir - Engelmann spruce/myrtle whortleberry (ABLA-PIENNAMY2) (C0320), Subalpine fir - Engelmann spruce/grouse whortleberry (ABLA-PIENNASC) (C0321)

Typical profile

0 to 2 inches: Cobbly silt loam
2 to 9 *inches:* Very cobbly silt loam
9 to 28 inches: Very cobbly sandy loam
28 to *45 inches:* Extremely stony loamy sand
45 to *60 inches:* Extremely stony loamy sand

7755B--Leighcan-Catamount families, moist complex, 5 to 40 percent slopes

Map Unit Setting

Elevation: 8,000 to 11,000 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 30 to 50 days

Map Unit Composition

Leighcan family, moist, and similar soils: 45 percent
catamount family, moist, and sim11ar soils: 40 percent

Description of Leighcan Family, Moist

Setting

Landform: Mountain slopes
Parent material: Residuum and/or slope alluvium derived from igneous and metamorphic rock

Properties and qualities

Slope: 5 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of *the most limiting layer to transmit water* ***(Ksat):*** High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches

Frequency of *flooding:* None
Frequency of *ponding:* None
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Other vegetative classification: Subalpine fir - Engelmann spruce/grouse whortleberry (ABLA-PIENNASC) (C0321), Subalpine fir- Engelmann spruce/ myrtle whortleberry (ABLA-PIENNAMY2) (C0320)

Typical profile

0 to 2 inches: Cobbly silt loam
2 to 9 *inches:* Very cobbly silt loam
9 to 28 inches: Very cobbly sandy loam
28 to 45 inches: Extremely stony loamy sand
45 to 60 inches: Extremely stony loamy sand

Description of Catamount Family, Moist

Setting

Landform: Mountain slopes
Parent material: Residuum weathered from igneous and metamorphic rock

Properties and qualities

Slope: 5 to 40 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 20 to 40 inches to lithic bedrock
Drainage class: Excessively drained
*capacity of the most limiting layer to transmit water (Ksat)*_ - Very low to moderately low (0.00 to 0_01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding None
Maximum salinity. Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 0.9 inches)

Interpretive groups

Other vegetative desilication: Subalpine fir - Engelmann spruce/myrtle whortleberry (ABLA-PDENNAMY2) (C0320), Subalpine fir- Engelmann spruce/ grouse whortleberry (ABLA-PIENNASC) (C0321)

Typical profile

0 to 1inches: Slightly decomposed plant material
1 to 2inches: Gravelly loam
2 to *5 inches:* Very gravelly sandy loam
5 to 11 inches: Extremely cobbly sandy loam
11 to 15 inches: Extremely cobbly sandy loam
15 to 26 inches: Weathered bedrock
26 to 30 inches: Unweathered bedrock

7702B-Goosepeak-Catamount families, moist complex, 5 to 40 percent slopes

Map Unit Setting

Elevation: 9,000 to 10,200 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 30 to 50 days

Map Unit Composition

Goosepeak family, moist, and similar soils: 45 percent
Catamount family, moist, and similar soils: 40 percent

Description of Goosepeak Family, Moist

Setting

Landform: Benches
Parent material: Colluvium and/or re55duum derived from sandstone

Properties and qualities

Slope: 5 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
capacity of the most limiting layer to transmit water (KsatJ: Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Other vegetative classification: Subalpine fir - Engelmann spruce/myrtle whortleberry {ABLA-PIENNAMY2) (C0320), Subalpine fir - Engelmann spruce/ common juniper (ABLA-PIEN/JUCO6) (C0309)

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 3 inches: Moderately decomposed plant material
3 to 5 inches: sandy loam
5 to 13 inches: Cobbly fine sandy loam
13 to 32 inches: Very cobbly sandy day loam
32 to 62 inches: Extremely cobbly sandy loam

1.2.3 Colorado Parks and Wildlife (CPW) Statement

The proposed modifications will not result in a Designated Mining Operation or significant impacts to wildlife use. The site has been in continuous operation since 1977, and was first permitted by DRMS in 1980. Man-made structures are present across the site to support the mining operation. Wildlife habitat has not been specifically evaluated, but will be evaluated during the summer 2021 season. When this data becomes available it will be forwarded to DRMS.

1.3 Water Resources

1.3.1 Surface Water Resources

Coon Track Creek bisects the proposed permit area. Associated with the drainage are some wetlands on either side of Coon Track Creek.

Surface water quality impacts are not expected. Where needed, appropriate Best Management Practice (BMP) storm water controls will be implemented during the construction and reclamation of the proposed activities. No hazardous or toxic chemicals will be used during any of the proposed construction.

Stormwater discharge and management is regulated by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) Colorado Pollutant Discharge Elimination System (CPDES). Mine stormwater management is documented under Permit #COR 040242. The mine submits annual reports on our SWPPP program. As required by regulation, the current Storm Water Pollution Prevention Plan (SWPPP), and the supporting Storm Water Management Plan containing sediment and erosion Best Management Practices (BMPs), are maintained on site for use and inspection. Appropriate BMP storm water controls will be implemented during the proposed construction and reclamation activities. No hazardous or toxic chemicals will be used during any of the proposed reclamation construction.

No actual stream flow or surface water quality data are available for Coon Track Creek or North Beaver Creek into which Coon Track Creek and Hicks Gulch flow. North Beaver Creek flows into Middle Boulder Creek at Nederland, CO. Stream flow data from Middle Boulder Creek at Nederland, CO, USGS Station ID 06725500 is used below to provide stream flow data. Stream Flow data (shown below) are from the following source: Colorado Division of Water Resources, data retrieved, May 4, 2021.

No site-specific surface water quality data is available from the Coon Track Creek. GIR has discussed surface and ground water monitoring programs with the DRMS and is preparing programs to monitor surface and ground water quality. The surface and ground water monitoring programs will be submitted to DRMS as a permit revision separate from this Amendment.

COLORADO
Division of Water Resources
Department of Natural Resources

MIDDLE BOULDER CREEK AT NEDERLAND, CO. (BOCMIDCO)
USGS STATION ID 06725500

DISCHARGE IN CFS WATER YEAR OCTOBER 2019 TO SEPTEMBER 2020

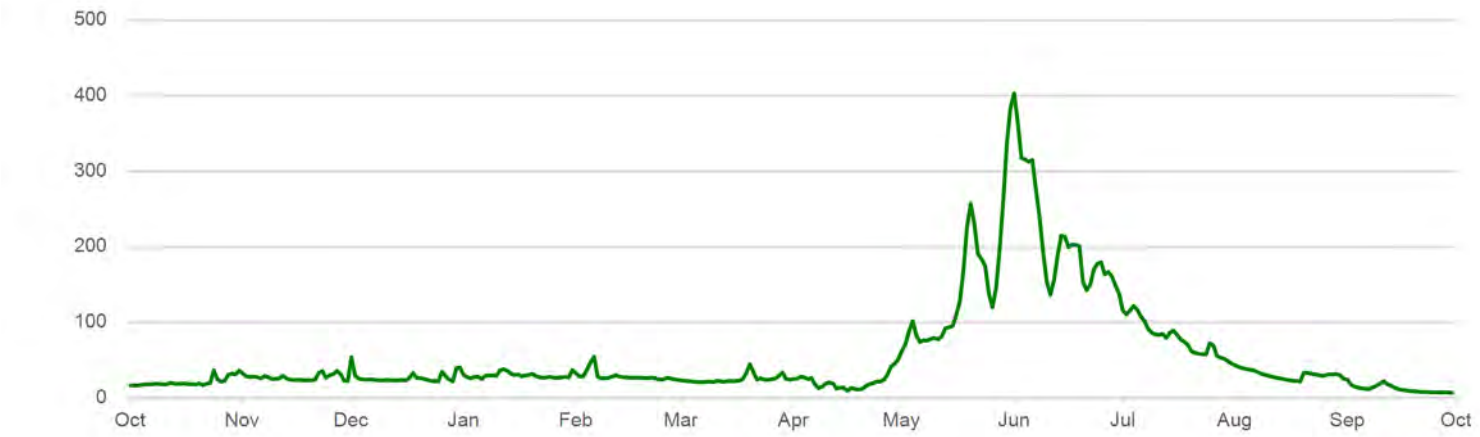
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	33	54	31	33	24	25	63	403	116	44	25
2	17	29	30	28	29	23	26	72	365	111	42	18
3	17	28	26	26	29	23	28	89	318	116	40	15
4	18	29	25	28	37	22	28	102	316	122	39	14
5	18	28	25	28	47	22	25	83	313	117	38	13
6	18	26	25	25	55	21	27	74	315	108	37	12
7	18	29	24	30	29	21	18	77	277	102	35	12
8	19	28	24	30	26	22	13	76	240	92	33	14
9	19	25	24	30	26	22	15	78	193	87	31	16
10	18	26	24	29	27	21	19	80	154	84	30	19
11	18	26	24	37	29	23	21	78	137	84	29	22
12	20	30	23	38	30	22	19	82	156	85	27	18
13	19	26	24	36	29	22	13	92	189	80	26	17
14	19	24	24	33	28	23	14	94	215	87	26	14
15	19	24	24	31	28	23	14	95	214	89	25	12
16	19	24	24	32	27	23	9.7	110	200	84	24	11
17	18	24	27	29	27	23	13	128	203	78	23	11
18	19	24	33	30	27	25	12	169	203	75	23	9.6
19	18	24	27	31	27	33	11	227	201	70	22	9.2
20	19	23	26	32	27	45	12	257	154	62	34	9.0
21	17	25	26	29	27	35	16	231	143	60	33	8.4
22	19	33	24	28	27	25	19	191	150	59	32	8.1
23	20	36	23	27	26	26	20	184	170	58	32	8.1
24	37	27	23	28	24	24	22	175	178	58	31	7.8
25	25	30	22	28	25	24	22	139	180	73	29	7.7
26	22	32	35	27	27	25	24	120	164	70	31	7.6
27	23	36	29	27	27	26	31	145	167	56	32	7.4
28	31	32	25	28	25	30	42	197	161	54	31	7.5
29	33	23	22	28	24	34	46	262	149	52	32	7.5
30	32	23	40	27		26	52	338	138	49	30	7.1
31	36		40	37		25		385		46	25	
TOTAL	662	827	846	928	849	783	656.7	4493	6366	2484	966	368.0
MEAN	21.4	27.6	27.3	29.9	29.3	25.3	21.9	145	212	80.1	31.2	12.3
AC-FT	1310	1640	1680	1840	1680	1550	1300	8910	12630	4930	1920	730
MAX	37	36	54	38	55	45	52	385	403	122	44	25
MIN	17	23	22	25	24	21	9.7	63	137	46	22	7.1

WATER YEAR 2020 TOTAL 20228.7 MEAN 55.3 MAX 403 MIN 7.1 AC-FT 40120

MAX DISCH

MAX GH



Published 04/05/2021

1.3.2 Wetlands

Wetlands on the Cross Mine property are primarily associated with Coon Track Creek, which is a narrow and well-defined channel that flows through the length of the property and drains the entire Cross Mine area watershed. Coon Track Creek is a tributary of Beaver Creek, which flows into Middle Boulder Creek above Barker Reservoir. Coon Track Creek exhibits steady low flows year-round below the mine site due to discharges from the Cross and Caribou mines, with high flows during snowmelt runoff.

Waters of the U.S., including associated wetlands, were surveyed within the proposed site boundary and plotted by a Professional Wetland Scientist for Walsh Environmental using a Trimble XT (hand-held GPS unit with ESRI ARC Pad mobile mapping software) and total 1.94- acres (84,506 sq. ft.). A Jurisdictional Determination was approved by US Army Corps of Engineer (USACE) on February 7, 2008. GIR is in the process of mapping the wetlands around Coon Track Creek; however, this will not occur until early summer of 2021. GIR will provide the new Jurisdictional Determination and the approval letter when completed. GIR received a letter of USACE No Permit Required Verification from the USACE stating that a 404 permit is not required for the road over the wetlands and creek. This letter is provided in Attachment II (USACE 2021).

1.3.3 Surface Water Quality

Water quality varies throughout the Boulder Creek Watershed, but is generally best in higher elevations where there is less human activity. Water quality declines downstream because of increased human impact and longer contact time with soil and rock. Surface water from snowmelt and groundwater that flowed through unreactive geology generally has low concentrations of dissolved solids and minerals. Overall, the chemistry of Boulder Creek at higher elevations is consistent with weathering of the crystalline rocks and historical mining does not appear to have contributed to metal loading in the creek. Analytical results show that metal concentrations (arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc) are all below 1 mg/L. Low sulfate concentrations could be derived from minor dissolution of pyrite (Verplank et al.2000).

The waste rock is primarily composed of gneiss and quartz monzonite. These materials have been analyzed for leachability and acid production by DRMS-approved methods. The results of the analyses demonstrated the materials are non-acid producing and non-metals leaching. Due to the nature of the waste rock generated by mining operations, significant impact to ground water quality is not expected.

Coon Track Creek is characterized by steep side slopes and a rocky channel bottom. In the upper and mid-reaches of the creek, the presence of wetland habitat is nominal and only extends beyond the banks in a few isolated, low-lying areas. Five man-made, plastic-lined ponds flank the north and west sides of the mining complex. The pond fringes are devoid of vegetation. Below the mine structures, the creek meanders along a narrow ravine before exiting the property through a Boulder County maintained culvert under the Cross Mine access road. Wetland habitat associated with the downstream reaches is limited to the riparian corridor and to a wet meadow area on the north bank that is situated just east of Pond #2 and extends into the adjacent aspen woodland.

The primary source of hydrology for wetlands is provided by up-slope runoff, groundwater exfiltration, and flows from the creek. Groundwater flows from the Idaho and Cross adits are directed into pond #2 and contribute to wetland hydrology in the lower half of the property. Secondary sources are provided by naturally occurring side slope seeps, snowmelt, and precipitation events.

1.3.4 Groundwater Resources:

The proposed mine and its expansion area are not impacted by designated floodplains, because the site is located very near the headwaters of Coon Track Creek. Mining will be as presented in the original mine permit application. No impacts to ground water due to the proposed site modifications are expected.

Groundwater at the site is generally controlled by drainage out of the existing mine adits, which report to two ponds for the addition of lime and discharge to Coon Track Creek through a permitted discharge point, and by discharge to stream channels, seeps, and springs.

Waste rock analyses previously performed and part of the Division's existing permit file indicate the host rock and ore are non-acid generating. Ground water pH based on three quarters of analysis has been between pH 6.4 and 7.6 in the three domestic wells.

The waste rock analyses and pH of the ground waters sampled at the three domestic wells indicate the waste rock is benign and there should not be a ground water quality issue. GIR is updating its Water Sampling and Analysis Plan.

2 References

O'Shea-Stone, M. and Ash, J. 2008. Burlington Mine VCUP Case History an Ecological Approach to Mine Site Remediation in Proceedings High Altitude Revegetation Workshop No. 18. March 2008.

Philip L. Verplanck, McCleskey, R. B and Roth D. 2000. Chapter 4 - Inorganic Water Chemistry of the Boulder Creek Watershed, Colorado, During High-Flow and Low-Flow Conditions, 2000 in Comprehensive Water Quality of the Boulder Creek Watershed, Colorado During High-Flow and Low-Flow Conditions 2000. Water-Resources Investigations, Report 03-4045.

Walsh Environmental Scientists and Engineers LLC. 2008a. Cross Mine Vegetation Ecological Site Survey and Assessment.

Walsh Environmental Scientists and Engineers LLC. 2008b. Request for Verification of Jurisdictional Delineation.

Exhibit C

1 Mining Plan (Rule 6.3.3)

The purpose of this mining plan is to supplement the existing approved mining plan. The sections in this mining plan conform describe how mining will affect the permit area for the duration of the operation. This plan is correlated to Exhibit E – Maps 2, 3 and 4:

This is an on-going mining operation. Based on known reserves and mining at 70,000 tons per year, the operation could produce for up to 50 years. We do not anticipate periods of intermittent mining activity.

1.1 Potosi Shaft and Caribou 300 Level Portal Openings

The Potosi Shaft will be accessed on foot from the main mine site and the Caribou 300 Level Portal already has an access road. No new roads will be constructed to these facilities. These openings are being secured with fencing and hazard sign posting to prepare for future use. We anticipate using the Potosi Shaft as an airway or secondary escape route if and when underground work locates the opening underground and after we evaluate its use from an engineering and economic perspective. In the intervening time we will stabilize the opening and prevent shaft entry or approach by the public. Similarly, the Caribou 300 Portal will be stabilized and the opening secured to prevent entry or approach by the public as we evaluate future use.

1.2 Topsoil

As shown in Exhibit B, Section 1.1, soil in the permit application areas is composed of mostly of a thin layer of loam underlain by cobbly and stony loam and weathered and unweathered bedrock except for the Cryaquolls, which are silty loams on relatively flat to gentle slopes (0 - 15 percent slopes). Other soil types are present on steeper slopes and transition to cobbly and stony within approximately 3 to 5 inches. There is little soil that can be salvaged at this site. There are no plant growth medium stockpiles on the site.

No topsoil stockpile construction is expected as part of this Amendment. Areas proposed for disturbance have previously been disturbed as part of the site's historic mining operations. If topsoil of sufficient quantity is found, it will be stockpiled so that rehandling is minimized. If soil is stockpiled, topsoil stockpiles will be field identified or marked. On occasion, topsoil may be added or removed from the topsoil stockpile to salvage or replace topsoil during mining operations.

Topsoil will be removed from the site of the proposed leach field and placed adjacent to the leach field. Once the leach field is constructed, the topsoil will be replaced, prepared for seeding, seeded with the approved seed mix and mulched. (Please see Exhibit D, Section 1.9). Mulching will only occur if the activity may be conducted without resulting in safety concerns on slopes.

The proposed Amendment activities will result in tree removal. Where tree removal is necessary, appropriate efforts will be made to remove only those trees and shrubs necessary to provide for an efficient and safe reclamation. Any trees removed during site construction will be made available to the employees for fire wood. Because site reclamation is well into the future, shrubs removed during site development will be hauled to an offsite facility for proper disposal.

The proposed road between the Cross mine and the Caribou mine is partially on previously disturbed land. The road construction in previously undisturbed areas is predominantly fill and any topsoil removed will be reused on road embankment revegetation. The addition of the new road will provide any topsoil or vegetative cover to be salvaged.

The increased permit boundary includes the Caribou hillside discussed in Technical Revision No. 7 (TR 7). The topsoil, vegetative cover, and reclamation plan are discussed in Exhibit D.

1.3 Overburden

This is an underground mining operation, producing ore from various near vertical mineralized veins and deposit thickness is not applicable. Some waste rock will be produced as the new Idaho Tunnel Drift is developed. Additionally, driving a new adit at the Cross mine and other development work will generate waste rock. The amount of waste rock generated annually is estimated as 20,000 to 40,000 yards.

1.4 Waste Rock Piles

There are currently three waste rock piles on the site (Map 7). One temporary waste rock pile is located adjacent to the Cross Ore Building. The second waste rock pile is also temporary and is currently located southeast of the Cross Mine warehouse. The third waste rock stockpile is located at the upper or western entrance to the Caribou Mine. This is the waste rock area proposed for future use under this amendment. The Caribou waste rock management area will be used for all waste rock generated on site after construction of the new road. It has a working stacked capacity of approximately 20,000 cubic yards. Waste rock is trucked off-site periodically for beneficial use by a permitted facility in Golden, CO. The material in the two Cross mine temporary waste rock areas will be used on-site for the new road construction. The two Cross waste rock areas will not be used for waste rock storage after construction of the new road; all waste rock will be consolidated into one waste rock area managed at the Caribou waste rock area. Waste rock is primarily composed of gneiss and quartz monzonite.

1.5 Operational Components

Major components of the mining operation are listed below.

Ventilation Shaft	New Roadway (between Cross and Caribou Mines
Ventilation Shaft and Escapeway	Roadway Accessing Caribou 300 Level
Cross Mine Portal	Caribou Management Office Trailer
Idaho Tunnel Portal	Caribou Storage Container 1*
Caribou 300 Level Portal	Caribou Storage Container 2*

Potosi Shaft	Cross Water Treatment Shed
Waste Rock Storage Areas	Caribou Water Treatment Shed
Pond 1	Water Monitoring Station (Shed 1)
Pond 2	Water Monitoring Station (Shed 2)
Pond 3A, 3B, 3C	Snowsheds
Main Parking Area	New Potable Water Pipe
Secondary Parking Area	New Sanitary Water Pipe
Subsurface Drinking Water Supply Line	Existing Septic Tank and Leach Field
Offices and Dry Room	Cross Shop
Cross Cabin	Cross Ore Building
NOAA Shed	Munitions Bunker (North)
Hazardous Materials Shed	Munitions Bunker (South)
New Septic Tank and Leach Field	Caribou Conex Storage Bay

Exhibit E – Map 6 depicts the major components of the existing mining operation. With the exception of the proposed Idaho Tunnel rehabilitation, the proposed road, and the increase in permit boundary, no other changes are proposed at this time. The proposed road will measure approximately 885 feet in length by 30 feet in width. The increase in acreage to the permit boundary is 1.03 acres.

The sizes of the disturbed areas are shown in Table 1.

Table 1 Disturbance Table

Facility	Square ft	Acres
New Roadway	26,550	0.609
Roadway Accessing Caribou 300 Level	30	0.0006
Ventilation Shaft	36	0.0008
Ventilation Shaft and Escapeway	64	0.0014
Cross Mine Portal	64	0.0014
Idaho Tunnel Portal	64	0.0014
Caribou 300 Level	14,250	0.3271
Potosi Shaft	2,700	0.0619
Waste Rock Storage Area	43,124	0.2479
Pond 1	1,512	0.0347
Pond 2	7,006	0.1608
Pond 3A, 3B, 3C	2,165	0.0497
Caribou Management Office Trailer	420	0.0096

Table 1 Disturbance Table		
Facility	**Square ft**	**Acres**
Caribou Storage Container 1 and 2 (in Idaho Tunnel)	320	0.0073
Cross Water Treatment Shed	160	0.0036
Caribou Water Treatment Shed	112	0.0025
Water Monitoring Station (Shed 1)	66	0.0015
Water Monitoring Station (Shed 2)	32	0.0007
Main Parking	8,660	0.1988
Subsurface Drinking Water Supply Line	–	–
Offices and Dry Room	5,825	0.1199
Cross Cabin	1,316	0.0302
NOAA Shed	117	0.0026
Hazardous Materials Shed	437	0.0100
Caribou Management Office Trailer	320	0.0073
Caribou Conex Storage Bay	1,280	0.0294
Secondary Parking	2,200	0.0505
New Septic Tank and Leach Field	3,770	0.0865
New Office and Dry Room	2,250	0.0516
Water Plumbing System	2,331	0.0535
Existing Septic Tank and Leach Field	4,230	0.0971
Total Disturbed Area	126,861	2.9
Total Undisturbed Area	34,8480	7.1

1.6 New Roads

As described in the Boulder County Development Agreement (dated August 22, 2011), GIR will be adding an internal property road between the Cross Gold Mine and the Consolidated Caribou Mine. Dimensions of the road are estimated to be 885 feet in length by 30 feet in width, with an additional 5 feet of disturbance on both sides of the road. The total area of the road and disturbance area equals 0.609 acres. (See Exhibit E - Maps 9.1 and 9.2).

Two (2) 4-foot concrete culverts will be installed to allow the flow of Coon Track Creek beneath the new road. Two 3-inch dirt berms will be installed on the sides of the road to comply with Storm Water Management. GIR is in the process of updating our current Storm Water Management Plan (SWMP) and will include both culverts and berms in the next updated SWMP.

1.7 Water Use

1.7.1 Water Sources and Volumes

Potable Water

No changes in source or use are proposed as part of this Amendment. Notice is provided here of required changes in permitting since last application. Historically, operations have used three wells to supply water for domestic and potable use. The three wells used for domestic use (Cross, Cabin, and Caribou) have been re-permitted as domestic/industrial with the Division of Water Resources, applications filed May 5, 2021. The well ownership has been changed to Grand Island Resources LLC to align with water rights ownership. Water rights are provided through a 1/8 share in the Farmers Ditch Company adjudicated and decreed for use from mine workings in case number W-8261-76. A substitute Water Supply Plan was filed May 19, 2021 to allow use of W-8261-76 mine workings water from co-located drilled wells. Supporting documentation is attached.

Operational Water

No changes in source or use are proposed as part of this Amendment. Notice is provided here of required changes in permitting since last application. Historically, operations have used a pump located on the 4th level of the Cross Mine for dewatering. Water rights are provided through a 1/8 share in the Farmers Ditch Company adjudicated and decreed for use from mine workings in case number W-8261-76. Dewatering is directed through ponds to Coon Track Creek. Application was made to the Division of Water Resources to assign a well permit to the Cross Mine Adit dewatering well. This well is being permitted for industrial supply and dewatering use.

Operational Ground Water Quality Impacts

The waste rock is primarily composed of gneiss and quartz monzonite. These materials are benign and have been analyzed for leachability and acid production by DRMS-approved methods. The results of the analyses demonstrated the materials are non-acid producing and non-metals leaching. Due to the nature of the waste rock generated by mining operations, significant impact to ground water quality is not expected.

GIR will comply with all applicable ground water standards established by the Water Quality Control Commission. Appropriate water treatment is being provided at water treatment pond (#1), sufficient to meet applicable water quality discharge standards, as specified in our CDPES permit.

Surface Water Quality Impacts

As with ground water, surface water quality impacts are not expected. Groundwater exposed from dewatering is discharged to Coon Track Creek under our CPDES permit. Where needed, appropriate storm water controls will be implemented during the construction and reclamation of the proposed activities.

Mine stormwater management is documented under Permit #COR 040242. The mine submits annual reports on our Storm Water Pollution Prevention Plan (SWPPP) program. As required by regulation, the current SWPPP, and the supporting Storm Water Management Plan (SWMP) containing sediment and erosion Best Management Practices (BMPs), are maintained on site for use and inspection. Appropriate BMP storm water controls will be implemented during the proposed construction and reclamation

activities. No hazardous or toxic chemicals will be used during any of the proposed reclamation construction.

GIR currently manages one permitted mine water discharge point, which discharges directly into Coon Track Creek under Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) Colorado Pollutant Discharge Elimination System (CPDES) Permit CO-0032751. We manage stormwater under Permit #COR 040242. We are asking CDPHE to combine these two CPDES permits under one permit number.

The permit boundary will be clearly marked to ensure all disturbances are within the approved permit area. No additional areas of disturbance, other than what are proposed as part of this Amendment shall occur. Storm water control measures will adhere to SWMP for all construction activities, on-going mining and final site reclamation operations. This is an underground mining operation, and all mine waters will be treated to meet applicable water quality standards. These measures will protect against offsite damages.

Impacts to Water Quantity

No changes proposed as part of this Amendment would affect water quality.

Permit conditions including numeric protection levels for unclassified ground water uses and points of compliance will be addressed in a subsequent permit revision.

Operational Ground Water Quality and Quantity Controls

The mine will be increasing dewatering as the mining plan progresses.

Stormwater Runoff Controls

Mine stormwater management is documented under Permit #COR 040242. The mine submits annual reports on our SWPPP program. As required by regulation, the current SWPPP, and the supporting SWMP containing sediment and erosion BMPs, are maintained on site for use and inspection. Appropriate BMP storm water controls will be implemented during the proposed construction and reclamation activities.

Points of Compliance

No points of compliance are proposed at this time but will be addressed in a subsequent permit revision.

Water rights are provided through a 1/8 share in the Farmers Ditch Company adjudicated and decreed for use from mine workings in case number W-8261-76. GIR is currently in compliance with existing Colorado water laws and regulations governing injury to existing water rights, under its approved mining and reclamation permit.

1.8 Mining Method:

No change under this Amendment.

1.8.1 On-site Operations

The primary commodities mined are gold, silver, lead, zinc, and copper. Secondary commodities are waste rock. Waste rock will be used on-site and delivered to Colorado Aggregate Recyclers in Golden CO for reuse. GIR will retain a maximum of approximately 20,000 yards of waste rock on site.

There are no on-site processing changes under this Amendment. Cross Mine ore will be processed at an offsite facility. There are no changes to explosive use from the existing approved permit. There will be no impacts to offsite areas as described in the Geotechnical Stability Exhibit is shown in Exhibit S.

1.8.2 Mill and Tailings

There is no mill on site and a tailing pond is not currently planned for the operation. No drill pits are anticipated during mining operations within the limits of the proposed permit boundary. However, if such pits are required, GIR will submit a technical revision at that time, prior to drilling operations.

1.8.3 Ground Water Quality

Groundwater Monitoring:

This is an existing mining operation. We have been in discussion with the DRMS as to the list of parameters to sample and sample point locations. This program will be submitted to DRMS under a separate permit revision. Based on this proposed amendment, we believe the proposed revisions will result in no changes to the existing surface and ground water quality. A full and complete program will be submitted to the DRMS for review as part of a future permit revision.

1.8.4 3.1.8 Wildlife:

This is a high-altitude mining operation with a short growing season (3.5 months on average). Impacts to wildlife have been insignificant due to minimal surface activity associated with this operation. On-going operations under an active underground mining operation will also have minimal impacts to wildlife. Regardless, GIR will make every effort to be aware of wildlife in order to prevent and or mitigate potential impacts.

Exhibit D

1 Reclamation Plan (Section 6.3.4)

The Cross Mine will be reclaimed in accordance with DRMS permit requirements and Section 3 of the Reclamation Performance Standards (Section 3.1, Hard Rock, Metal, and Designated Mining Operations (Colorado Mined Land Reclamation Board 2019) as described below. The Reclamation Performance Standards follow the Reclamation Measures

The post-mining land use will be industrial. GIR has communicated this land use Boulder County and is awaiting concurrence from the County. Reclamation activities described in this plan are directed toward this future use on what is private land. The existing private residence (historic cabin) will be retained on site. No substitute lands are proposed for reclamation. No structural fill will be imported.

The site components that will be reclaimed include the following:

Ventilation Shaft	New Roadway between Cross and Caribou Mines
Ventilation Shaft and Escapeway	Roadway Accessing Caribou 300 Level
Cross Mine Portal	Caribou Management Office Trailer
Idaho Tunnel Portal	Caribou Storage Container 1 (in the Idaho Tunnel)
Caribou 300 Level Portal	Caribou Storage Container 2 (in the Idaho Tunnel)
Potosi Shaft	Cross Water Treatment Shed
Waste Rock Storage Areas	Caribou Water Treatment Shed
Pond 1	Water Monitoring Station (Shed 1)
Pond 2	Water Monitoring Station (Shed 2)
Pond 3A, 3B, 3C	Snowsheds

1.1 Excess Equipment and Facilities

No site reclamation will begin until the underground mining activity is complete. The sewer line and leach field will be left as constructed. Excess equipment will be repurposed offsite or hauled to an approved landfill for disposal such as Republic Services Foothills Landfill (approximately 29.5 miles to the east). All remaining explosives will be disposed according to regulation and approved methods. Any remaining fuels, lubricants, toxic substances (if any) will be disposed in approved facilities such as Boulder County Hazardous Materials Management Facility in Boulder Colorado (approximately 21.9 miles to the east). All equipment and scrap will be removed from the area. Materials that are potentially salable will be salvaged and sold. This will reduce the amount of waste that would be transported to waste facility. The Caribou Management Office Trailer, storage containers, water treatment sheds, and the monitoring station will be removed from the site. The office trailer, containers, and sheds will be repurposed offsite, if possible. If these facilities cannot be repurposed, they will be hauled to an

approved landfill for disposal such as Front Range Landfill (approximately 40 miles to the east). Trash, weeds and other debris that will interfere with seeding operations will be removed and disposed of in an approved landfill such as Front Range Landfill (approximately 40 miles to the east).

Facilities and structures that are left as part of the post mining land use will meet Boulder County building and zoning codes.

1.2 Shafts and Portals

There are currently 2 ventilation shafts, three shafts, and two portals that will require closure as listed in Table 1.

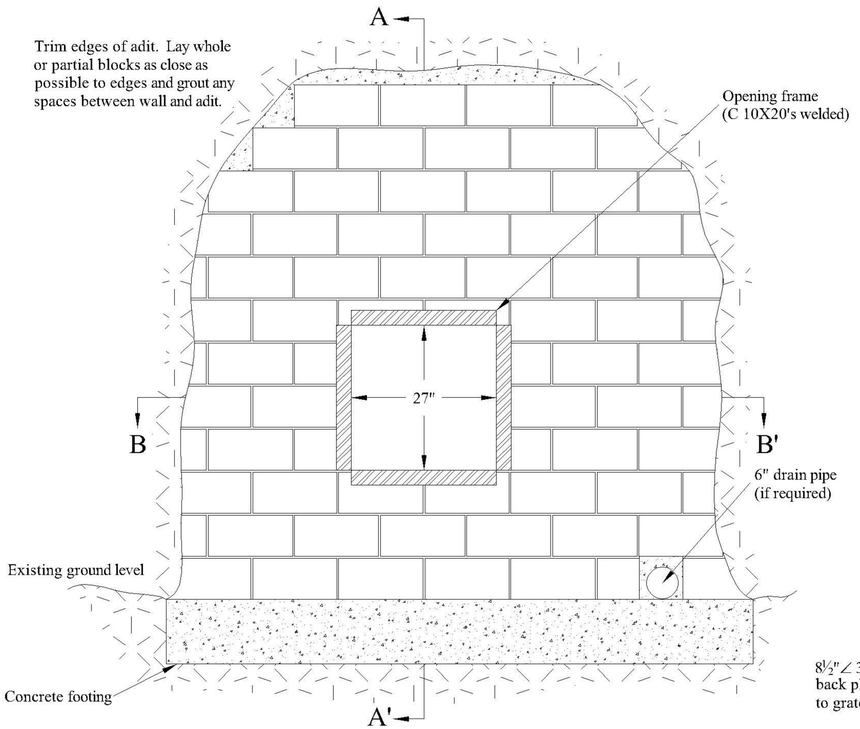
Table 1 Shafts and Portals	
Name	**Size (feet)**
Potosi Shaft	**6 x 6**
Cross Shaft	**8x8**
Caribou Shaft	**8x8**
Caribou Level 300 Portal	**8x8**
Idaho Tunnel Portal	**8x8**

All shafts, adits, portals, and ventilation shafts will be closed according to the Colorado Inactive Mine Program standards and specifications (DRMS 2009). Figure 1 is an example of DRMS adit closure (DRMS 2009). We do not anticipate mine drainage or the necessity of a hydraulic plug to prevent mine drainage. Shafts and portals will be plugged with concrete except for the Potosi Shaft, which will be closed with a bat gate (Figure 2). We anticipate that a 40 ft concrete plug will seal the shafts and portals. Shafts and portals will be gated to prevent access. Fences will be 3 feet from the concreted opening and will be 8 feet high with barbed wire. Ventilation and escape way shafts will also utilize either one of the following approved standard methods shown on Figure 3 (DRMS 2009).

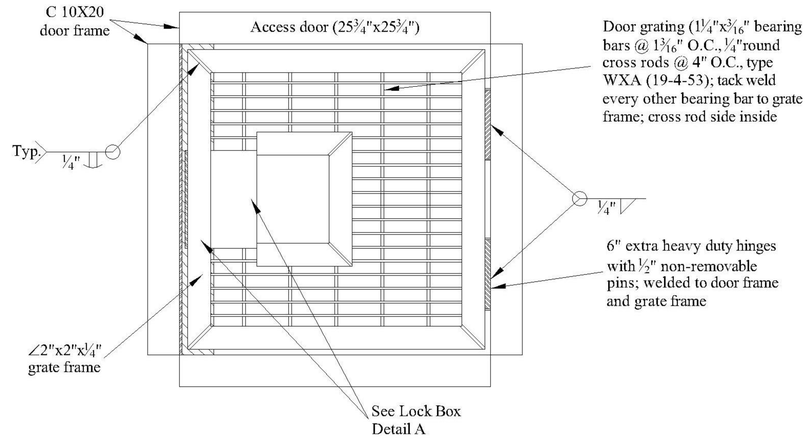
The Potosi Shaft will be reclaimed using hand entry and hand tools. A collar and bat gates will be installed. A fence will enclose the shaft area. An example of DRMS bat gates is shown on Figure2 (DRMS 2009).

All drill and auger holes will be plugged with non-combustible material and sealed with grout or neat cement according to DRMS approved methods.

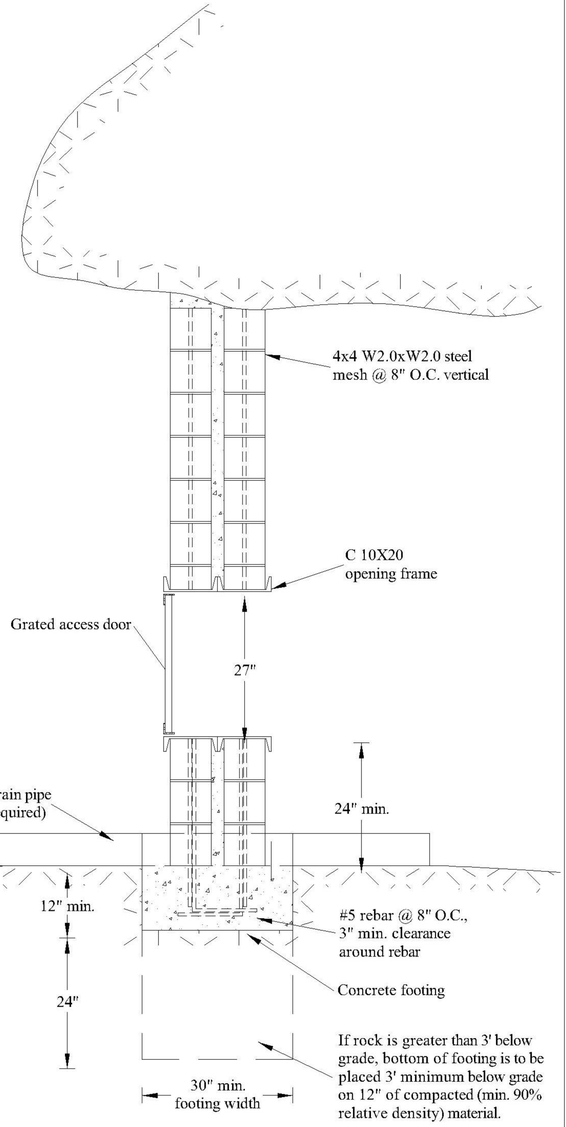
Slopes will be reconfigured to Approximate Original Contour (AOC) or less and will blend in with the surrounding topography. In addition, areas adjacent to mine shafts and portals will be stable but may be steeper than 2:1. Areas steeper than 2:1 will be kept to a minimum.



CONCRETE BLOCK WALL CLOSURE

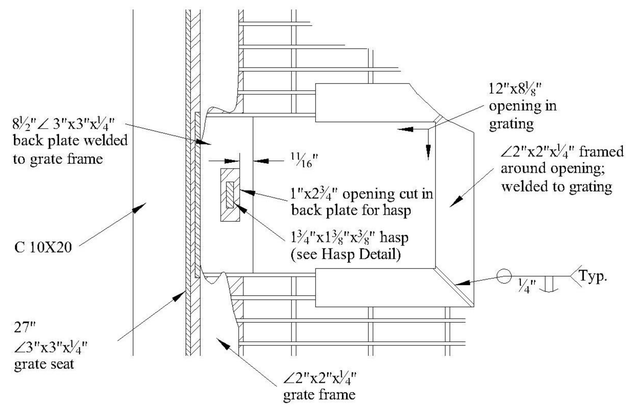


GRATED ACCESS DOOR



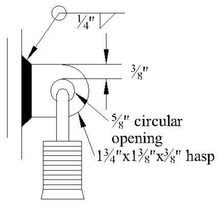
CONCRETE BLOCK WALL CLOSURE SECTION A-A'

Exhibit D Figure 1



LOCK BOX DETAIL A

(Front plate not shown)



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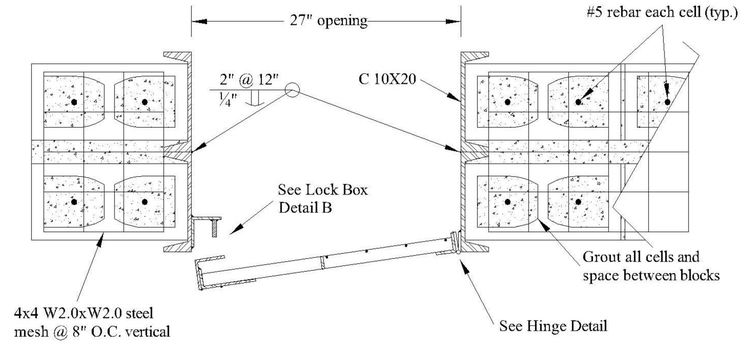
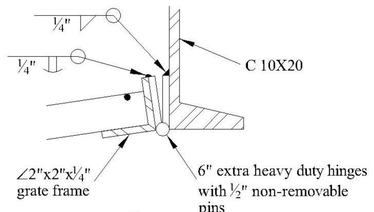


CONCRETE BLOCK WALL CLOSURE SECTION B-B'



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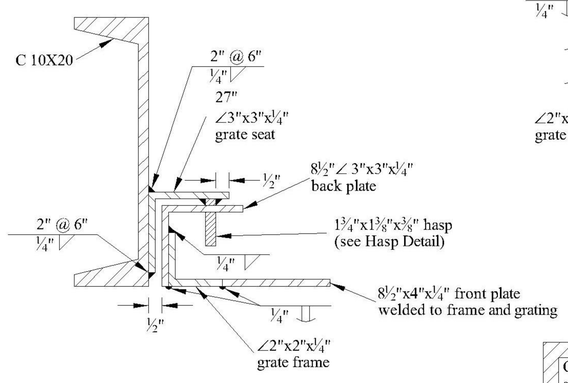


LOCK BOX DETAIL B

CAUTION: This project requires construction work around and over hazardous and unprotected mine shafts, stope, adits, and other openings which may be open to the surface or hidden from view by trash, debris or thin and unstable layers of surficial materials or rock. The contractor shall be responsible for thoroughly investigating the site conditions and scheduling his equipment, equipment operations, personnel and safety procedures to prevent accidents and injuries.

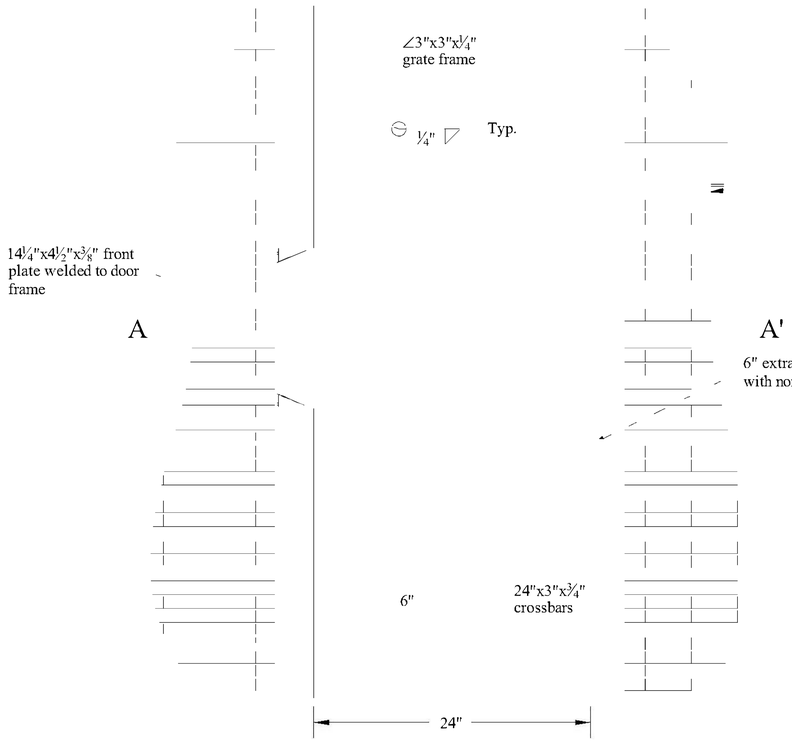
COLORADO DIVISION OF MINERALS & GEOLOGY
RECLAMATION·MINING·SAFETY·SCIENCE

INACTIVE MINE RECLAMATION PROGRAM

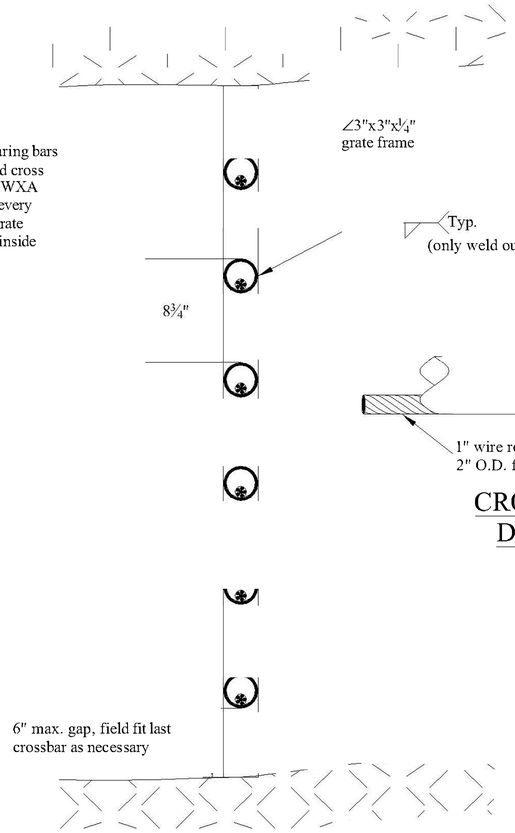
STANDARD DRAWING No. 12

CONCRETE BLOCK BULKHEAD SEAL CLOSURE

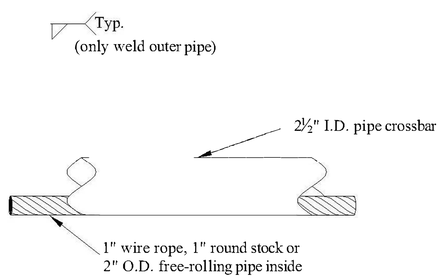
Scale Varies	12/15/03	Sheet No. 1 of 1
Drawn by: JTG	Reviewed by: JTH & ALA	



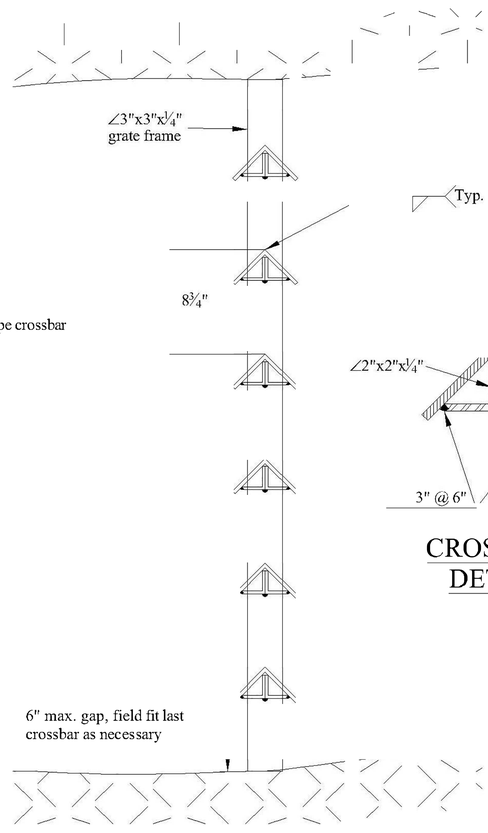
BAT CLOSURE
BAR STOCK CROSSBAR ALTERNATIVE



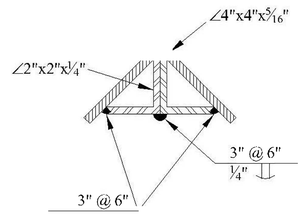
BAT CLOSURE
PIPE CROSSBAR ALTERNATIVE
(Adapted from Utah Dept. of Oil, Gas, and Mining)



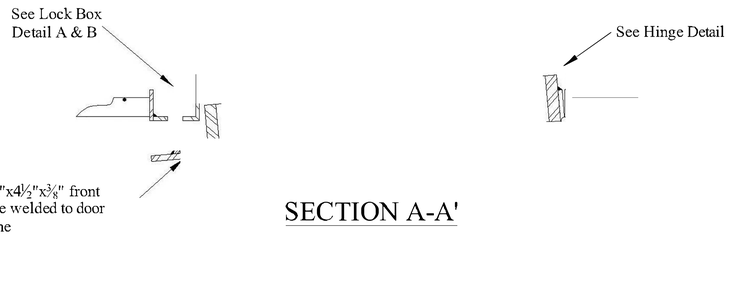
CROSSBAR
DETAIL



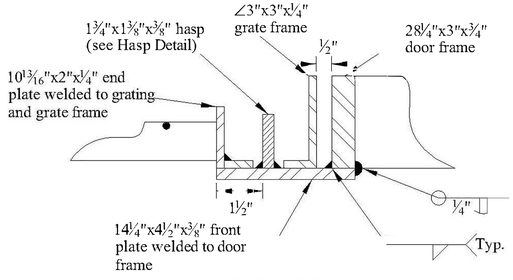
BAT CLOSURE
ANGLE IRON CROSSBAR ALTERNATIVE



CROSSBAR
DETAIL

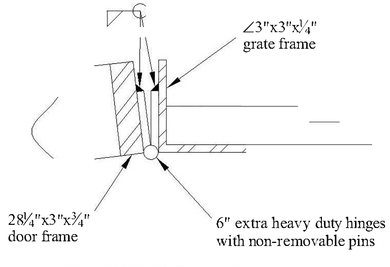


SECTION A-A'

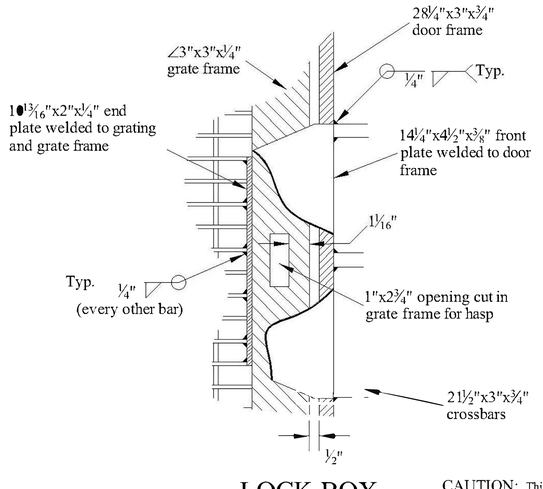


LOCK BOX
DETAIL B

*Maximum ¼" free-play in door.

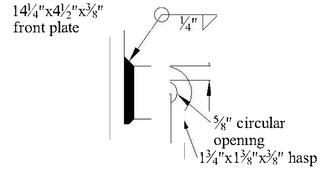


HINGE DETAIL



LOCK BOX
DETAIL A
(Front plate cut away)

CAUTION: This project requires construction work around and over hazardous and unprotected mine shafts, stope, adits, and other openings which may be open to the surface or hidden from view by trash, debris or thin and unstable layers of surficial materials or rock. The contractor shall be responsible for thoroughly investigating the site conditions and scheduling his equipment, equipment operations, personnel and safety procedures to prevent accidents and injuries.



HASP DETAIL

Exhibit D Figure 2

COLORADO DIVISION OF MINERALS & GEOLOGY
RECLAMATION·MINING SAFETY·SCIENCE

INACTIVE MINE RECLAMATION PROGRAM

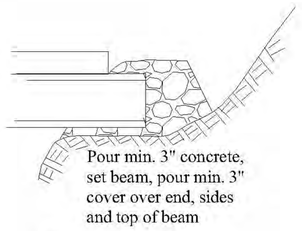
STANDARD DRAWING No. 6
BAT GRATE ALTERNATIVES

Scale Varies	1/30/04	Sheet No. 2 of 2
Drawn by: JTG	Reviewed by: JTH & ALA	

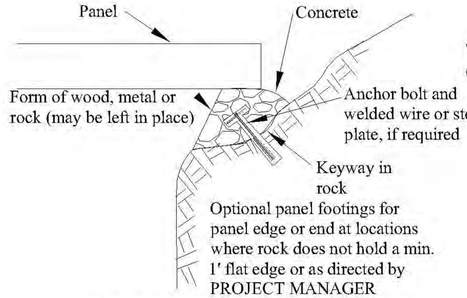
Beam span (ft)	Min. section modulus(in^3)	Beam sections having 12"min. flange width and min. section modulus	Built up sections Cont. welds
10	67.5	HP 12 x 63 HP 12 x 74 HP 12 x 84 All HP 13 & HP14 W 12 x 65 on up W 14 x 90 on up	C 15 x 33.9 on up MC 12 x 37 on up W 8 x 40 on up W 10 x 33 on up W 12 x 26 on up
11	79.2	HP 12 x 63 HP 12 x 74 HP 12 x 84 All HP 13 & HP14 W 12 x 65 on up W 14 x 90 on up	C 15 x 33.9 on up MC 12 x 40 on up W 8 x 48 on up W 10 x 39 on up W 12 x 35 on up
12	91.9	HP 12 x 74 HP 12 x 84 HP 13 x 73 HP 13 x 87 HP 13 x 100 All HP 14 W 12 x 72 on up W 14 x 90 on up	C 15 x 40 on up MC 12 x 50 MC 13 x 50 on up W 8 x 58 on up W 10 x 45 on up W 12 x 35 on up
13	106	HP 12 x 84 HP 13 x 87 HP 13 x 100 All HP 14 W 12 x 72 on up W 14 x 90 on up	C 15 x 50 MC 18 x 42.7 on up W 10 x 49 on up W 12 x 45 on up
14	120	HP 13 x 100 HP 14 x 89 HP 14 x 102 HP 14 x 117 W 12 x 96 on up W 14 x 90 on up	MC 18 x 42.7 on up W 10 x 54 on up W 12 x 50 on up
16	136	HP 13 x 100 HP 14 x 102 HP 14 x 117 W 12 x 106 on up W 14 x 90 on up	MC 18 x 51.9 on up W 10 x 66 on up W 12 x 53 on up
18	164	HP 14 x 102 HP 14 x 117 W 12 x 120 on up W 14 x 103 on up	S 18 x 54.7 on up W 10 x 77 on up W 14 x 61 on up W 16 x 58 on up W 18 x 50 on up W 21 x 49 on up
20	188	W 12 x 161 on up W 14 x 119 on up W 21 x 112 on up W 24 x 100 on up	S 18 x 70 S 20 x 65.4 on up W 10 x 89 on up W 12 x 72 on up W 14 x 61 on up W 16 x 58 on up W 18 x 55 on up W 21 x 55 on up
22	212	W 12 x 161 on up W 14 x 136 on up W 24 x 100 on up W 24 x 100 on up	S 20 x 65.4 on up S 24 x 79.9 on up W 10 x 100 on up W 12 x 79 on up W 14 x 74 on up W 16 x 71 on up W 18 x 60 on up W 21 x 55 on up W 24 x 55 on up
24	236	W 12 x 190 W 14 x 150 on up W 24 x 100 on up W 24 x 100 on up	S 20 x 65.4 on up W 10 x 112 on up W 12 x 92 on up W 14 x 78 on up W 16 x 78 on up W 18 x 64 on up W 21 x 62 on up W 24 x 61 on up

Structural steel beam supports for precast concrete panels.
(Section modulus and shapes taken from AISC Manual of Steel Construction, 8th edition.) Beams shall be ASTM A36 all purpose steel.

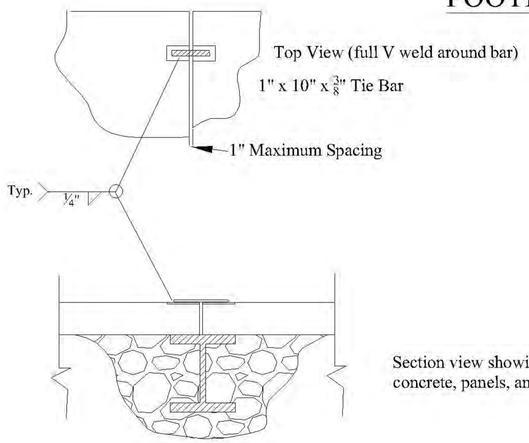
BEAM DESIGN TABLE



DETAIL A BEAM SEAT



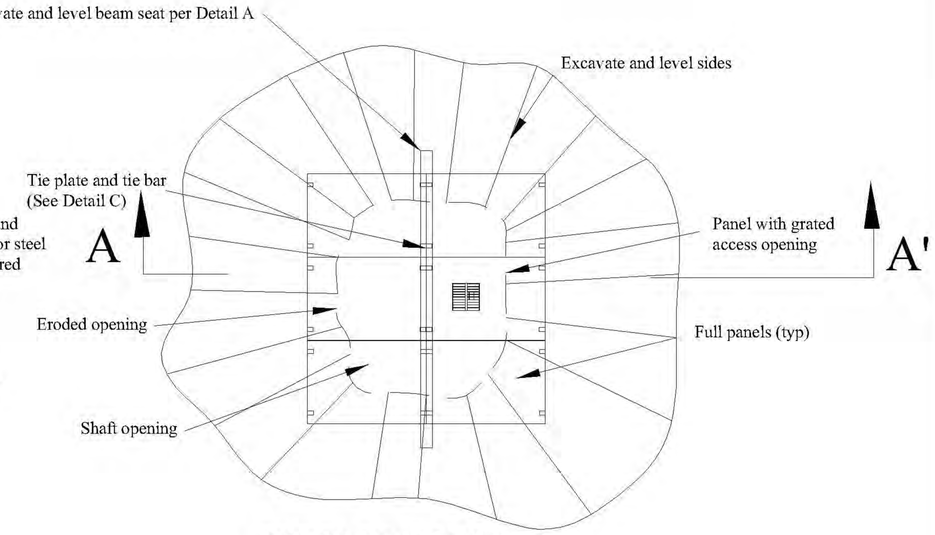
DETAIL B OPTIONAL PANEL FOOTINGS



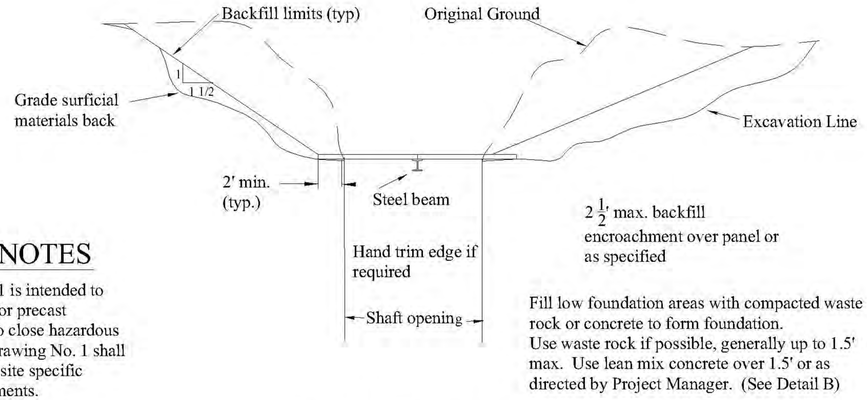
Section view showing I beam set in concrete, panels, and tie bar

DETAIL C SECTION AND TIE PLATE DETAIL

CAUTION: This project requires construction work around and over hazardous and unprotected mine shafts, stope, adits, and other openings which may be open to the surface or hidden from view by trash, debris or thin and unstable layers of surficial materials or rock. The CONTRACTOR shall be responsible for thoroughly investigating the site conditions and scheduling his equipment, equipment operations, personnel and safety procedures to prevent accidents and injuries.



PRECAST CONCRETE PANEL CLOSURE



Fill low foundation areas with compacted waste rock or concrete to form foundation.
Use waste rock if possible, generally up to 1.5' max. Use lean mix concrete over 1.5' or as directed by Project Manager. (See Detail B)

PRECAST CONCRETE PANEL CLOSURE SECTION A - A'

GENERAL NOTES

1. Standard Drawing No. 1 is intended to provide installation details for precast reinforced concrete panels to close hazardous mine openings. Standard Drawing No. 1 shall be used in conjunction with site specific information in the bid documents.

2 During excavation, the nature of the bearing surface for precast concrete panels may vary and show a different configuration than that shown on the drawings. The contractor shall notify the Project Manager of this situation and various panel footing options or layout modifications will be authorized if required.

3. Concrete for panel footings, shims and miscellaneous uses shall have a minimum compressive strength of 3,000 psi at 28 days.

4. Steel beam and built up steel section supports for precast concrete panels are shown in Table A for the maximum allowable fill height of four feet for precast concrete panels. The opening to be covered may vary up to 24 feet in span and any length. Only those HP, W, and built up shapes meeting the section modulus requirements for various spans, and having minimum of a 12 inch wide flange, are shown.

Exhibit D Figure 3

COLORADO DIVISION OF MINERALS & GEOLOGY RECLAMATION·MINING SAFETY·SCIENCE

INACTIVE MINE RECLAMATION PROGRAM

STANDARD DRAWING No. 1
PRECAST CONCRETE PANEL CLOSURE

Scale Varies	December 2003	Sheet No. 1 of 1
Drawn by: ALA	Reviewed by JTH and JTG	

1.3 Waste Rock Piles

There are three existing waste rock piles (Exhibit E, Map 7). The majority of the waste rock will be eliminated prior to reclamation. GIR has entered into an agreement to deliver waste rock to Colorado Aggregate Recyclers in Golden CO (approximately 22 miles to the south east). GIR will retain approximately 20,000 yards of waste rock on site for site needs.

The waste rock pile foot prints will require reclamation if the waste rock has been repurposed, once mining ceases. The waste rock pile foot prints are estimated not to exceed 0.99 acres. Their locations are shown on Exhibit E – Maps 6 and 7. Waste rock pile footprints will be reclaimed in accordance with the procedures in Exhibit D, Section 1.8.

If at closure not all waste rock has been repurposed, the remaining waste rock piles will be contoured to provide mechanically stable piles that are visually compatible with the landscape and support revegetation. Slopes of the waste rock piles will be 3H:1V to prevent wind and water erosion. Void spaces within the top layer of the waste rock will be filled with suitable subsoil that will facilitate revegetation. The waste rock pile will be covered with a 2-ft thick topsoil mixture to support revegetation with native grasses. Runoff along the slope will be controlled with erosion and sediment control structures to minimize rill and gully formation, especially prior to establishment of vegetation.

1.4 Ponds

All five ponds (1, 2, 3A, 3B, and 3C) will be reclaimed. After mining ends, water in the ponds will be allowed to evaporate. Any remaining water will be removed, tested and disposed off-site at Publicly-Owned Treatment Works such as the Nederland Sewage Treatment plant (approximately 5.8 miles south). Any sediment on the liners will be sampled and removed if required by regulatory requirements and disposed of in an approved facility. The pond liner will be removed and disposed off-site at an approved facility such as Republic Services Foothills Landfill (approximately 29.5 miles to the east). The pond areas will be filled in as necessary with waste rock to 2 feet below the surface, covered with topsoil, regraded to provide positive drainage to prevent ponding, and revegetated in accordance with Exhibit D, Sections 1.8 and 1.9. Pond slopes will be less than 2:1. The area of the ponds is approximately 0. 245 acres.

Liners were removed from Ponds 3 A and B in 2019. Approximately 8 cubic yards of sediment was removed. GIR anticipates similar amounts will be removed from the other three ponds (4 cy per pond) and approximately 2 cy from Ponds 3A and 3B on closure.

1.5 Coon Track Creek

The road over and culverts in Coon Track Creek will be removed. Concrete and rock used in the construction of the road will be removed. Concrete will be disposed of at an approved facility such as the Republic Services Foothills Landfill (approximately 29.5 miles to the east). The Creek and Creek banks will be restored to as near to original conditions as possible (See Exhibit D, Sections 1.8 and 1.9). To restore flow conditions, natural rock and boulders, steps, or other techniques, may be used

depending on the condition of the Creek at closure. GIR will photograph the Creek and banks during the summer of 2021 to document original conditions. Creek banks will be regraded as necessary and revegetated. Photographs will inform creek bank revegetation. GIR may use species listed in Table 2 initially to prevent erosion of the bank but will include willows and alders, sedges, and shrubs during creek bank revegetation.

1.6 Wetlands

The wetlands (0.224-acres (9,748 sq. ft.)) around Coon Track Creek will be reclaimed by replanting with native wetland species (See Exhibit D, Section 1.9). Species may include those listed in Table 3. Willows and shrubs will be hand planted.

1.7 Roads

The new road between Cross and Caribou mines will be reclaimed. The new road between the Cross and Caribou mines will be approximately 885 feet in length by 30 feet in width, with an additional 5 feet of disturbance on both sides of the road. The total area of the road and disturbance area equals 0.609 acres. The Coon Track Creek culvert along with all other road structures (anchors, riprap, foundations) will be removed along with road base and materials. These materials will be disposed of in an approved facility such as the Republic Services Foothills Landfill (approximately 29.5 miles to the east). Road materials along the portion of the road traversing the wetland will be removed and disposed of in an approved facility such as the Front Range Landfill in Erie, Colorado (approximately 40 miles east). The remainder of the road will be re-graded to approximate the original topography. Berms will be knocked down and regraded with the surrounding area. Additional fill material will be used as necessary to fill the road cuts and restore the slopes to natural contours. Roads will be revegetated in accordance with Exhibit D, Sections 1.8 and 1.9.

The Caribou Level 300 road (approximately 0.0006 acres) will be regraded and tilled prior to revegetation in accordance with Exhibit D, Section 1.9.

1.8 Soil Preparation and Revegetation

Surfaces for revegetation will be roughed to gain a mechanical bond between the subgrade and the replaced topsoil. Where the subgrade is of acceptable quality, it may include disc plowing the topsoil and subgrade together where there is access and safety is not compromised. Where equipment can operate without compromising safety, the seedbed will be loosened (four to six inches (4" to 6") deep) and smoothed. At locations where equipment cannot operate, the seedbed will be prepared by hand, scarifying to a minimum depth of one inch (1") (DRMS 2009).

GIR will replace topsoil in as even a manner as equipment allows. Topsoil will be sourced locally in Nederland, CO. Because of the thin soil types at this site, there is no available site soil for reclamation. Soil amendments will be as recommended by the local NRCS. Currently, they recommend that if soil tests are not performed, forty (40) pounds per acre of each of the major nutrients (nitrogen and phosphoric acid [H_3PO_4]) be applied. They also recommend a combination of mulch or other organic matter and a nutrient source such as well-cured feedlot or barnyard manure be applied. The recommended application rate should be at least twenty (20) tons per acre, evenly spread. The manure

must contain at least 60% (by weight) large chunks, five inches or more in diameter. (Granular or powdery manure will not meet specifications.)

If phosphoric acid is applied, it will be applied on the overburden prior to plant growth medium replacement. This nutrient is not mobile. Placing it in the root zone prior to plant growth medium replacement will ensure optimal utilization by plant roots.

The seedbed will be well settled and firm, but friable enough so the seed can be drilled at the recommended depth. Soils having been compacted by traffic or other equipment will be tilled (deep-chiseled or ripped if necessary) breaking up restrictive or compacted layers, and then harrowed and rolled or packed to produce the required firm seedbed. If the seed is to be broadcast seeded, then the seedbed will be settled and fairly firm, but left rough enough to catch the seed and allow some coverage by soil when tracked in by equipment or harrowed and packed into the soil surface. Seedbed preparation will be avoided when the soil is wet to prevent seedbed compaction. Planting depth will be less than one inch. Drill row spacing will be approximately 8 inches.

Topsoil will be replaced to a depth of between 8 to 12 inches similar to native soil in rocky areas. Soil will need to be deep enough to encourage root growth. Other areas (waste rock areas for instance) topsoil will be placed to a depth of 2 feet, depending on the condition of the surface. Because of the thin soil types at this site, there is no available site soil for reclamation.

Because this is an underground mine, no overburden was removed and none will be replaced. The operation will not conduct backfill operations as one would expect for open pit or strip mine. There is always the possibility some minor backfilling may occur (ponds). Where backfilling should occur, it will be done in such a manner that the backfilled material will be appropriately compacted to prevent slippage or settling, provided it can be done in a manner not endangering operators and equipment. No toxic or acid forming material will be backfilled on site. Therefore, leaching of toxic or acid forming materials shall not occur.

1.9 Seed Mixes

The seed and planting mixes suggested below, were developed from the vegetation descriptions contained in Exhibit B, recommendations from DRMS, and (O'Shea-Stone and Ash 2008). Seeds and plantings may change because of availability at the time of reclamation or if site conditions change.

The designated seed mixture shall be sown uniformly on the prepared areas during the fall to take advantage of winter moisture and cover. Seeding shall not be conducted if the ground is frozen. The seed mix recommended by the DRMS Inactive Mine Lands Program for high elevations will be used to revegetate the site. The following seed mix (Table3) is the DRMS recommended reclamation seed mix from Table 20-5 DRMS (2009) and is the suggested seed mix for areas above 9,000 ft. to timberline, and contains species currently at the site.

The broad selection of species for reclamation is those recommended by the DRMS for mid to high altitude abandoned mine sites. All planting will take place in the fall of the year to take advantage of winter moisture, ensuring a satisfactory level of establishment. Where practical, seed will be drilled. Where not practical due to slope steepness, the areas will be broadcast seeded at twice the drill seeding rate. The seeded areas will be mulched and crimped or tackifier to control wind and water erosion.

Because these are fertile, mountain soils, we do not intend to routinely take subsoil and topsoil soil samples for analysis. However, where soil amendments are necessary, they will be applied as appropriate (see Exhibit D, Section1.8). No grazing will be permitted since this is private land. In addition, the National Resource Conservation (NRCS) will be consulted prior to any site reclamation for site specific recommendations

Table 3 **Subalpine Vegetation Areas {9,000' to tree line}** **The below rates are for drilled seeding. The rates for broadcast seeding are double the drilled rate.**			
Species	**Scientific Name**	**Variety**	**lbs/acre**
Yarrow*	***Achillea lanulosa***	**-**	**0.1**
Groundsel	***Senecio atratus***	**-**	**0.1**
Lupine	***Lupinus alpestris***	**-**	**LO**
Slender wheatgrass	***Elymus trachycaulus***	**San Lois**	**1.4**
Nodding brome	***Bromus anomalous***		**2.5**
Sheep fescue	***Festuca ovina***	**Cover**	**0.5**
Hard fescue	***Festuca ovine duriuscula***	**Durra**	**0.5**
Red fescue	***Festuca rubra***	**Penn lawn**	**0.5**
Tufted hairgrass	***Deschampsia caespitosa***		**0.5**
Redtop	***Agrostis alba***		**0.1**
Blue wildrye	***Elymus glaucus***		**1.15**
Mutton grass	**Poa fendleriana**	**San Lois**	**0.5**
TOTAL pls lbs./acre (drilled)			**9.45**

*To be bagged separately from mix. Bag to be attached outside of primary seed bag.

This mix will be used across the areas requiring reclamation. Specific areas will be supplemented by upland tree and shrubs and wetland species (Tables 4 and 5). Quantities for supplemental species have not been provided, but will depend of the final reclamation slope configurations and the best chance of success for each species.

Suggested species selected are similar to those described in Exhibit B, Section 1.1 and successful reclamation in similar environments (O'Shea-Stone and Ash 2008).

The Idaho Tunnel slope with be supplemented with species listed in Table 4.

Table 4 **Upland Tree and Shrub Reclamation Mix**	
Species	**Scientific Name**
Ponderosa Pine	***Pinus ponderosa***
Mountain Mahogany	***Cerocarpus montanus***
Rocky Mountain Juniper	***Juniperus scopulorum***
Quaking Aspen	***Populus tremuloides***
Wild Rose	***Rosa woodsii***
Chokecherry	***Padus virginiana***
Waxcurrent	***Ribes cereum***

Table 4 Upland Tree and Shrub Reclamation Mix	
Species	**Scientific Name**
Shrubby cinquefoil	***Pentaphylloides floribunda***
Black eyed Susa	***Rudbeckia hirta***
Rocky Mountain penstemon	***Penstemon strictus***

The wetland areas and Coon Track Creek banks will be supplemented with the suggested species in Table 5.

Table 5 Wetland Reclamation Mix	
Species	**Scientific Name**
Colorado Blue Spruce	***Picea pungens***
Thin-leaf alder	***Alnus incana***
Willow	***Salix***
Wax currant,	***Ribes cereum***
Woods Rose	***Rosa woodsii***
Chokecherry	***Padus virginiana***
Waxcurrent	***Ribes cereum***
Wild strawberry	***Fragaria vesca*)**
Wild Geranium	***Geranium richardsonii***
Blue Bells	***Mertensia ciliata***

Dependent on the ability to gain access in a safe manner some areas will be broadcast seeded. If the seed is to be broadcast, the seedbed will be settled and fairly firm, but left rough enough to catch the seed and allow some coverage by soil when tracked in by equipment or harrowed and packed into the soil surface.

Tree and shrub seedlings will be hand planted in the Idaho Tunnel slope, wetland, and Coon Track Creek bank areas. Shrubs will dominate these areas and will be planted at a rate that considers the final topography and species success at being established. The total area of tree and shrub plantings will be approximately 4.71 acres.

After reseeding, mulch will be applied. Mulch will consist of hay or straw mulch, pest-free or weed-free to the extent possible. Approximately 30 percent by weight of the mulch material shall be ten inches (10") in length or longer. Rotted, caked, decayed or moldy material will not be accepted. Hay or straw mulch will be applied uniformly at the rate of two (2) tons per acre. Hydromulch may be used in some areas that may be difficult to access. Hydromulch will be applied at the rate of one and a half (1 1/2) tons per Acre (DRMS 2009).

1.10 Slopes

Slopes will be reconfigured to Approximate Original Contour (AOC) or less and will blend in with the surrounding topography or match the AOC. Where possible, regraded slopes will be 3:1 or less. Areas steeper than 2:1 will be kept to a minimum. At the Idaho Tunnel hillside, the vertical slope is currently

steeper than 3:1. However, as per approved TR No. 7 (under Rule 6.5), the final reclamation of the hillsides will meet all slope requirements and Approximate Original Contour (AOC). If necessary, the stability of replace topsoil on graded slopes will be assured by roughing in final grading to eliminate slippage zones. The proposed road will meet slope requirements. Other than the hillside and the road, there will be no significant areas of reclaimed slopes. Areas adjacent to mineshafts and portals will be stable but may be steeper than 2:1. Runoff along slopes will be controlled with erosion and sediment control structures to minimize rill and gully on slopes (See Exhibit D, Section 1. 12).

Because this is an underground mining operation, there will be no highwalls. There will be some rock faces where shafts occur (an existing shaft and the Cross Mine Decline portal). Grading will be conducted on the contour where it does not pose a safety hazard to operators and equipment.

During site reclamation, BMP storm water control practices will be in place to control erosion and siltation. Slides and other damage should not be a factor since only small areas will likely need to be graded.

1.11 Remaining Site Features

The following mine components will remain after reclamation:

- Main Parking Area
- Secondary Parking Area
- Subsurface Drinking Water Supply Line
- Offices and Dry Room
- Cross Cabin
- NOAA Shed
- Hazardous Materials Shed
- New Septic Tank and Leach Field
- New Potable Water Pipe
- New Sanitary Water Pipe
- Existing Septic Tank and Leach Field
- Cross Shop
- Cross Ore Building
- Munitions Bunker (North)
- Caribou Conex Storage Bay

Wildlife use will be incidental and not part of the post mining land use.

1.12 Erosion Control Features

The surface areas that will require stabilization include any remaining waste rock piles, areas around the ponds and stream, and other areas where buildings have been removed. Appropriate storm water controls will used to retain and filter runoff sediment from the piles. Any exposed areas not disturbed by on-going mining operations will be seeded with the topsoil mix. All roads and parking areas will be surfaced with appropriately sized waste rock or purchased crushed rock.

All remaining ditches and sediment control facilities will be reclaimed following the specifications in this amendment and applicable Mined Land Reclamation Board regulations.

All storm water control structures and facilities will be removed and the areas reclaimed once the major areas of site reclamation are successfully revegetated and stabilized so that storm water controls may

safely be removed.

There are no large siltation structures at the site. Should one become necessary in the future it will be removed during reclamation. No new earthen dams will be constructed under this Amendment.

1.13 Reclamation Costs

Reclamation costs were estimated using the Nevada Standardized Reclamation Cost Estimator Version 1.4.1 (SRCE), Build 017b (available at: https://nvbond.org/. (NDEP-BMRR 2019). This cost estimator is a robust and accepted by federal and state agencies in the western U.S. A summary is provided in Table 6 below and the full set of spreadsheets (with quantities) is available in Appendix III.

Site Specific Assumptions

- Topsoil is trucked in from Nederland (4.3 miles = 22,704 ft distance at 6.6% grade)
- Pond sediment is trucked to landfill in Erie (44.3 miles = 233,872 ft at -2.2% grade)
- Foundation is assumed to be 6" for buildings and 0" for CONEX containers
- The Seed mix in Table 4 (Riparian or custom) as the seed mix because it is the most expensive mix in the spreadsheet at $393/acre.
- Mulch and fertilizer are not included in the revegetation cost estimate.
- There is a 60% erosion maintenance to the budget, which was approximated by determining revegetated areas where the natural ground exceeds 3:1.
- There is a 50% revegetation maintenance allowance.
- The spreadsheet is designed for regrading, not complete removal of waste rock piles. Waste rock volumes with haul distances (similar to the ponds) are used.
- Acres for reclamation are shown in Exhibit C, Table 1.

Table 6 Reclamation Cost Summary

	Labor	Equipment	Materials	Total
A. Earthwork/Recontouring	**$22,423**	**$50,681**	**$5,976**	**$79,080**
B. Revegetation/Stabilization	**$3,319**	**$1,186**	**$10,342**	**$14,847**
C. Detoxification/Water Treatment/Disposal of Wastes	**$905**	**$1,695**	**$0**	**$2,600**
D. Structure, Equipment and Facility Removal, and Misc.	**$8,799**	**$4,549**	**$9,500**	**$22,848**
E. Monitoring	**$5,203**	**$14,170**	**$1,528**	**$20,901**
F. Construction Management Support	**$0**	**$0**	**$0**	**$0**
G. Closure Planning, G&A, Human Resources	**$0**	**$0**	**$0**	**$0**
Subtotal Operational and Maintenance	**$40,649**	**$72,281**	**$27,346**	**$140,276**
Indirect Costs	**0**	**0**	**0**	**$61,070**
Total	**$40,649**	**$72,281**	**$27,346**	**$201,346**

1.14 Time Limit and Phased Reclamation (Section 3.1.3)

This is an underground mining operation. Once underground mining is complete and the surface facilities are no longer needed, the affected mine site surface areas (Exhibit D, Section 1.1) will be reclaimed within the five-year time period.

Year One: Reclamation will begin with removal of facilities, debris, and other materials (Exhibit D, Section 1.1) that would interfere with revegetation. Water, sediment, and liners will be removed from the ponds. Reclamation areas will be graded and prepared for revegetation. If time allows during the first year of reclamation, the reclamation sites will be revegetated. Revegetation may need to wait for Year Two: Shafts and portals will be closed and fenced.

1.15 Public Use

Other than sanctioned mine tours, the area will not be open to the public. The mine access points will be gated and appropriately marked stating no unauthorized access is permitted.

1.16 Reclamation Measures Materials Handling (Rule 3)

All reclamation measures and materials handling will be conducted in accordance with the Colorado Mined Land Reclamation Board Mineral Rules and Regulations for Hard Rock, Metal, and Designated Mining Operations Reclamation Performance Standards, Rule 3. Specific requirements are addressed throughout the Exhibits in this permit application amendment.

1.16.1 Impacts to Groundwater and Surface Water

Disturbances to the prevailing hydrologic balance will be minimized by adherence to Colorado Water Quality Regulations

Groundwater Impacts

The waste rock is primarily composed of gneiss and quartz monzonite. These materials have been analyzed for leachability and acid production by ORMS-approved methods. The results of the analyses demonstrated the materials are non-acid producing and non-metals leaching. Due to the nature of the waste rock generated by mining operations, significant impact to ground water quality is not expected.

Surface Water

As with ground water, surface water quality impacts are not expected. Where needed, appropriate Best Management Practice (BMP) storm water controls will be implemented during the construction and reclamation of the proposed activities. No hazardous or toxic chemicals will be used during any of the proposed construction. Please see Exhibit B, Section 1.7.1.

GIR currently manages and treats one permitted mine water discharge point, which discharges directly into Coon Track Creek under Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) Colorado Pollutant Discharge Elimination System (CPDES) Permit CO-0032751.

1.16.2 Wildlife

During reclamation activities GIR will take into account the safety and protection of wildlife on the mine site, at processing sites, and along all access roads to the mine site with special attention given to critical periods in the life cycle of those species which require special consideration (e.g., elk calving, migration routes, and peregrine falcon nesting).

GIR will not create new wildlife habitats because the future land use is industrial use. However, the Reclamation Plan, though not intended to provide wildlife habitat, is designed to promote use by wildlife to the extent practical. The seed mix proposed for the site is extensive and is suitable for the post mining land use (Please see the Tables in Exhibit D, Section 1.9). This seed mix is recommended by the DRMS for high elevation abandoned mine site reclamation and will support use by wildlife.

1.16.3 Topsoil

The proposed Amendment reclamation activities should not result in tree removal. However, if tree removal is necessary, appropriate efforts will be made to remove only those trees and shrubs necessary to provide for an efficient and safe reclamation. Any trees removed during reclamation will be made available to the employees for fire wood.

Weeds will be managed in accordance with Appendix I.

1.16.4 Fire Lanes

The main mine site access road will remain as part of the post mining land use. It will provide adequate access for site reclamation. When necessary, fire lanes or access roads shall be constructed through the areas to be reclaimed. Given the size of the mine site and the location of the main access road, no other fire lanes or access roads will be needed.

1.16.5 Signs and Markers:

A mine identification sign with the following listed information is presently posted at the main entrance to the mining operation. An additional sign with the same required information will be posted at the additional proposed mine access point.

- The name of the Operator,
- A statement that a reclamation permit for the operator has been issued by the Colorado Mined Land Reclamation Board, and
- The permit numbers.

Given the nature of the site, some permit comers will be marked with wooden or steel fence posts; other areas will need to be drilled and a marker cemented in place. In any event, the markers will be permanent for the duration of the mining operation, visible from one post to the next, and painted a color acceptable to Boulder County.

At this time GIR intends to install monuments at the permit boundary comers.

2 References

Colorado Inactive Mine Reclamation Program, Division of Reclamation, Mining & Safety Department (DRMS) of Natural Resources, State of Colorado. 2009. General Bid Specifications.

Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation (NDEP-BMRR). 2019. Standardized Reclamation Cost Estimator (SRCE) Version 1.4.1, Build 017b.

O'Shea-Stone, M. and Ash, J. 2008. Burlington Mine VCUP Case History an Ecological Approach to

Exhibit E

Maps

Map 1: General Facilities Arrangement

Map 2: Proposed Permit Boundary Modifications

Map 3: Proposed Permit Boundary Modifications - Cross-Caribou Site

Map 4: Proposed Permit Boundary Modifications - Potosi Mine Shaft and Caribou 300 Level

Map 5: Plant Communities - Cross-Caribou Site

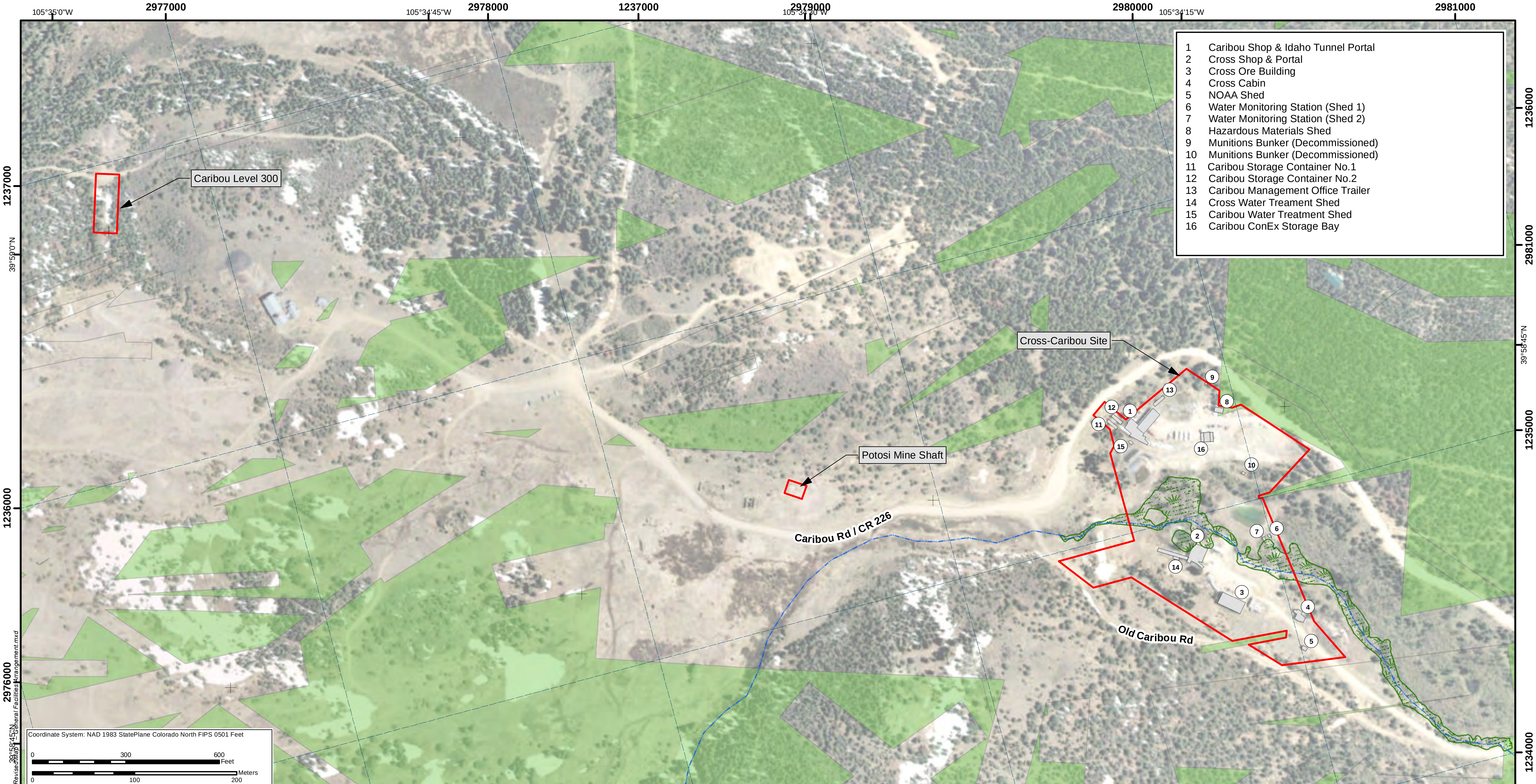
Map 6: Mining Plan

Map 7: Mine Reclamation Plan - Cross-Caribou Site

Map 8: General Facilities Arrangement Post Reclamation

Map 9.1: Proposed Road Plan View

Map 9.2: Proposed Road Profile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2978000
1237000
2979000
105°34'30"W
2980000
105°34'15"W
2981000
1236000
2981000
1235000
39°58'45"N
1234000
1237000
39°59'0"N
1236000
2976000
39°58'45"N
1 Caribou Shop & Idaho Tunnel Portal
2 Cross Shop & Portal
3 Cross Ore Building
4 Cross Cabin
5 NOAA Shed
6 Water Monitoring Station (Shed 1)
7 Water Monitoring Station (Shed 2)
8 Hazardous Materials Shed
9 Munitions Bunker (Decommissioned)
10 Munitions Bunker (Decommissioned)
11 Caribou Storage Container No.1
12 Caribou Storage Container No.2
13 Caribou Management Office Trailer
14 Cross Water Treament Shed
15 Caribou Water Treatment Shed
16 Caribou ConEx Storage Bay
Caribou Level 300
Cross-Caribou Site
Potosi Mine Shaft
Caribou Rd / CR 226
Old Caribou Rd
Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet
0 300 600 Feet
0 100 200 Meters

Legend

- Permit Boundary - Modified (9.60 ac)
- Buildings
- Private
- US Forest Service
- Coon Track Creek
- Wetland

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 1 - General Facilities Arrangement.mxd

Project: DRMS Amendment 2

Title:

EXHIBIT E

General Facilities Arrangement

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.	
GIS:	JST	05/17/21	Scale As Shown	Rev 0
Check:	BG	05/17/21	**Map 1**	
Review:	BG	05/17/21		

2976000 2977000 2978000 2979000 2980000 2981000

105°35'10"W 105°35'0"W 105°34'50"W 105°34'40"W 105°34'30"W 105°34'20"W 105°34'10"W

1237000 1236000 1235000

Caribou Level 300

Potosi Mine Shaft

Cross-Caribou Site

Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet

0 400 800 Feet

0 120 240 Meters

WY NE UT Colorado KS AZ NM OK

Legend

- Permit Boundary - Modified (9.99 ac)
- Permit Boundary - Current (8.95 ac)

Underground Workings

- Level 1
- Sub Levels

N

Project: DRMS Amendment 2

Title:

EXHIBIT E

Proposed Permit Boundary Modifications

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.		
GIS:	JST	05/17/21	Scale As Shown		Rev 0
Check:	JST	05/17/21	Map 2		
Review:	DP	05/17/21			

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 2 - Proposed Permit Boundary Modifications.mxd

Modified Permit Boundary (Cross-Caribou)			
Line		Length ft.	Bearing
L1	POB	204.414	N 82° 18' 56.87" W
L2	Thence	126.268	N 43° 00' 52.78" W
L3	Thence	121.461	S 85° 35' 51.79" E
L4	Thence	22.479	N 20° 31' 56.22" E
L5	Thence	177.625	N 85° 47' 58.79" W
L6	Thence	383.792	N 42° 47' 11.84" W
L7	Thence	126.053	S 89° 40' 40.12" W
L8	Thence	139.869	N 37° 45' 56.90" W
L9	Thence	251.135	N 89° 40' 40.11" E
L10	Thence	291.427	N 00° 19' 19.88" W
L11	Thence	26.840	N 44° 40' 40.12" E
L12	Thence	55.221	N 00° 19' 19.88" W
L13	Thence	69.704	N 34° 50' 24.47" W
L14	Thence	56.697	N 55° 09' 35.53" E
L15	Thence	88.561	S 34° 50' 24.46" E
L16	Thence	254.498	N 65° 15' 13.12" E
L17	Thence	126.268	S 41° 46' 28.81" E
L18	Thence	48.527	S 18° 59' 37.69" W
L19	Thence	43.650	S 65° 26' 48.35" E
L20	Thence	31.020	N 85° 04' 40.17" E
L21	Thence	262.951	S 41° 46' 28.81" E
L22	Thence	188.212	S 57° 55' 06.21" W
L23	Thence	36.387	S 86° 49' 33.08" W
L24	Thence	8.319	S 10° 01' 04.02" W
L25	Thence	11.830	S 85° 30' 30.81" E
L26	Thence	430.712	S 07° 39' 42.79" E
L27	Thence	152.299	S 25° 58' 47.74" E

1236000 2980000 39°58'50"N 1235500 1235000 2980500 105°34'10"W 1234500

105°34'20"W 2979500 2979000 105°34'20"W 1236000

New Section (B)
Oil Building Parking Lot

New Section (C)
Pond 2 Water Pipes

POB
X - 2980130.128
Y - 1234436.765

New Section (A)
Idaho Tunnel Slope

New Section (D)
Pond 3 & Road

105°34'10"W 2980500 1234000 2980000 39°58'30"N

Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet
0 150 300 Feet
0 50 100 Meters

Legend

- Permit Boundary - Modified (9.60 ac)
- Permit Boundary - Current (8.95 ac)

Underground Workings

- Level 1
- Sub Levels

Permit Modifications		
New Section	Name	Area (ac)
A	Idaho Tunnel & Slope	0.11 ac
B	Oil Building Parking Lot	0.27 ac
C	Pond 2 Water Pipes	0.13 ac
D	Pond 3 & Road	0.13 ac

Project: DRMS Amendment 2

Title:

EXHIBIT E

Proposed Permit Boundary Modifications
Cross-Caribou Site

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.	
GIS:	JST	05/17/21	Scale As Shown	Rev 0
Check:	JST	05/17/21	**Map 3**	
Review:	DP	05/17/21		

Path: G:\Projects\Nederland\ArcMap\DRMSAmendment 2\Revised\Map 3 - Proposed Permit Boundary Modifications Cross-Caribou Site.mxd

Modified Permit Boundary (Potosi Shaft)			
Line		Length ft.	Bearing
L1	POB	60.000	N 56° 16' 17.96" W
L2	Thence	45.000	N 33° 43' 42.04" E
L3	Thence	60.000	S 56° 16' 17.96" E
L4	Thence	45.000	S 33° 43' 42.04" W

POB
X - 2978576.242
Y - 1235379.052

Modified Permit Boundary (Caribou Level 300)			
Line		Length ft.	Bearing
L1	POB	75.000	N 72° 40' 24.50" W
L2	Thence	190.000	N 17° 19' 35.50" E
L3	Thence	75.000	S 72° 40' 24.50" E
L4	Thence	190.000	S 17° 19' 35.50" W

POB
X - 1236772.353
Y - 2976671.955

Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet
0 100 200 Feet
0 30 60 Meters

Legend
- Potosi Permit Boundary - Modified (0.06 ac)
- Caribou 300 Level Permit Boundary - Modified (0.33 ac)

Underground Workings
- Level 1
- Sub Levels

Project: DRMS Amendment 2

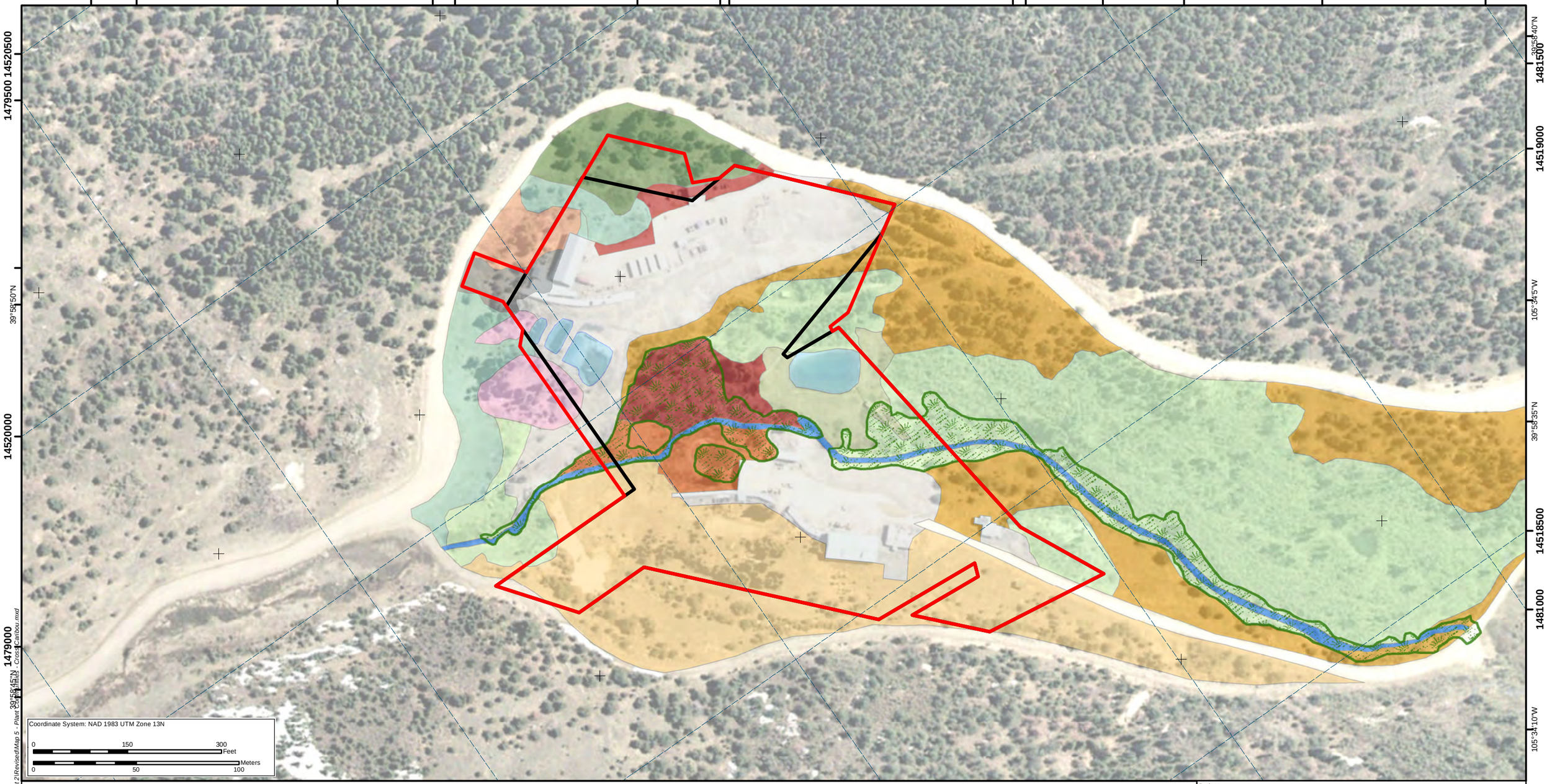
Title: **EXHIBIT E**

Proposed Permit Boundary Modifications
Potosi Mine Shaft and Caribou 300 Level

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.	
GIS:	JST	05/17/21	Scale As Shown	Rev 0
Check:	JST	05/17/21	Map 4	
Review:	DP	05/17/21		

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 4 - Proposed Permit Boundary Modifications Potosi Mine Shaft and Caribou 300 Level.mxd



Legend

- Permit Boundary - Modified (9.60 ac)
- Permit Boundary - Current (8.95 ac)
- Wetland

Vegetation

- Coon Track Creek
- Aspen Woodland
- Aspen/Lodgepole Pine Woodland
- Developed
- Disturbed Upland Meadow
- Limber/Lodgepole Pine Parkland
- Lodgepole Pine Parkland
- Planted Grasses
- Pond (Open Water)
- Rock Outcrop
- Spruce/Fir Woodland
- Upland Meadow
- Willow/Spruce/Fir Woodland
- Willow Woodland

Project

DRMS Amendment 2

Title

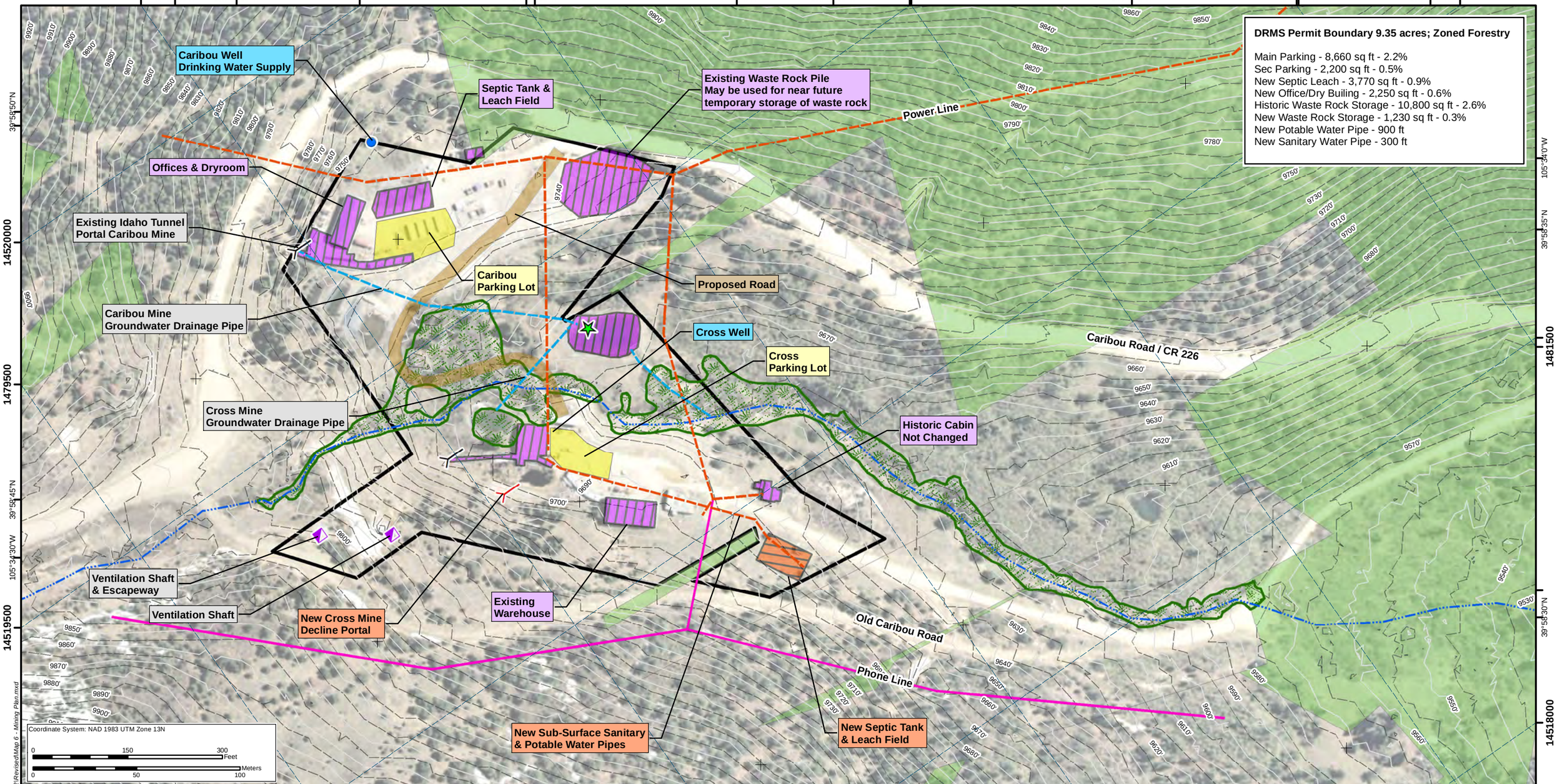
EXHIBIT E

Plant Communities
Cross-Caribou Site

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.	
GIS:	JST	05/17/21	Scale As Shown	Rev 0
Check:	BG	05/17/21	**Map 5**	
Review:	BG	05/17/21		

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 5 - Plant Communities - Cross-Caribou.mxd



Legend

- Permit Boundary - Current (8.95 ac)
- Private
- US Forest Service
- Caribou Well
- Ventilation Shaft & Escapeway
- Existing Cross Mine Portal
- New Cross Mine Decline Portal
- Weekly Water Flow Measurement
- Power Line
- Phone Line
- Groundwater Drainage Pipe
- Coon Track Creek
- Historic Features
- New Features
- Parking Area
- Wetland
- Water Feature
- Proposed Road

Project: DRMS Amendment 2

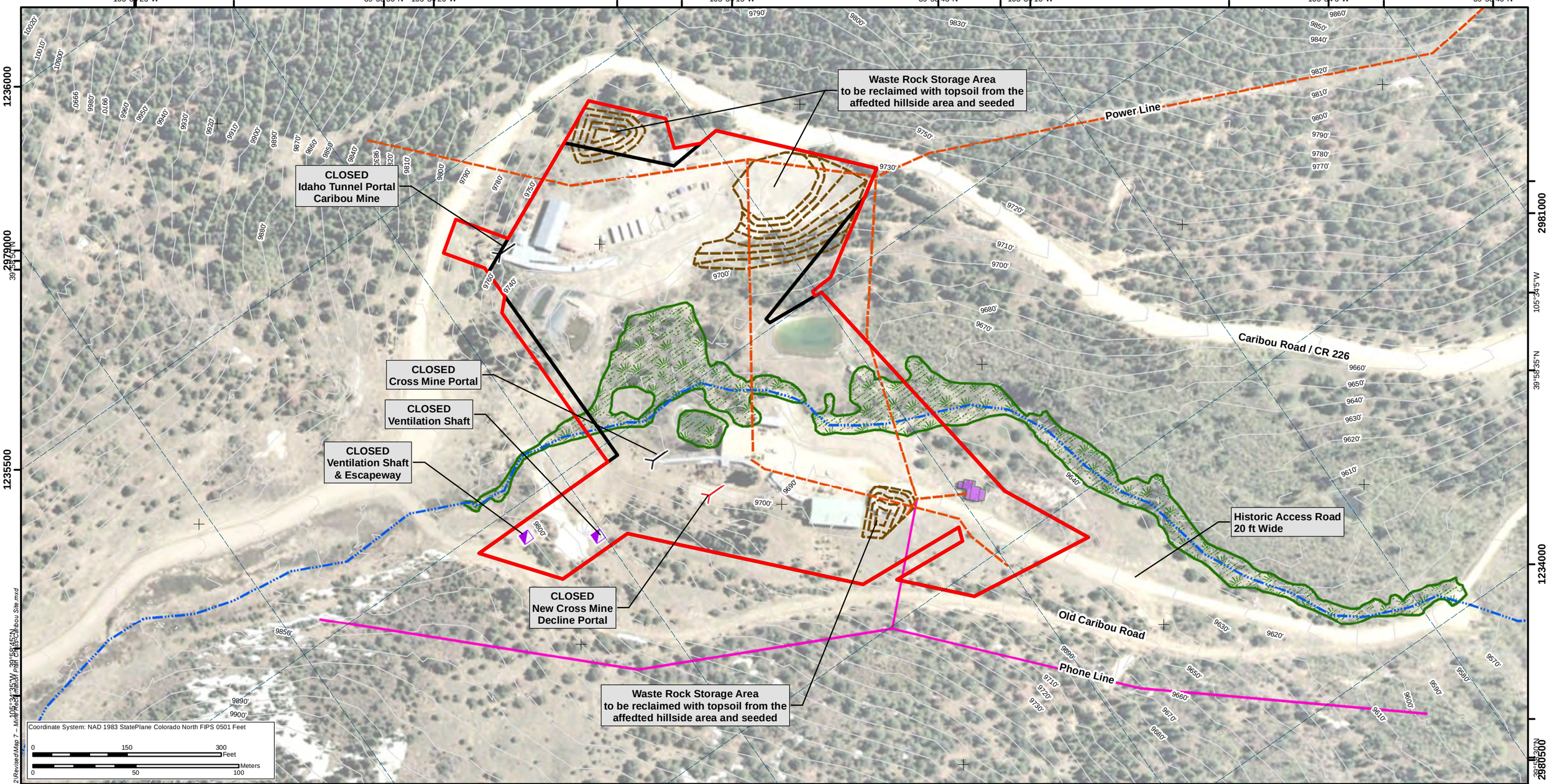
Title: **EXHIBIT E**

Amendment 1
Mining Plan

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.		
GIS:	JST	05/24/21	Scale As Shown	Rev 0	
Check:	BG	05/24/21	**Map 6**		
Review:	BG	05/24/21			

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 6 - Mining Plan.mxd



Legend

- Permit Boundary - Modified (9.60 ac)
- Permit Boundary - Current (8.95 ac)
- Ventilation Shaft & Escapeway
- Existing Cross Mine Portal
- New Cross Mine Decline Portal
- Power Line
- Phone Line
- Coon Track Creek
- Historic Cabin
- Wetland

Project: DRMS Amendment 2

Title:

EXHIBIT E

Mine Reclamation Plan
Cross-Caribou Site

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.	
GIS:	JST	05/17/21	Scale As Shown	Rev 0
Check:	BG	05/17/21	Map 7	
Review:	BG	05/17/21		

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 7 – Mine Reclamation Plan Cross-Caribou Site.mxd

2980000

105°34'15"W

1235000

1234000

39°58'30"N

Caribou Rd / CR 226

Old Caribou Rd

28

10

4

19

22

9

18

4	Caribou Shop
9	Cross Shop
10	Storage Magazine
18	Ore Building
19	Cross Cabin
22	NOAA Shed
28	Old Stone Magazine

Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet

0 120 240 Feet

0 40 80 Meters

Legend

- Private
- US Forest Service
- Permit Boundary - Modified (9.60 ac)
- Buildings - Post Reclamation
- Mill Building (Unconstructed)
- Septic and Leach Field
- Water Wells

Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Revised\Map 8 Exhibit E Facilities Arrangement Post Reclamation.mxd

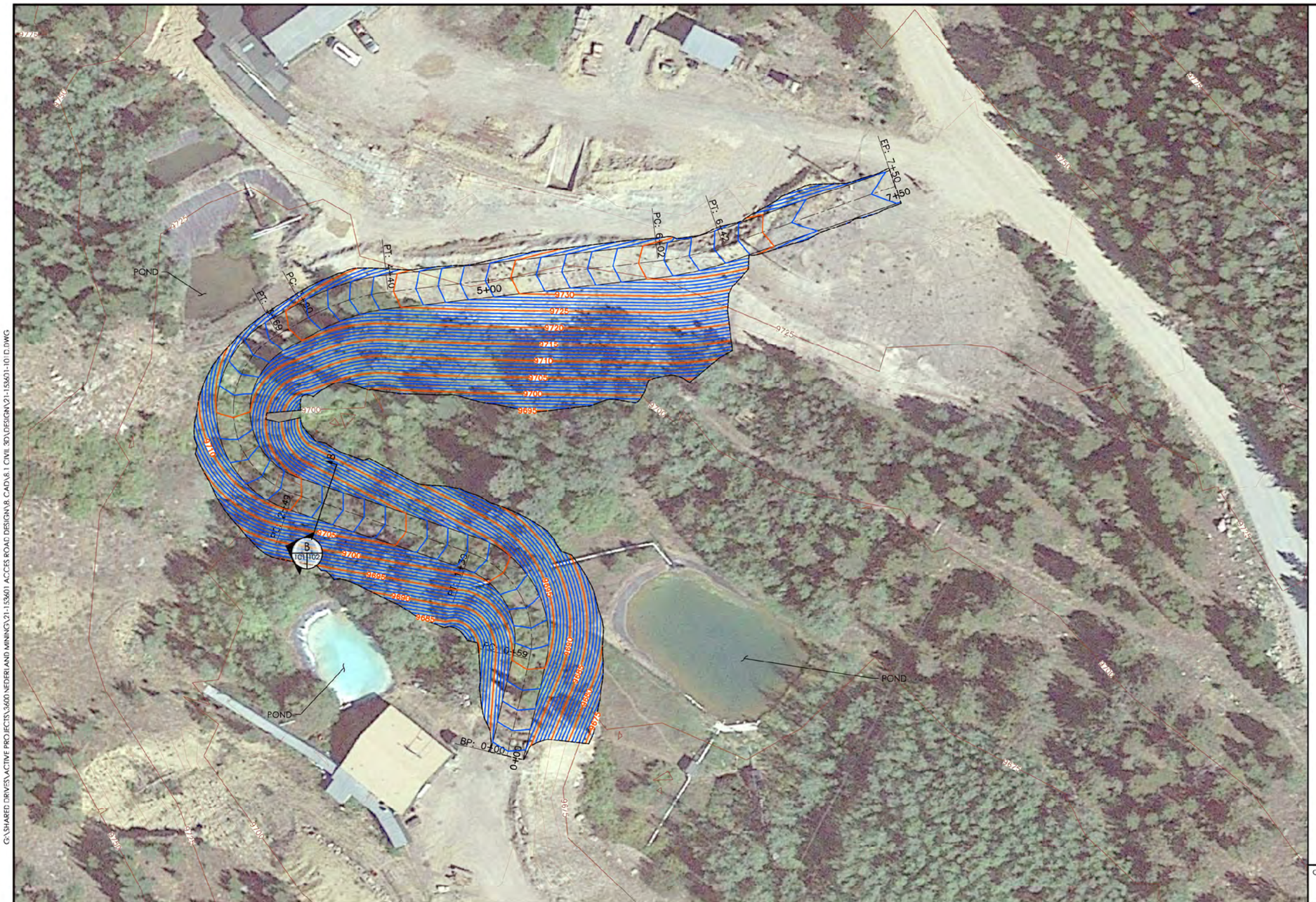
Project: DRMS Amendment 2

Title: **EXHIBIT E**

General Facilities Arrangement Post Reclamation

GRAND ISLAND RESOURCES

Project No. CO-0801			File No.		
GIS:	JST	05/20/21	Scale As Shown		Rev 0
Check:	BG	05/20/21	**Map 8**		
Review:	BG	05/20/21			



LEGEND:

EXISTING GROUND CONTOURS

PROPOSED CONTOURS

N

30 0 30 60

SCALE FEET

Dwg. No.	REFERENCE	Ref. No.	REV	BY	APP'D	DESCRIPTION	DA	MO	YR
N/A	01 - TOPO.PDF	02	B	JAC	JAC	ISSUED FOR REVIEW	23	5	21
N/A	CONTOURS.DWG	01	A	JAC	JAC	ISSUED FOR REVIEW	11	5	21

APPROVED JAC	DRAWN ARM	23	5 21
DATE MAY 23, 2021	CHECK JAC	23	5 21
SCALE 1:30	DESIGN JAC	23	5 21
B 21-153601	DES. CHK. JAC	23	5 21
	CAD FILE: 21-153601-101D		

SOLUM CONSULTING GROUP

CLIENT: GRAND ISLAND RESOURCES

PROJECT: ACCESS ROAD DESIGN AND CONSTRUCTION DRAWINGS

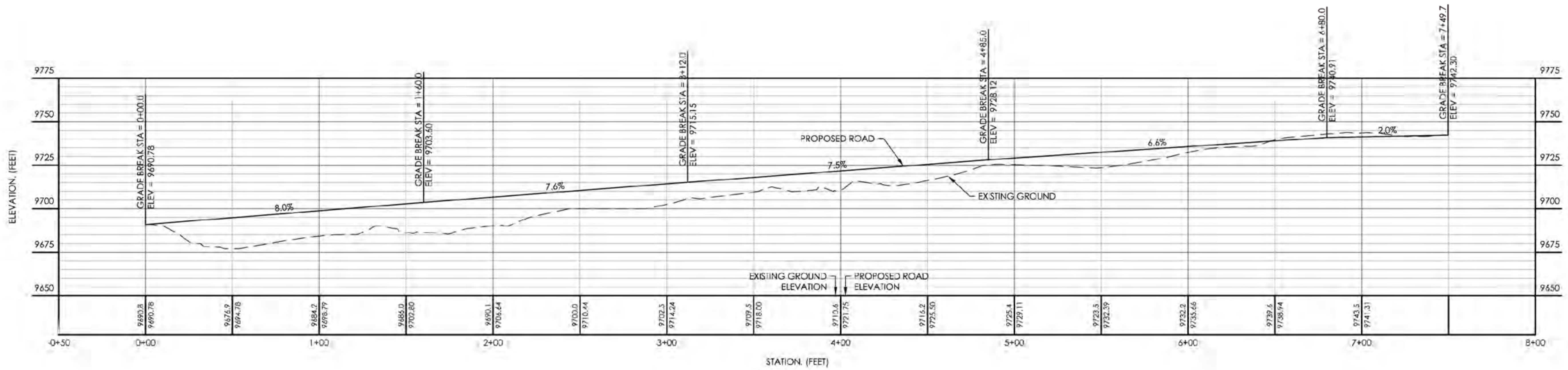
TITLE: EXHIBIT E
PROPOSED ROAD
PLAN VIEW
CONCEPTUAL

MAP 9-1

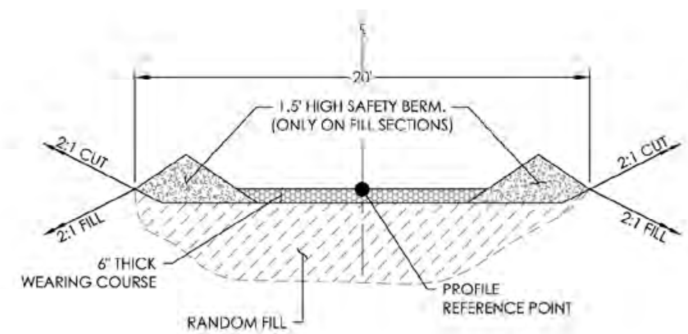
DWG. 21-153601-101D | REV B

G:\SHARED DRIVES\ACTIVE PROJECTS\3600 NEDERLAND MINING\21-153601 ACCES ROAD DESIGN\8 CAD\8.1 CIVIL 3D\DESIGN\21-153601-101D.DWG

Sunday, May 23, 2021 8:25:00 PM



PROPOSED ROAD PROFILE (A 102|101)
1:30



TYPICAL SECTION ROAD (B 102|101)
NOT TO SCALE

SCALE 30 0 30 60 FEET

CLIENT: GRAND ISLAND RESOURCES

PROJECT: ACCESS ROAD DESIGN AND CONSTRUCTION DRAWINGS

TITLE: EXHIBIT E
PROPOSED ROAD
PROFILE VIEW
CONCEPTUAL

MAP 9-2

DWG. 21-153601-102D | REV B

APPROVED	JAC		DRAWN	ARM	23	5	21		
DATE	MAY 23, 2021		CHECK	JAC	23	5	21		
SCALE	1:30		DESIGN	JAC	23	5	21		
B	21-153601		DES. CHK.	JAC	23	5	21		
			CAD FILE:	21-153601-101D					

SOLUM CONSULTING GROUP

THIS DRAWING AND ITS CONTENTS ARE CONFIDENTIAL FOR THE PRIVATE INFORMATION OF NEDERLAND MINING CONSULTANT FOR USE ONLY FOR THE PROJECT FOR WHICH IT WAS PREPARED, AND ARE NOT TO BE RELIED UPON OR USED IN WHOLE OR IN PART FOR OTHER PURPOSES OR BY OR FOR THE BENEFIT OF OTHERS WITHOUT PRIOR ADAPTATION AND SPECIFIC WRITTEN VERIFICATION BY SOLUM C.G.

Dwg. No.	REFERENCE	Ref. No.	REV	BY	APP'D	DESCRIPTION	DA	MO	YR
N/A	04 - COON CREEK CROSSING.PDF	05							
N/A	03 - SECTIONS ALONG ROADWAY.PDF	04							
N/A	02 - ROADWAY SECTION CUTS.PDF	03	B	JAC	JAC	ISSUED FOR REVIEW	23	5	21
N/A	CONTOURS.DWG	01	A	JAC	JAC	ISSUED FOR REVIEW	11	5	21

G:\SHARED DRIVES\ACTIVE PROJECTS\600 NEDERLAND MINING\21-153601 ACCESS ROAD DESIGN\8. CAD\8.1 CIVIL 3D\DESIGN\21-153601-101D.DWG

Sunday, May 23, 2021 8:24:10 PM

Exhibit F

List of Other Permits and Licenses Required

Provide a statement identifying which of the following permits, licenses and approvals which are held or will be sought in order to conduct the proposed mining and reclamation operations. (Effluent discharge permits, air quality emissions permits, radioactive source material licenses, disposal of dredge and fill material (404) permits, permit to construct a dam, State Historic Preservation Office clearance, highway access permits, U.S. Forest Service permits, Bureau of Land Management permits, county zoning and land use permits, and city zoning and land use permits):

CDPHE

Water Quality Control Division (WQCD)

Permit #: M1977-410

Amendment #1: Submitted 10/18/2011

Amendment #2: Submitted 1/6/2021

Storm Water Discharge Permit #: COR 040242

Water Quality Control Division (WQCD)

Discharge Permit #: CO-0032751:

Air Pollution Control Division

Permit #: 09B00439.XP

Alcohol Tobacco and Firearms

Federal Explosives/License Permit #: 5-CO-013-33-OH-00625

Mine Safety & Health Administration

Mine ID #: 0502430 – Cross Gold Mine

Mine ID #: 0502730 – Consolidated Caribou District

Boulder County

Special Use Permit #: SU-08-006

Letter regarding Special Use Permit #: SU-08-006 is attached below.

U.S. Army Cop of Engineers

No Permit Required Verification – Corps File No. NWO-2021-00388-DEN

GRAND ISLAND
RESOURCES

P.O. Box 3395
Nederland, CO 80466
May 24, 2021

May 21, 2021

Amy Eschberger
Environmental Protection Specialist
Colorado Department of Natural Resources
Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

RE: File No. M1977-410-110(2) Limited Impact Permit Amendment Application
Boulder County Community Planning and Permitting Response

Ms Eschberger,

On March 5th, 2021, Boulder County Planning and Permitting (BCCPP) responded to Grand Island Resources, LLC (GIR) Amendment 2 Application. Their response states that certain activities proposed by GIR are covered under the existing Special Use Permit (SU-08-006) while other activities may not be. BCCPP states that the existing Special Use Permit will need a modification review to determine the necessary steps forward.

GIR has developed a path forward with the guidance of BCCPP Planners and Code Compliance Specialists. Both GIR and BCCPP understand the process will take some time and may require a Minor and/or Major Modification in the future.

4/05/2021 – GIR submitted Planning Application Request for SU-008-006.
4/27/2021 – Modification Determination Application was accepted by BCCPP
Docket #: MD-21-0014

The Special Use Modification Determination is still on-going, and at this time, GIR has not received an official response to the application. However, GIR is working directly with Sr. Planners at BCCPP and appreciates their support and guidance to modifying the existing permit.

When a response is received from BCCPP, GIR will provide a status update to DRMS. If you should require anything in the interim, please do not hesitate to ask.

Sincerely,

Daniel Pollock
Regulations and Permitting
Grand Island Resources, LLC
720.207.5154
dpollock@nedmining.com

Exhibit G

Source of Legal Right to Enter

Provide a description of the basis for the legal right of entry to the site and to conduct mining and reclamation for Owners of Record:

See attached:

Right to Enter Property Under Recorded Agreements

03882970 05/05/2021 10:26 AM
RF: $143.50 DF: $0.00 Page: 1 of 17
Electronically recorded in Boulder County Colorado. Recorded as received.

Prepared By

Gregory P Miller
PO Box 1468
Socorro, New Mexico 87801

After Recording Return To

Richard Mittasch
4415 Caribou Road
PO Box 3395
Nederland, Colorado 80466

Space Above This Line for Recorder's Use

COLORADO GENERAL WARRANTY DEED

STATE OF COLORADO
BOULDER COUNTY

KNOW ALL MEN BY THESE PRESENTS, That for and in consideration of the sum of TEN DOLLARS ($10.00) in hand paid to Aardvark Agencies, Inc., a Washington corporation, whose address is 4415 Caribou Road, PO Box 3395, Nederland, Colorado, 80466, County of Boulder, State of Colorado (hereinafter known as the "Grantor(s)") hereby grants, conveys, and sells to Grand Island Resources LLC, a Colorado Limited Liability Company, whose address is Grand Island Resources LLC, 4415 Caribou Road, PO Box 3395, Nederland, Colorado, 80466, County of Boulder, State of Colorado (hereinafter known as the "Grantee(s)") all the rights and warrants the title, interest, and claim in or to the following described real estate in Exhibit A attached), situated in Boulder County, Colorado to-wit:

Mining Claims as described in Exhibit A

TOGETHER WITH all the rights, members and appurtenances to the Real Estate in anywise appertaining or belonging thereto.

TO HAVE AND TO HOLD, the tract or parcel of land above described together with all and singular the rights, privileges, tenements, appurtenances, and improvements unto the said Grantees, their heirs and assigns forever.

And said Grantors, for said Grantors, their heirs, successors, executors and administrators, covenants with Grantees, and with their heirs and assigns, that Grantors are lawfully seized in fee simple of the said Real Estate; that said Real Estate is free and clear from all Liens and Encumbrances, except as hereinabove set forth, and except for taxes due for the current and subsequent years, and except for any Restrictions pertaining to the Real Estate of record in the Probate Office of said County; and that Grantors will, and their heirs, executors and administrators shall, warrant and defend the same to said Grantees, and their heirs and assigns, forever against the lawful claims of all persons.

IN WITNESS WHEREOF, Grantor has executed and delivered this General Warranty Deed under seal as of the day and year first above written.

Grantor's Signature

Richard MiHasch

Grantor's Name

PO Box 3395

Address

Nederland, CO 80466

City, State & Zip

Grantor's Signature

Grantor's Name

Address

City, State & Zip

STATE OF COLORADO)

COUNTY OF Boulder)

I, the undersigned, a Notary Public in and for said County, in said State, hereby certify that Richard Mittasch whose names are signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, they, executed the same voluntarily on the day the same bears date.

Given under my hand this 4th day of May, 2021.

C Laforge

Notary Public

CHELSEY LAFORGE
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20144010719
My Commission Expires March 7, 2022

My Commission Expires: March 7, 2022

Parcel A **EXHIBIT A**

The following property located in Sections 5, 7, 8 and 9, Township 1 South, Range 73 West of the 6th P.M., in the Grand Island Mining District, County of Boulder, State of Colorado, to Wit:

The East 500 Feet of the Arizona Lode Claim (United States Mineral Survey No. 54), as set forth in Patent recorded November 25, 1878 in Book 57 at Page 123, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Barablas Lode Claim (United States Mineral Survey No. 15588), as set forth in Patent recorded January 24, 1980 on Film 1101 as Reception No. 380278, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Brazilian Lode and Brazilian Millsite Claims (United States Mineral Survey Nos. 13367A and 13367B), as set forth in Patent recorded January 28, 1911 in Book 339 at Page 75, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

(Continued to Following Pages)

The Candia, Northpark, California and Toledo Lode Claims (United States Mineral Survey No. 20483), as set forth in Patent recorded March 11, 1938 in Book 651 at Page 305, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Caribou Lode Claim (United States Mineral Survey No. 37), as set forth in Patent recorded October 9, 1872 in Book V at Page 122, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Carry Lode Claim (United States Mineral Survey No. 660), as set forth in Patent recorded January 24, 1980 on Film 1101 as Reception No. 380277, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Columbia Lode Claim (United States Mineral Survey No. 167), as set forth in Patent recorded October 27, 1883 in Book 79 at Page 41, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Douglas Lode Claim (United States Mineral Survey No. 47), as set forth in Patent recorded April 24, 1887 in Book 31 at Page 241, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Extension Lode Claim (United States Mineral Survey No. 92), as set forth in Patent recorded October 17, 1887 in Book 38 at Page 564, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Federal Lode Claim (United States Mineral Survey No. 91), as set forth in Patent recorded September 7, 1874 in Book 31 at Page 49, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Golconda Lode Claim (United States Mineral Survey No. 192), as set forth in Patent recorded November 11, 1880 in Book 59 at Page 141, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Grand Island Lode Claim (United States Mineral Survey No. 61), as set forth in Patent recorded June 27, 1883 in Book 79 at Page 269, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Grand View Lode Claim (United States Mineral Survey No. 297), as set forth in Patent recorded January 31, 1947 in Book 799 at Page 464, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Grant County Lode Claim (United States Mineral Survey No. 115), as set forth in Patent recorded October 13, 1884 in Book 79 at Page 157, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Hidden Treasure Lode Claim (United States Mineral Survey No. 105), as set forth in Patent recorded November 1, 1875 in Book 31 at Page 423, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

An undivided 10/12ths interest in and to the Isabel Lode Claim (United States Mineral Survey No. 170), as set forth in Patent recorded June 17, 1883 in Book 79 at Page 81, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Jay Lode Claim (United States Mineral Survey No. 169), as set forth in Patent recorded January 24, 1980 on Film 1101 as Reception No. 380279, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Kalamazoo Lode Claim (United States Mineral Survey No. 76), as set forth in Patent recorded August 9, 1946 in Book 887 at Page 304, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Lost Lode Claim (United States Mineral Survey No. 56), as set forth in Patent recorded January 22, 1887 in Book 79 at Page 217, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The No Name Lode Claim (United States Mineral Survey No. 77), as set forth in Patent recorded April 14, 1880 in Book 59 at Page 100, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Non Pareil Lode Claim (United States Mineral Survey No. 6853), as set forth in Patent recorded January 28, 1911 in Book 339 at Page 77, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Southeasterly 500 feet of the Ontario Lode Claim (United States Mineral Survey No. 55), as set forth in Patent recorded July 7, 1875 in Book 31 at Page 310, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Poorman Lode Claim (United States Mineral Survey No. 42), as set forth in Patent recorded June 6, 1874 in Book V at Page 578, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Seven Thirty Lode Claim (United States Mineral Survey No. 71), as set forth in Patent recorded April 19, 1875 in Book 31 at Page 231, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Sherman Lode Claim (United States Mineral Survey No. 93), as set forth in Patent recorded January 15, 1885 in Book 79 at Page 161, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Silver Dollar Lode Claim (United States Mineral Survey No. 654), as set forth in Patent recorded July 25, 1884 in Book 237 at Page 122, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Socorro Lode Claim (United States Mineral Survey No. 104), as set forth in Patent recorded May 24, 1883 in Book 79 at Page 53, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Spencer Lode Claim (United States Mineral Survey No. 168), as set forth in Patent recorded February 5, 1878 in Book 49 at Page 210, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

The Fannie Lode Claim (United States Mineral Survey No. 659), as set forth in Patent recorded December 29, 1947 in Book 819 at Page 375, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced parent.

Parcel B

The Belcher Lode Mining Claim (United States Mineral Survey No. 150) located in the Grand Island Mining District, and embracing a portion of Township 1 South, Range 73 West of the 6th P.M., County of Boulder, State of Colorado,

Expressly excepting and excluding those portions thereof lying within the Caribou (United States Mineral Survey No. 37), Poorman (United States Mineral Survey No. 42), Grand Republic (United States Mineral Survey No. 51), Arizona (United States Mineral Survey No. 54), Ontario (United States Mineral Survey No. 55), Magnolia (United States Mineral Survey No. 58), Peabody (United States Mineral Survey No. 68), 730 (United States Mineral Survey No. 71), Sherman (United States Mineral Survey No. 93), Maine (United States Mineral Survey No. 102), Air Shaft (United States Mineral Survey No. 116), Stanton Island (United States Mineral Survey No. 124), 530 (United States Mineral Survey No. 137), Lode Mining Claims,

As excepted United States Patent recorded January 5, 1878, in Book 49 at Page 153.

Parcel C

The West 900.00 feet of the Ontario Lode Mining Claim (United States Mineral Survey No. 55) located in Grand Island Mining District and embracing a portion of the Northwest ¼ of Section 8, Township 1 South, Range 73 West of the 6th P.M., County of Boulder, State of Colorado,

Excepted any portion thereof lying within the Arizona Lode Mining Claim (United States Mineral Survey No. 54).

PARCEL A
THE COMSTOCK LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 52) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 8, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED OCTOBER 13, 1888 IN BOOK 79 AT PAGE 273

PARCEL B
THE IXL LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 85) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 8, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED MARCH 17, 1928 IN BOOK 452 AT PAGE 73

PARCEL C
THE STATEN ISLAND LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 124) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIONS 5 AND 8, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED MAY 20, 1935 IN BOOK 452 AT PAGE 118

PARCEL D
THE PROMISE LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 149) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 5, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED OCTOBER 2, 1912 IN BOOK 167 AT PAGE 211

PARCEL E
THE MONITOR LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 227) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIONS 8 AND 9, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED IN BOOK 59 AT PAGE 214

PARCEL F
THE MONADNOC LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 274) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 5, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED PATENT RECORDED . . . . . .IN BOOK . . . . . AT PAGE. . . . . .

PARCEL G
THE NEW YORK LODE MINING CLIAM AND NEW YORK MILL SITE CLAIM (UNITED STATES MINERAL SURVEY NO. 344A AND 344B) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 8 AND 9, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED SEPTEMBER 29, 1896 IN BOOK 204 AT PAGE 113

PARCEL H
THE NORTHWESTERN LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 429) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 5, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TE P.M. AS SET FORTH AND PATENTED IN UNITED STAATES PATENT RECORDED . . . . . IN BOOK . . . . . AT PAGE . . . . .

PARCEL I
THE NAUTILIS LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 452) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 8, TOWNSHIP1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED IN BOOK 59 AT PAGE 332

PARCEL J
THE LITTLE EDDIE LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 716) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 8 TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED OCTOBER 7, 1906, IN BOOK 237 AT PAGE 48

PARCEL K
THE NORTH STAR LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 5269) LOCATD IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 5 TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED FEBRUARY 15, 1912 IN BOOK 339 AT PAGE 102

PARCEL L
THE DEVELING LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 13510) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIONS 4 AND 5, TOWNSHIP1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED JUNE 9, 1903 IN BOOK 237 AT PAGE 108

PARCEL M
THE EUREKA LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 13685) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING SECTIONS 5 AND 8, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED JANUARY 25, 1904 IN BOOK 237 AT PAGE 128

PARCEL N
THE LAST CHANCE LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 14246) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 8, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED DECEMBER 19, 1979 UNDER RECEPTION NO. 375456

PARCEL O
THE PANDORA #1 AND PANDORA #4 LODE MINING CLAIMS (UNITED STATES MINERAL SURVEY NO. 20597) LOCATED IN GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 5, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M. AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED MARCH 1, 1961 IN BOOK 1175 AT PAGE 1

THE OPHIR LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 587) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIONS 8 AND 9, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE SIXTH PRINCIPAL MERIDIAN AS SET FORTH AND PATENTED IN UNITED STATES PATENT RECORDED

AN UNDIVIDED 3/8 INTEREST IN THE CANADIAN LODE MINING CLAIM (UNITED STATES MINERAL SURVEY #666) LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIN 6, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE SIXTH PRINCIPAL MERIDIAN AS SET FORTH AND PATENTED IN UNITED

THE ENTERPRISE LODE MINING CLAIM, SURVEY LOT NO. 19828 IN SECTIONS 4,5 8 AND 9, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH PRINCIPAL MERIDIAN, GRAND ISLAND MINING DISTRICT, EXCEPTING THOSE PORTIONS THEREOF EMBRACED IN RICO LODE MINING CLAIM AND APEX LODE MINING CLAIM, BOTH IN SURVEY LOT NO. 14286, ALSO EXCEPTING THOSE PORTIONS THEREOF EMBRACED IN OPHIR LODE MINING CLAIM SURVEY LOT NO. 587, AND CENTRAL LODE MINING CLAIM SURVEY LOT NO. 481.

Parcel P

THE ARLET NO. 1, NO. 2, NO. 3 AND NO. 4 LODE MINING CLAIMS (U.S. SURVEY NO. 16705) AND THE STANDARD NO. 8 LODE MINING CLAIM (U.S. MINERAL SURVEY NO. 15088) AND THE STANDARD NO. 6 AND NO. 9 LODE MINING CLAIMS (U.S. MINERAL SURVEY NO. 16705; LYING NORTH AND WEST OF THE SOUTH LINE OF THE AFORESAID ARLET NO. 1 LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIONS 9 AND 16 IN TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M., COUNTY OF BOULDER, STATE OF COLORADO.

EXPRESSLY EXCEPTING AND EXCLUDING ALL THAT PORTION OF NATION NO. 2 AND NATION NO. 3 LODE CLAIM SURVEY NO. 15637, AS EXCEPTED AND EXCLUDED IN PATENT RECORDED APRIL 9, 1991 ON FILM 1668 AS RECEPTION NO. 1096724.

Parcel Q

NATIONAL PLACER (U.S. SURVEY NO. 17718) LOCATED IN GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 9, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M., COUNTY OF BOULDER, STATE OF COLORADO.

Parcel R

THE AMERICAN FLAG LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 12790); AND

EAGLE BIRD LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 12790); EXPRESSLY EXCEPTING AND EXCLUDING ANY PORTION OF SAID EAGLE BIRD LODE MINING CLAIM EMBRACED IN THE SWEET HOME LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 12597), AS EXCEPTED AND EXCLUDED IN UNITED STATES PATENT RECORDED DECEMBER 2, 1932 IN BOOK 452 AT PAGE 94;

BOTH LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTIONS 9, 10, AND 15, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M., COUNTY OF BOULDER, STATE OF COLORADO,

AND

EAST ST. LOUIS LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 14592);

ELONDIKE LODE MINING CLAIM (UNITED STATES MINERAL SURVEY NO. 14592);

BOTH LOCATED IN THE GRAND ISLAND MINING DISTRICT AND EMBRACING A PORTION OF SECTION 9, TOWNSHIP 1 SOUTH, RANGE 73 WEST OF THE 6TH P.M., COUNTY OF BOULDER, STATE OF COLORADO.

PARCEL A:

AMERICAN FLAG LODE, U.S. Mineral Survey No. 12790,
ARIZONA LODE (EAST 500 FEET), U.S. Mineral Survey No. 54,

ARLET NO. 1 LODE, U.S. Mineral Survey No. 16705,
ARLET NO. 2 LODE, U.S. Mineral Survey No. 16705,
ARLET NO. 3 LODE, U.S. Mineral Survey No. 16705,
ARLET NO. 4 LODE, U.S. Mineral Survey No. 16705,

BARABLAS LODE, U.S. Mineral Survey No. 15588,
BELCHER LODE, U.S. Mineral Survey No. 150,
BRAZILIAN LODE, U.S. Mineral Survey No. 13367A,
BRAZILIAN MILLSITE, U.S. Mineral Survey No. 13367B,

CALIFORNIA LODE, U.S. Mineral Survey No. 20483,
CANADIAN LODE (UNDIVIDED 3/8), U.S. Mineral Survey No. 666,
CANDIA LODE, U.S. Mineral Survey No. 20483,
CARIBOU LODE, U.S. Mineral Survey No. 37,
CARRY LODE, U.S. Mineral Survey No. 660,

COLUMBIA LODE, U.S. Mineral Survey No. 167,
COMSTOCK LODE, U.S. Mineral Survey No. 52,
DEVELING LODE, U.S. Mineral Survey No. 13510,
DOUGLAS LODE, U.S. Mineral Survey No. 47,
EAGLE BIRD LODE, U.S. Mineral Survey No. 12790,

EAST IDAHO LODE (UNDIVIDED 50%), U.S. Mineral Survey No. 346,
EAST ST. LOUIS LODE, U.S. Mineral Survey No. 14592,
ENTERPRISE LODE (UNDIVIDED 50%), U.S. Mineral Survey No. 19828,
EUREKA LODE, U.S. Mineral Survey No. 13685,
EXTENSION LODE, U.S. Mineral Survey No. 92,

FANNIE LODE, U.S. Mineral Survey No. 659,
FEDERAL LODE, U.S. Mineral Survey No. 91,
GOLCONDA LODE, U.S. Mineral Survey No. 192,
GRAND ISLAND LODE, U.S. Mineral Survey No. 61,
GRAND VIEW LODE, U.S. Mineral Survey No. 297,

GRANT COUNTY LODE, U.S. Mineral Survey No. 115,
HIDDEN TREASURE LODE, U.S. Mineral Survey No. 105,
ISABEL LODE (UNDIVIDED 10/12), U.S. Mineral Survey No. 170,
IXL LODE, U.S. Mineral Survey No. 85,

JAY LODE, U.S. Mineral Survey No. 169,
KALAMAZOO LODE, U.S. Mineral Survey No. 76,
KLONDIKE LODE, U.S. Mineral Survey No. 14592,
LAST CHANCE LODE, U.S. Mineral Survey No. 14246,
LITTLE EDDIE LODE, U.S. Mineral Survey No. 716,

LOST LODE, U.S. Mineral Survey No. 56,
MONADNOC LODE, U.S. Mineral Survey No. 274,

MONITOR LODE, U.S. Mineral Survey No. 227,
NATIONAL PLACER, U.S. Mineral Survey No. 17718,
NAUTILIS LODE, U.S. Mineral Survey No. 452,

NEW YORK LODE, U.S. Mineral Survey No. 344A,
NEW YORK MILLSITE, U.S. Mineral Survey No. 344B,
NO NAME LODE, U.S. Mineral Survey No. 77,
NON PAREIL, U.S. Mineral Survey No. 6859,
NORTH STAR LODE, U.S. Mineral Survey No. 5269,

NORTHPARK LODE, U.S. Mineral Survey No. 20483,
NORTHWESTERN LODE, U.S. Mineral Survey No. 429,
ONTARIO LODE (SOUTHEASTERLY 500 FEET), U.S. Mineral Survey No. 55,
ONTARIO LODE (WEST 900 FEET), U.S. Mineral Survey No. 55,
OPHIR LODE, U.S. Mineral Survey No. 587,

PANDORA #1 LODE, U.S. Mineral Survey No. 20597,
PANDORA #4 LODE, U.S. Mineral Survey No. 20597,
POORMAN LODE, U.S. Mineral Survey No. 42,
PROMISE LODE, U.S. Mineral Survey No. 149,
SEVEN THIRTY LODE, U.S. Mineral Survey No. 71,

SHERMAN LODE, U.S. Mineral Survey No. 93,
SILVER DOLLAR LODE, U.S. Mineral Survey No. 654,
SOCORRO LODE, U.S. Mineral Survey No. 104,
SPENCER LODE, U.S. Mineral Survey No. 168,
STANDARD NO. 6 LODE, U.S. Mineral Survey No. 16705,

STANDARD NO. 8 LODE, U.S. Mineral Survey No. 16705,
STANDARD NO. 9 LODE, U.S. Mineral Survey No. 16705,
STATEN ISLAND LODE, U.S. Mineral Survey No. 124,
TOLEDO LODE, U.S. Mineral Survey No. 20483,
County of Boulder, State of Colorado.

PARCEL B:

7-49 LODE (UNDIVIDED 1/3), U.S. Mineral Survey No. 16199,
AIRSHAFT, U.S. Mineral Survey No. 116,
ALPINE LODE, U.S. Mineral Survey No. 14286,
AMANDA LODE, U.S. Mineral Survey No. 13172,
AMERICAN LODE, U.S. Mineral Survey No. 14286,

ANACONDA LODE (SUBSURFACE MINERALS), U.S. Mineral Survey No. 12934,
ANACONDA LODE (T.S. HENDRICKS' SURFACE), U.S. Mineral Survey No. 12934,
APEX LODE, U.S. Mineral Survey No. 14286,
ARIZONA LODE (WEST 900 FEET), U.S. Mineral Survey No. 54,
BOB TAIL LODE (SUBSURFACE MINERALS), U.S. Mineral Survey No. 13180,

BOB TAIL LODE, SURFACE - OWNED BY T.S. HENDRICKS), U.S. Mineral Survey No. 13180,
BROKEN BOW LODE, (SUBSURFACE), U.S. Mineral Survey No. 13146,
CENTRAL LODE, U.S. Mineral Survey No. 481,
CHIEF LODE, U.S. Mineral Survey No. 15637,
CONGER LODE, U.S. Mineral Survey No. 94A,

CROSS LODE, U.S. Mineral Survey No. 518,
Cross MILLSITE, U.S. Mineral Survey No. 20681B,
CROSS NO. 2 LODE, U.S. Mineral Survey No. 20681A,
CROWN POINT LODE, U.S. Mineral Survey No. 6825,
DEFIANCE LODE, U.S. Mineral Survey No. 5868,

EMILIE LODE (UNDIVIDED 1/3), U.S. Mineral Survey No. 16199,
GARFIELD LODE (UNDIVIDED 3/8), U.S. Mineral Survey No. 522,
GARFIELD LODE (UNDIVIDED 5/8), U.S. Mineral Survey No. 522,
GILPIN COUNTY LODE, (SMITH TRUST MINING LEASE, U.S. Mineral Survey No. 12933,
GOLD COIN, U.S. Mineral Survey No. 18514,

HOMESTEAD LODE (SMITH TRUST MINING LEASE), U.S. Mineral Survey No. 13471,
IDAHO LODE (39/143 INT.), U.S. Mineral Survey No. 96A,
IDAHO MILLSITE (221/858 INT.), U.S. Mineral Survey No. 96B,
IRON KING (SUBSURFACE ONLY), U.S. Mineral Survey No. 16776,
IRON KING NO. 2, (SUBSURFACE ONLY), U.S. Mineral Survey No. 16776,

IRON WONDER (SUBSURFACE ONLY), U.S. Mineral Survey No. 16776,
ISABEL LODE (UNDIVIDED 2/12), U.S. Mineral Survey No. 170,
JULIET LODE, U.S. Mineral Survey No. 13272,
LAFAYETTE LODE (SUBSURFACE MINERALS), U.S. Mineral Survey No. 12934,
LAFAYETTE LODE (SURFACE - THOMAS S. HENDRICKS), U.S. Mineral Survey No. 12934,

LARAMIE COUNTY LODE (SMITH TRUST MINING LEASE), U.S. Mineral Survey No. 13471,
LARAMIE COUNTY NO. 2 LODE, U.S. Mineral Survey No. 13471,
L.S. ROOT MILLSITE, U.S. Mineral Survey No. 117,
MAINE LODE, U.S. Mineral Survey No. 102,
MAMMOTH LODE, U.S. Mineral Survey No. 13272,
MONTICELLO LODE, U.S. Mineral Survey No. 15637,

NATION LODE, U.S. Mineral Survey No. 12985,
NATION NO. 2 LODE, U.S. Mineral Survey No. 15637,
NATION NO. 3 LODE, U.S. Mineral Survey No. 15637,
PAY ROCK LODE, U.S. Mineral Survey No. 8480,
PONDEROSA LODE, U.S. Mineral Survey No. 13172,

POTOSI LODE, U.S. Mineral Survey No. 48,
PROTECTION LODE, U.S. Mineral Survey No. 13272,
RARE METALS LODE, U.S. Mineral Survey No. 20681A,
RARE METALS MILLSITE, U.S. Mineral Survey No. 20681B,
READY CASH LODE, U.S. Mineral Survey No. 6852,

RICO LODE, U.S. Mineral Survey No. 14286,
ROBERTS PLACER (SUBSURFACE ONLY), U.S. Mineral Survey No. 14284,
ROMEO LODE, U.S. Mineral Survey No. 13272,
SILVER BRICK LODE, U.S. Mineral Survey No. 159,
SILVER POINT LODE, U.S. Mineral Survey No. 39,

SMUGGLER LODE, U.S. Mineral Survey No. 13219,
SUNNY VIEW LODE, U.S. Mineral Survey No. 13471,
SYNDICATE LODE, U.S. Mineral Survey No. 15609,
TACOMA LODE, U.S. Mineral Survey No. 13272,

TEN FORTY LODE, U.S. Mineral Survey No. 287,
WINDY POINT LODE, U.S. Mineral Survey No. 16926,
WORCESTER LODE, U.S. Mineral Survey No. 14286,
County of Boulder, State of Colorado.

Parcel A

Dutch Park Lode Claim (United States Mineral Survey No. 16838) located in the Grand Island Mining District, as set forth in Patent recorded April 21, 1937 at Book 398 at Page 441, expressly excepting and excluding all that portion of ground embraced in mining claims or mineral surveys excepted in the above referenced patent.

Congo Chief Lode Claim located in the Grand Island Mining District, as set forth in the Additional and Amended Location Certificate recorded August 13, 1925 in Book 320 Page 280 Boulder County embracing portions of Section 5, Township 1 South Range 73 West of the Sixth Principal Meridian.

Congo Chief #2 Lode Claim located in the Grand Island Mining District, as set forth in the Location Certificate recorded October 22, 1917 in Book 332 Page 493 Boulder County embracing portions of Section 4, Township 1 South Range 73 West of the Sixth Principal Meridian.

Chester City Lode Claim 1/8th interest located in the Grand Island Mining District, as set forth in the Additional and Amended Location Certificate recorded March 5, 1907 in Book 230 Page 24 Boulder County embracing portions of Section 24, Township 1 North Range 72 West of the Sixth Principal Meridian

London Lode Claim 1/8th interest located in the Grand Island Mining District, as set forth in the Additional and Amended Location Certificate recorded September 19, 1969 in Film #0679 Boulder County embracing portions of Section 24, Township 1 North Range 72 West of the Sixth Principal Meridian.

Exhibit H

Municipalities Within a Two Mile Radius

There are no municipalities within a two mile radius of the proposed Grand Island Resources, LLC mine site expansion area.

Exhibit I

Proof of Filing With County Clerk

Please see email from Boulder County Clerk and Recorders Office. Due to COVID restrictions, stamped receipts are not currently available.

DPollock@nedmining.com

From:	DPollock@nedmining.com
Sent:	Friday, December 18, 2020 9:42 AM
To:	'recording@bouldercounty.org'
Cc:	'Richard Mittasch'; 'TApodaca'; 'Daniel Takami'
Subject:	Grand Island Resources Recording Request
Attachments:	BOCO ClerkandRecorderCoverLetter 12-18-2020.docx; 12-18-20 BoulderCountyClerkSubmittal.pdf

Boulder County Clerk and Recorder's Office,

Please find attached a cover letter and DRMS permit application to be recorded. Payment instructions are included in the cover letter.

If you have any questions or concerns, please contact me.

Thank you,
Daniel Pollock
Director of Regulations and Permitting
Grand Island Resources
Nederland Mining Consultants
720.207.5154 – Office
312.342.6145 – Cell

GRAND ISLAND
RESOURCES

December, 18 2020

Boulder County Clerk and Recorders Office
1750 33rd St
Boulder, CO 80301
303.413.7700
recording@bouldercounty.org

RE: File No. M1977-410-110(2) Limited Impact Permit Amendment Application

Applicant: Grand Island Resources, LLC

Greetings,

Please find enclosed, to be filed and recorded, a Department of Reclamation, Mining and Safety - Limited Impact Operation 110(2) Reclamation Permit Application Form.

Total # of pages – 7 (not including this cover letter).

Payment Method:
Visa # 4427 4203 4119 4873
Name: Anthony R Russo
Expiration: 02/25
CVV: 887

Please confirm a successful transaction/recording to the following email:
dpollock@nedmining.com

Thank you in advance for your assistance in this matter. Should there be any questions or concerns, please contact me at the information listed below.

Sincerely,

Daniel V Pollock
Director of Regulations and Permitting
Grand Island Resources, LLC
Office – 720.207.5154
Cell – 312.342.6145

DPollock@nedmining.com

From: Recording <recording@bouldercounty.org>
Sent: Monday, December 21, 2020 1:55 PM
To: DPollock@nedmining.com
Cc: 'Richard Mittasch'; 'TApodaca'; 'Daniel Takami'
Subject: RE: Grand Island Resources Recording Request

Good afternoon Daniel,

I have filed your document in our public notices file with the received date of 12/18/2020 since that is when you initially sent it in.
As discussed, public notices such as this are not recorded in the real estate records; they are filed in the public notices to provide public access upon request.

Please let me know if you have any questions.
Regards,
Jennifer

Jennifer Bowser
Recording Division Manager
Boulder County Clerk and Recorder
303.413.7770
recording@bouldercounty.org

From: DPollock@nedmining.com <DPollock@nedmining.com>
Sent: Friday, December 18, 2020 9:42 AM
To: Recording <recording@bouldercounty.org>
Cc: 'Richard Mittasch' <rmittasch@nedmining.com>; 'TApodaca' <TApodaca@nedmining.com>; 'Daniel Takami' <DanielTakami@gmail.com>
Subject: Grand Island Resources Recording Request

Boulder County Clerk and Recorder's Office,

Please find attached a cover letter and DRMS permit application to be recorded. Payment instructions are included in the cover letter.

If you have any questions or concerns, please contact me.

Thank you,
Daniel Pollock
Director of Regulations and Permitting
Grand Island Resources
Nederland Mining Consultants
720.207.5154 – Office
312.342.6145 – Cell

Exhibit J

Rule 6.3.11

Proof of Notices to Board of County Commissioners and Soil Conservation District:

Please see attached notice documents.

Please see email from Boulder County Board of Commissioners. Due to COVID restrictions, stamped receipts are not currently available.

DPollock@nedmining.com

From:	DPollock@nedmining.com
Sent:	Friday, December 18, 2020 9:42 AM
To:	'recording@bouldercounty.org'
Cc:	'Richard Mittasch'; 'TApodaca'; 'Daniel Takami'
Subject:	Grand Island Resources Recording Request
Attachments:	BOCO ClerkandRecorderCoverLetter 12-18-2020.docx; 12-18-20 BoulderCountyClerkSubmittal.pdf

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Daniel Pollock
Director of Regulations and Permitting
Grand Island Resources
Nederland Mining Consultants
720.207.5154 – Office
312.342.6145 – Cell

GRAND ISLAND
RESOURCES

December, 18 2020

Boulder County Clerk and Recorders Office
1750 33rd St
Boulder, CO 80301
303.413.7700
recording@bouldercounty.org

RE: File No. M1977-410-110(2) Limited Impact Permit Amendment Application

Applicant: Grand Island Resources, LLC

Greetings,

Please find enclosed, to be filed and recorded, a Department of Reclamation, Mining and Safety - Limited Impact Operation 110(2) Reclamation Permit Application Form.

Total # of pages – 7 (not including this cover letter).

Payment Method:
Visa # 4427 4203 4119 4873
Name: Anthony R Russo
Expiration: 02/25
CVV: 887

Please confirm a successful transaction/recording to the following email:
dpollock@nedmining.com

Thank you in advance for your assistance in this matter. Should there be any questions or concerns, please contact me at the information listed below.

Sincerely,

Daniel V Pollock
Director of Regulations and Permitting
Grand Island Resources, LLC
Office – 720.207.5154
Cell – 312.342.6145

DPollock@nedmining.com

From: Recording <recording@bouldercounty.org>
Sent: Monday, December 21, 2020 1:55 PM
To: DPollock@nedmining.com
Cc: 'Richard Mittasch'; 'TApodaca'; 'Daniel Takami'
Subject: RE: Grand Island Resources Recording Request

Good afternoon Daniel,

I have filed your document in our public notices file with the received date of 12/18/2020 since that is when you initially sent it in.
As discussed, public notices such as this are not recorded in the real estate records; they are filed in the public notices to provide public access upon request.

Please let me know if you have any questions.
Regards,
Jennifer

Jennifer Bowser
Recording Division Manager
Boulder County Clerk and Recorder
303.413.7770
recording@bouldercounty.org

From: DPollock@nedmining.com <DPollock@nedmining.com>
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Director of Regulations and Permitting
Grand Island Resources
Nederland Mining Consultants
720.207.5154 – Office
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Daniel Pollock
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Grand Island Resources
Nederland Mining Consultants
720.207.5154 – Office
312.342.6145 – Cell

GRAND ISLAND
RESOURCES

December, 18 2020

Boulder County Clerk and Recorders Office
1750 33rd St
Boulder, CO 80301
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Office – 720.207.5154
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If you have any questions or concerns, please contact me.

Thank you,
Daniel Pollock
Director of Regulations and Permitting
Grand Island Resources
Nederland Mining Consultants
720.207.5154 – Office
312.342.6145 – Cell

Exhibit L

Permanent Man-Made Structures

Permanent Man-made Structures:

Provide information sufficient to demonstrate that the stability of any structures located within two hundred (200) feet of the operation or affected land will not be adversely affected:

The Excel power line and AT&T phone line currently cross or enter the mining operation. These structures have been associated with the mining operation since it was first permitted in 1977. In addition, Boulder County Road 128 runs adjacent to existing structures located just south and east of CR 128. These structures will not be impacted by the proposed activities associated with the permit amendment. Compensation agreements are not part of this amendment since this is an existing mining operation and the structures, as noted above, have been associated with this operation since 1977, if not earlier.

The three water wells are part of the existing mining operations. As such, they do not require compensation agreements.

An example Structure Agreement which meets the requirements of the Statutes is shown below.
****

Structure Agreement

This letter has been provided to you as the owner of a structure on or within two hundred (200) feet of a proposed mine site. The State of Colorado, Division of Reclamation, Mining and Safety ("Division") requires that where a mining operation will adversely affect the stability of any significant, valuable and permanent man-made structure located within two hundred (200) feet of the affected land, the Applicant shall either:

a) Provide a notarized agreement between the Applicant and the Person(s) having an interest in the structure, that the Applicant is to provide compensation for any damage to the structure; or

b) Where such an agreement cannot be reached, the Applicant shall provide an appropriate engineering evaluation that demonstrates that such structure shall not be damaged by activities occurring at the mining operation; or

c) Where such structure is a utility, the Applicant may supply a notarized letter, on utility letterhead, from the owner(s) of the utility that the mining and reclamation activities, as proposed, will have "no negative effect" on their utility. (*Construction Materials Rule 6.3.12 and Rule 6.4.19 & Hard Rock/Metal Mining Rule 6.3.12 and Rule 6.4.20)*

The Colorado Mined Land Reclamation Board ("Board") has determined that this form, if properly executed, represents an agreement that complies with Construction Materials Rule 6.3.12(a), Rule 6.4.19(a), and C.R.S. § 34-32.5-115(4)(e) and with Hard Rock/Metal Mining Rule 6.3.12(a), Rule 6.4.20(a), and C.R.S. § 34-32-115(4)(d). This form is for the sole purpose of ensuring compliance with the Rules and Regulations and shall not make the Board or Division a necessary party to any private civil lawsuit to enforce the terms of the agreement or create any enforcement obligations in the Board or the Division.

The following structures are located on or within 200 feet of the proposed affected area:

1. Boulder County Road CR 226, Caribou Road
2. _____
3. _____
4. _____
5. _____

(*Please list additional structures on a separate page*)

CERTIFICATION

The Applicant, Grand Island Resources, LLC (print applicant/company name), by Daniel Takami (print representative's name), as Manager (print representative's title), does hereby certify that Boulder County, Colorado (structure owner) shall be compensated for any damage from the proposed mining operation to the above listed structure(s) located on or within 200 feet of the proposed affected area described within Exhibit A, of the Reclamation Permit Application for Transfer of Operator/Cross Gold Mine/Caribou Mine (operation name), File Number M-1977-410.

This form has been approved by the Colorado Mined Land Reclamation Board pursuant to its authority under the Colorado Land Reclamation Act for the Extraction of Construction Materials and the Colorado Mined Land Reclamation Act for Hard Rock, Metal, and Designated Mining Operations. Any alteration or modification to this form shall result in voiding this form.

NOTARY FOR PERMIT APPLICANT

ACKNOWLEGED BY: Daniel Takami

Applicant Grand Island Resources, LLC Representative Name Daniel Takami

Date June 11, 2020 Title Manager

STATE OF Colorado)
) ss.
COUNTY OF Boulder)

The foregoing was acknowledged before me this 11th day of June, 2020, by Daniel Takami as Manager of Grand Island Resources, LLC

Carrie Jo Lake
Notary Public

My Commission Expires: 8/25/2023

Carrie Jo Lake
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20154033631
MY COMMISSION EXPIRES August 25, 2023

NOTARY FOR STRUCTURE OWNER

ACKNOWLEGED BY:

Structure Owner _____ Name Michael A. Thomas

Date June 15, 2020 Title County Engineer

STATE OF Colorado)
) ss.
COUNTY OF Boulder)

The foregoing was acknowledged before me this 15th day of June, 2020, by Mike Thomas as County Engineer of Boulder County.

_____ My Commission Expires: 3/6/22
Notary Public

LAUREN CELY
Notary Public
State of Colorado
Notary ID # 20144010468
My Commission Expires 03-06-2022

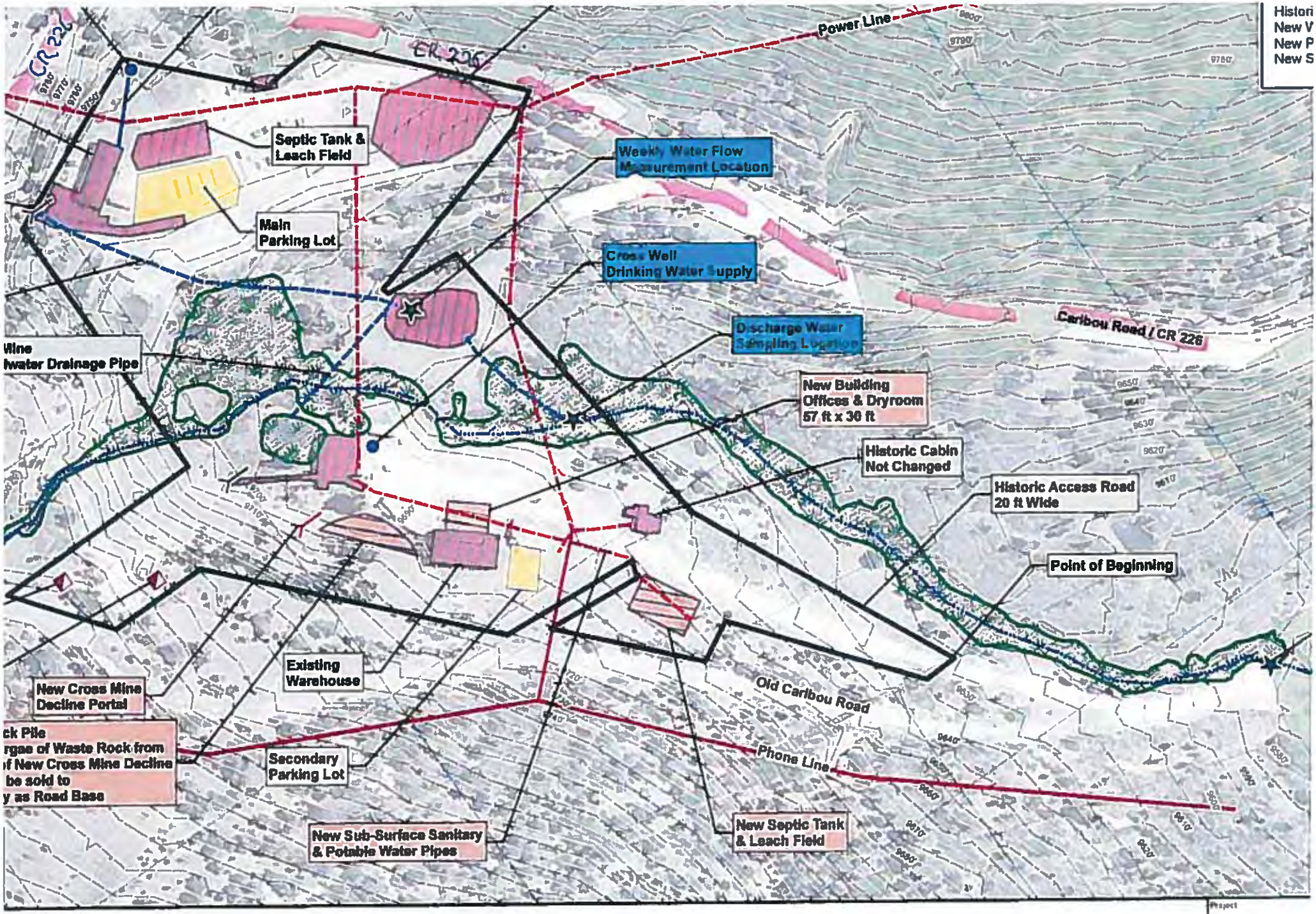

Power Line
CR 226
ER 226
Septic Tank & Leach Field
Weekly Water Flow Measurement Location
Main Parking Lot
Cross Well Drinking Water Supply
Discharge Water Sampling Location
Caribou Road / CR 226
New Building Offices & Dryroom 57 ft x 30 ft
Historic Cabin Not Changed
Historic Access Road 20 ft Wide
Point of Beginning
Existing Warehouse
New Cross Mine Decline Portal
Old Caribou Road
Phone Line
Secondary Parking Lot
New Septic Tank & Leach Field
New Sub-Surface Sanitary & Potable Water Pipes
Drinking Water Supply Line
Power Line
Phone Line
Historic Features
New Features
Parking Area

Exhibit M

Water Sampling Analysis Plan

Currently under revision. Will be provided at a later date.

Exhibit N

Rule 1.6.2(1)(a)

Notice of Filing to BOCO Conservation District

To be filed after application is accepted by CDRMS.

Exhibit O
Rule 1.6.2(1)(b)
Post Notice Sign(s) at Mine Site

Notices were posted at the entrance to the Cross Mine and the Caribou Mine on December 12, 2020. They are also posted on the exterior of each building as well as inside at office locations.

Exhibit P

Rule 1.6.2(1)(d)

Notice to Newspapers and Landowners

To be filed after application is accepted by DRMS.

Exhibit Q

Rule 1.6.2(1)(e)

List of Surrounding Land Owners

RULE 1.6.2(1)(e)

List of Surrounding Land Owners

Permit Area and Adjacent Property Owners within 200 Feet:

The following is a consolidated list of adjacent property owners within 200 feet, for the parcels that encompass that proposed permit area. The list was developed from Boulder County Assessor records.

Adjacent Property Owners within 200 feet of the affected area:

Owner	**Mailing Address**
Grand Island Resources, LLC	PO Box 3395 Nederland, CO 80466
US Government US Forest Service	C/O Land Staff 2140 Yarmouth Boulder, CO 80301
Boulder County (Road Right of Way)	PO Box 471 Boulder, CO 80306
Mark Phillips	3060 W 58th Ave Denver CO 80221
Permitted Area Property Owner(s)	**Mailing Address**
Grand Island Resources, LLC	PO Box 3395 Nederland, CO 80466

Exhibit R

Rule 1.6.2(1)(g)

Proof of Publication Return Receipts

To be filed after application is accepted by DRMS.

Exhibit S

Rule 6.5

Geotechnical Stability Exhibit

Cross Mine (M1977-410)

Technical Revision No. 9

Submitted by:

Grand Island Resources, LLC

Prepared for:

Colorado Division of Reclamation, Mining and Safety

May 6, 2021

COLORADO DIVISION OF RECLAMATION, MINING AND SAFETY
1313 Sherman Street, Room 215, Denver, Colorado 80203 ph(303) 866-3567

REQUEST FOR TECHNICAL REVISION (TR) COVER SHEET

File No.: M- 1977-410 Site Name: Cross Gold Mine

County Boulder TR# *(DRMS Use only)*

Permittee: Grand Island Resources, LLC

Operator (If Other than Permittee):

Permittee Representative: Richard Mittasch

Please provide a brief description of the proposed revision:

The purpose of this TR is to address the stipulation in the Division's TR-7 approval letter dated December 3, 2020 (attached).

As defined by the Minerals Rules, a Technical Revision (TR) is: "a change in the permit or application which does not have more than a minor effect upon the approved or proposed Reclamation or Environmental Protection Plan." The Division is charged with determining if the revision as submitted meets this definition. If the Division determines that the proposed revision is beyond the scope of a TR, the Division may require the submittal of a permit amendment to make the required or desired changes to the permit.

The request for a TR is not considered "filed for review" until the appropriate fee is received by the Division (as listed below by permit type). Please submit the appropriate fee with your request to expedite the review process. After the TR is submitted with the appropriate fee, the Division will determine if it is approvable within 30 days. If the Division requires additional information to approve a TR, you will be notified of specific deficiencies that will need to be addressed. If at the end of the 30 day review period there are still outstanding deficiencies, the Division must deny the TR unless the permittee requests additional time, in writing, to provide the required information.

There is no pre-defined format for the submittal of a TR; however, it is up to the permittee to provide sufficient information to the Division to approve the TR request, including updated mining and reclamation plan maps that accurately depict the changes proposed in the requested TR.

Required Fees for Technical Revision by Permit Type - Please mark the correct fee and submit it with your request for a Technical Revision.

Permit Type	**Required TR Fee**	**Submitted** (mark only one)
110c, 111, 112 construction materials, and 112 quarries	$216	☐
112 hard rock (not DMO)	$175	☐
110d, 112d(1, 2 or 3)	$1006	☐

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

December 3, 2020

Richard Mittasch
Grand Island Resources LLC
4415 Caribou Rd
Nederland, CO 80466

RE: Cross Gold Mine, Permit No. M-1977-410, Technical Revision Approval, Revision No. TR-7

Mr. Mittasch:

On December 3, 2020, the Division of Reclamation, Mining and Safety (Division) approved the Technical Revision application (TR-7) submitted to the Division on May 7, 2020, addressing the following:

To present geotechnical stability analyses for the slopes adjacent to the Idaho Tunnel Portal

The Division's approval of TR-7 includes the following stipulation:

Stipulation No. 1:

1) Once the Idaho Tunnel has been sufficiently stabilized to allow the necessary information to be collected and analyzed, the operator shall submit a Technical Revision application that includes an updated engineering stability analysis which demonstrates the portal slope meets the stability requirements of the Mined Land Reclamation Board (as described in the Memorandum from Peter Hays, DRMS, dated May 27, 2020).

The terms of the Technical Revision No. 7 approved by the Division are hereby incorporated into Permit No. M-1977-410. All other conditions and requirements of Permit No. M-1977-410 remain in full force and effect.

Please be advised, the Division's approval of this revision does not authorize any surface disturbances to occur outside of the approved affected land boundary. To increase the affected area for the mine site, the operator must submit an Amendment application (for up to 9.9 acres) or a Conversion application (for 10 acres or more). These application forms can be downloaded from the Division's website at: https://www.colorado.gov/pacific/drms/minerals-program-forms.

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.

Sincerely,

Amy Eschberger
Environmental Protection Specialist

Cc: Peter Hays, DRMS
Michael Cunningham, DRMS

Technical Memorandum

DATE:	3 May, 2021	**PROJECT:**	Cross Mine
ATTENTION:	Richard Mittasch	**COMPANY:**	Grand Island Resources, LLC
PREPARED BY:	Dave Hallman, PE, PG	**REVIEWED BY:**	RM

SUBJECT: Idaho Tunnel Portal – Slope Stability Analysis

1.0 INTRODUCTION

This Technical Memorandum has been prepared to present geotechnical stability analyses for the slopes adjacent to the Idaho Tunnel Portal in response to a stipulation presented in the TR-7 authorization from DRMS dated December 3, 2020 in conjunction with the Cross Mine, DRMS Permit No. M-1977-410. The Idaho Tunnel (at the Caribou Mine) was in a collapsed condition creating potential slope stability issues near the northern permit boundary and the adjacent Caribou Road. This is a concern pursuant to Rule 3.1.5(3) and C.R.S. 34-32-116(7)(h) which require areas outside of the affected land to be protected from slides or damage occurring during the mining operation and reclamation. In order to address this concern the portal slope has been stabilized, reinforced and will be backfilled to a final slope of 3H:1V below the county road for reclamation using waste rock.

As indicated in the authorization letter from DRMS, once the Idaho Tunnel was sufficiently stabilized to allow the necessary information to be collected and analyzed, the operator is required to submit updated engineering stability analysis which demonstrates the portal slope meets the stability requirements of the Mined Land Reclamation Board (as described in the Memorandum from Peter Hays, DRMS, dated May 27, 2020). This memorandum presents the required stability evaluation based on updated engineering data now that the tunnel has been adequately stabilized. The analyses were conducted by Mr. David Hallman, a geological engineer with 38 years of experience and licensed as Colorado Professional Engineer (Civil) 26076, as affirmed by the stamp and signature affixed at the end of this document.

1.1 BACKGROUND

1.1.1. Location

The Cross Mine site is located approximately 3 miles west of Nederland, Colorado adjacent to the Roosevelt National Forest, at an elevation of 9700 feet above mean sea level (MSL). The general location is parcels of land in Section 9, Township 1 South, Range 73 West of the 6 Principal Meridian, County of Boulder, State of Colorado. This is an existing hard rock mining operation owned by Grand Island Resources Inc. (GIR), although at present, no active mining is being conducted.

1.1.2. Idaho Tunnel

The Idaho Tunnel provides access to the Caribou Mine portion of the site. The timbered tunnel entrance and area around the opening were excavated in order to stabilize the historic tunnel portal. This effort involved excavating approximately 25 feet into the hillside, installing soil anchors, and applying a layer of fiber-reinforced shotcrete. The excavated slopes stood unsupported following excavation and were dry

at the time. The maximum height at the taller left (south) wing wall excavation is 28 ft, sloping at an angle of 70-80 degrees from horizontal.

The top of the excavation is approximately 40 ft from County Road 128 (Caribou Road) at the closest point and 20 ft lower in elevation.

1.1.3. Portal Rehabilitation

Entrance to the Idaho Tunnel at the mine site was in such a state of neglect and disrepair from long-term gradual deterioration that it was not safe to enter and operate the mine water system per the approved permit. In particular, the timber ground supports at the portal were tilted dangerously askew and the ground slopes adjacent to the portal exhibited signs of shallow slope failures and sloughing.

In December 2019 a roof collapse occurred a short distance into the tunnel during initial rehabilitation efforts. The roof failure occurred in an 11-12 ft section of unsupported ground as the tunnel opening was being enlarged through a section of mixed soil and decomposed gneiss. The collapse completely blocked the mine opening, crushed the pipe carrying the flow of mine water, and daylighted in the slope below County Road 128 (Caribou Road), leaving a large remnant void above the tunnel opening.

As described in TR-7, the remaining void created by the portal collapse was backfilled with pervious cellular concrete to provide permanent ground support to stabilize the slope and allow drainage. The cellular concrete backfill is significantly stronger than the soil which originally comprised the slope while imposing only a fraction of the weight.

Placing the cellular concrete backfill within the initial collapse void was completed on May 19, 2020. This increased stability of the slope below the county road. Tunnel rehabilitation was resumed approximately a week later and additional sloughing into the tunnel occurred, daylighting in the slope immediately west of the previous backfill material. Additional cellular concrete backfill was placed and again more sloughing occurred when rehabilitation was resumed. This occurred repeatedly as tunnel rehabilitation advanced for each of the next four steel sets (16 ft). Additionally, high strength grout was used immediately above the tunnel crown in several areas, and riprap subsequently infilled with cellular concrete was used to backfill one of the larger voids. The end result is that 447 cubic yards of the disturbed ground overlying the old adit has now been replaced with substantially stronger cellular concrete, riprap and high strength grout, a significant amount. Table 1 provides a summary of the final quantity of each of these materials used.

Table 1 – Summary of Backfill Materials

Material Type	Quantity (yd^3)
Cellular concrete	299
Riprap	100
High Strength Grout	48

The flowable nature of the cellular concrete backfill allowed it to flowed forward within the ground disturbed above the historic tunnel opening. This served to encapsulate loose blocks of rock and previous ground supports in a solid mass to provide support during the remaining rehabilitation efforts.

1.2 Geology

The Idaho tunnel has been rehabilitated sufficiently to allow the geology to be examined up to and beyond the county road. GIR has explored the first 200 ft of the Idaho Tunnel in order to investigate the corresponding ground conditions. Starting at the portal the first 60 ft of tunnel consist of regolith and colluvial soils. Next is a 28 ft section of fractured and weathered blocky gneiss which extends beyond the county road.

Grouted threadbar drilled into the slope to further anchor the cellular concrete into the hillside encountered refusal of the jack-leg drill 15 to 20 ft into the hillside. This is interpreted as indicating the transition into relatively intact rock comprising the blocky gneiss unit.

The Caribou Road (County Road 126) above the Idaho tunnel is located entirely in mixed soil and rock colluvium and regolith materials. Fresh gneiss of the Idaho Springs formation is present a short distance above the road and to the south of the tunnel portal.

Figure 1 presents a schematic cross section of the tunnel and slope which depicts these conditions.

2.0 STABILITY ANALYSIS

2.1 Approach

The stability analyses were conducted using the RocScience SLIDE2 software, a 2D slope stability program for evaluating the safety factor or probability of failure, of circular and non-circular failure surfaces in soil or rock slopes. Slide2 analyzes the stability of slip surfaces using vertical slice or non-vertical slice limit equilibrium methods like Bishop, Janbu, Spencer, and Sarma, among others. Search methods can be applied to locate the critical slip surface for a given slope. The Bishop method of slices for circular failures surfaces while the Janbu method of slices for satisfying both moment and force equilibrium was adopted for non-circular surfaces.

SLIDE2 supports a comprehensive list of soil material models including Mohr-Coulomb, undrained, impenetrable, bilinear, strength as a function of depth, anisotropic strength, generalized shear-normal function, SHANSEP), and more. Typical rock material models supported by SLIDE2 include generalized Hoek-Brown (Hoek, et. al, 2018), Barton and Choubey (1977), and Miller (1988) can be handled by SLOPE/W using the generalized shear-normal function with or without an anisotropic modifier function. Analyses for the portal slope were performed using Mohr-Coulomb strength criteria for the soil materials, Hoek Brown (2018) for the regolith and block gneiss and a shear-normal strength function based on Leps (1970) for the waste rock.

2.2 Model Input

3.3.1. Slope Geometry

An idealized representative two-dimensional cross-section was considered for analysis. This section consisted of the profile along the axis of the tunnel included on Figure 1, consisting of a 28-ft high excavation at an angle of 75-degrees then natural ground sloping at approximately 40 ft to the edge of

the 20-ft wide County Road. Starting below the road the slope will be backfilled to 3H:1V using compacted rock fill. A pair of Connex shipping containers and steel supports will be used to maintain the tunnel opening through the waste rock. A reinforced concrete retaining structure will be used to create a vertical face around the portal opening. The surface of the waste rock will be covered with growth media and revegetated. The previous nature of the cellular concrete, waste rock backfill and presence of the tunnel will allow groundwater to freely drain from the slope in order to ensure long-term stability.

3.3.2. Material Properties

The analyses incorporated conservative shear strength parameters for the colluvial soil material, regolith and blocky rock mass separately. Since the slope height is not great, the shear stresses will be low. For the low range of stresses present, equivalent linear Mohr-Coulomb shear strength parameters were assumed.

During excavation the regolith and colluvium was observed to stand near-vertical for up to 28 ft without ground support. The colluvium material consists of poorly-graded sandy gravel with cobbles, silt and clay (GP). For the purposes of the stability analysis this material was assigned a friction angle of 38 degrees and 500 psf (3.47 psi) cohesion with a moist unit weight of 125 pcf. Areas which contain a higher proportion of coarse rock fragments will exhibit higher shear strength, and the overall average strength is likely higher, however, if failure were to occur it will tend to pass through the weaker materials which offer less resistance.

In some areas the underlying bedrock is quite weathered and grades into fully decomposed regolith, while in other areas it more closely resembles fractured hard rock with little weathering present.

The regolith consists of decomposed gneiss which has been weathered and decomposed in situ, but has not been disturbed and retains the original rock fabric. The feldspar minerals have been largely altered to clay and can be readily excavated using the pick point of a geologic hammer. Portions of the rock which contain a high percentage of quartz require one or more blows of a rock hammer to fracture, but exhibit a high degree of jointing. The regolith material represents a weak rock mass for which the Hoek-Brown criterion[1] was used to estimate the average rock mass strength across this material based on a large body of empirical data. Conservative rock mass parameters adopted for Decomposed Gneiss:

Intact Rock UCS = 1000 -2000 ksf (7,000 – 14,000 psi)
GSI = 15 (Disintegrated with highly weathered surfaces with soft clay coatings or infilling)
mi = 25
D = 0

The fractured and weathered blocky gneiss represents highly fractured rock with some weathering and is quite variable. Conservative rock mass parameters adopted for the Blocky Gneiss:

Intact Rock UCS = 1000 -2000 ksf (7,000 – 14,000 psi)

[1] E.Hoek and E.T.Brown, 2018; "The Hoek–Brown Failure Criterion and GSI – 2018 Edition." Journal of Rock Mechanics and Geotechnical Engineering, Volume 11, Issue 3, June 2019, Pages 445-463

GSI = 45 (Blocky/Disturbed/Seamy with rough, slightly weathered, iron stained surfaces -or- Very Blocky with smooth, moderately weathered and altered surfaces)
mi = 25
D = 0

The cellular concrete void fill is much stronger than the soil and regolith material it replaces. Laboratory testing results on test cylinders cast during the pours exhibited an average 28-day strength of 109 psi. This material was modeled with a unit weight of 35 pcf and shear strength of 50 psi. Riprap which was infilled with cellular concrete was modeled as cellular concrete.

Since the precise source for the waste rock is unknown, the material properties adopted for the waste rock fill material were conservatively modeled using the lower bound shear strength envelop presented by Leps (1970)[2] for rock fill composed non-compacted, weak or poorly graded particles. The Leps approach models the variance in material strengths relative to varying confining pressures and the degree of particle interlocking or crushing that results. Table 1 presents the shear-normal parameters used for the waste rock fill.

Table 1 – Shear Strength of Waste Rock Fill

Normal Stress (psf)	Shear Stress (psf)
144	205
288	376
720	858
1441	1600
2880	3035
7201	6834
14405	12744
28807	23747

3.3.3. Ground Support Elements

Due to their relatively short length and irregular pattern of placement, the soil anchors were neglected in the analyses. The shotcrete will have little overall effect on global stability of the slope and was also neglected in the analyses for conservatism. The primary purpose of the shotcrete is to control shallow surface sloughing and raveling.

3.3.4. Idaho Tunnel

Due to the ground support elements that will be employed and its small size relative to the scale of the slope, the tunnel opening was not included in the stability section. Spillings installed above the top of the tunnel opening will become integrated with the cellular concrete void fill to help stabilize the opening and face of the excavation below the County Road.

[2] Leps, T.M., 1970; "Review of Shearing Strength of Rock Fill" ASCE Journal of the Soil Mechanics and Foundations Division, Vol. 96, No. SM4, July, pp 1159 – 1170.

3.3.5. Groundwater Conditions

The slope was modeled as drained, without groundwater to reflect drainage provided by the pervious cellular concrete, the Idaho Tunnel and coarse rock fill placed to reconfigure the slope.

3.0 ANALYSIS RESULTS

The minimum FoS for a failure surface which intersects the County Road was found to be 3.6. Figure 2 presents a summary of these stability analysis results and includes the critical failure surface. These analyses demonstrate that the lower FoS failure surfaces pass entirely through the colluvium and waste rock fill materials due to the slope geometry. The cellular concrete beneath the slope prevents deep seated instability.

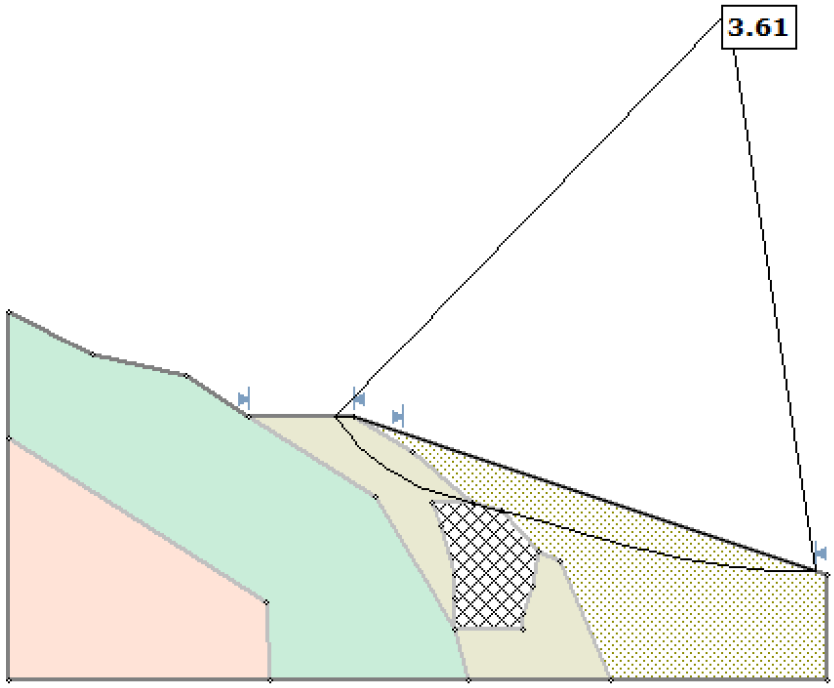


Figure 2 – Stability Analysis Summary

4.0 CONCLUSIONS

Where there is the potential for off-site impacts due to failure of any geologic structure or constructed earthen facility, which may be caused by mining or reclamation activities, the Operator is required to demonstrate through appropriate geotechnical and stability analyses that off-site areas will be protected with appropriate factors of safety incorporated into the analysis. For geotechnical stability of the Country Road a required minimum FoS is not defined by the current Boulder County Multimodal Transportation Standards[3]. In accordance with the Recommended Minimum Factors of Safety for Slope Stability Analyses for Operations and Reclamation within Section 30.4 of the Policies of the Mined Land Reclamation Board

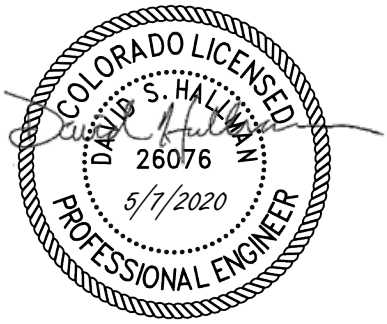
[3] https://assets.bouldercounty.org/wp-content/uploads/2017/02/multi-modal-standards.pdf

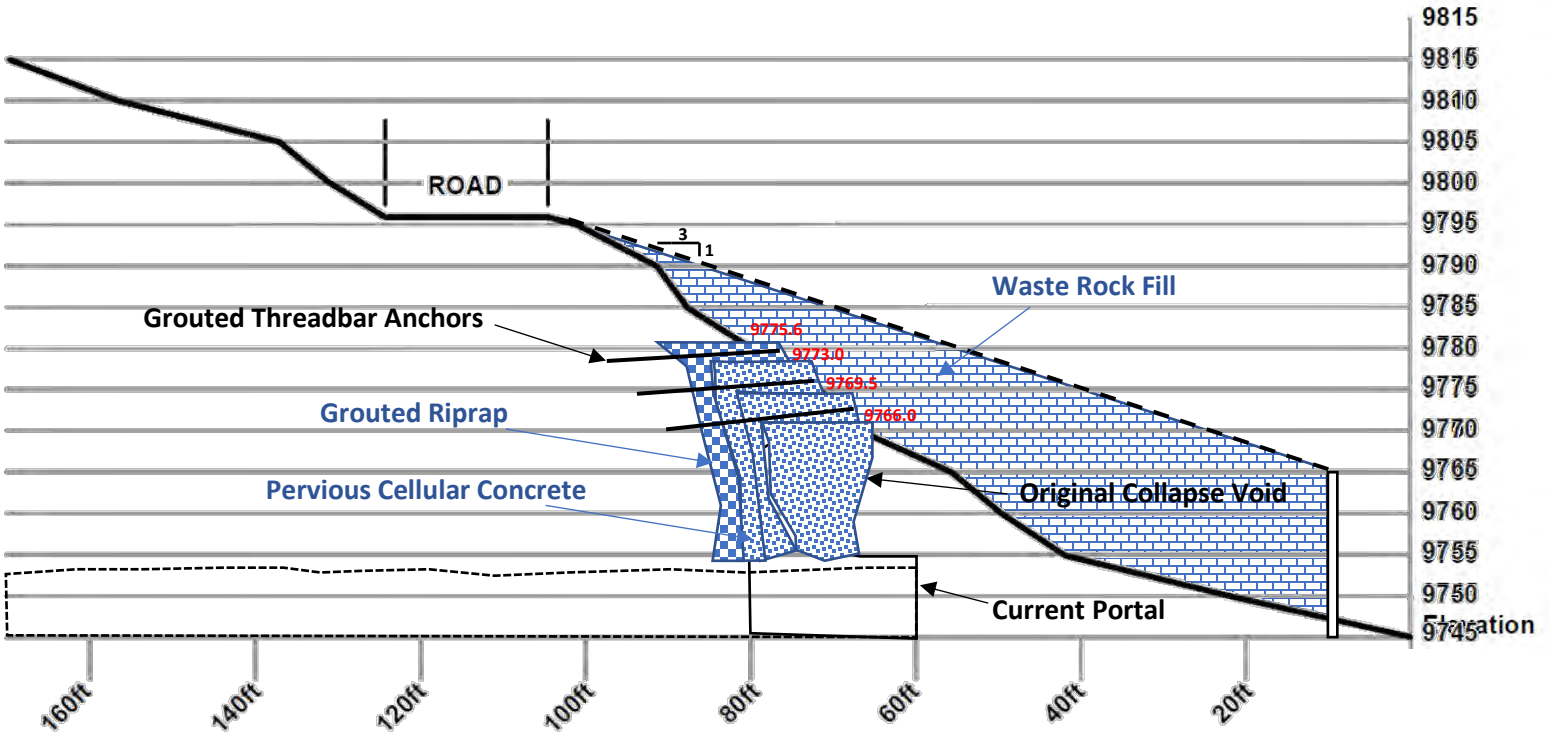
(MLRB), effective May 16, 2018, the Division requires the Operator to comply with a minimum factor of safety (FOS) of 1.5 for critical structures (roads) in static conditions since the Operator utilized limited engineering data in the current analysis. With a calculated minimum FoS of 3.6 using conservative input parameters the results of the analyses are sufficient to demonstrate that the slope meets the Division criteria for long-term static loading conditions.

Spillings and soil anchors installed through the cellular concrete void fill serve to underpin the portion of the slope directly above the Idaho Tunnel and below the County Road, although these anchors were neglected in the analyses. Permanent tunnel lining ground support installed as the tunnel is rehabilitated will ensure that stability of the tunnel itself does not impact the road.

This study updates previous analyses based on additional data such as the as-built slope geometry. Due to the difficulty of trying to accurately characterize the highly variable geologic conditions within the slope due to weathering of the gneiss bedrock, rather conservative material properties were adopted. For the final 3H:1V slope configuration the critical least factor of safety failure surfaces lie entirely within the waste rock fill and the strength of the underlying soil and regolith make little difference in the analyses.

Stability analysis of the Idaho Tunnel portal slopes was conducted by Mr. David S. Hallman, licensed as Colorado Professional Engineer (Civil) 26076, as affirmed by the stamp and signature affixed below.




ROAD
3
1
Waste Rock Fill
Grouted Threadbar Anchors
9775.6
9773.0
9769.5
9766.0
Grouted Riprap
Pervious Cellular Concrete
Original Collapse Void
Current Portal
9815
9810
9805
9800
9795
9790
9785
9780
9775
9770
9765
9760
9755
9750
9745
Elevation
160ft
140ft
120ft
100ft
80ft
60ft
40ft
20ft

Appendix I

Weed Management

Weed Management

GIR will follow all requirements of the Boulder County Noxious Weed Management Plan. GIR will control, to the extent possible, List A and List B noxious weed species. List A species will be eradicated prior to seed development. Once noxious plants are eliminated, efforts will be made to detect and eliminate new plants arising from seed, reproductive propagule, or root stock. Plants, seeds, or other propagules removed from the site will be placed in sealed plastic bags and disposed of at an offsite solid waste landfill, which covers refuse daily with six inches of soil. List A species in Boulder County include the following:

- Orange Hawkweed (*Hieracium aurantiacum)*
- Spotted Knapweed (*Acosta maculosa*)
- Japanese Knotweed (*Polygonum cuspidatum)*
- Purple Loosestrife (*Lythrum salicaria*)
- Mediterranean Sage (*Salvia aethiopis*)
- Rush Skeletonweed (*Chondrilla juncea*)
- Cypress Spurge (*Euphorbia cyparissias*)
- Myrtle Spurge (*Euphorbia myrsinites*)
- Yellow Starthistle (C*entaurea solstitialis*)

List B noxious weeds will be treated by containment and suppression, through mowing, tilling, and hand pulling. A combination of techniques may be used. GIR will work with the Boulder County Weed Coordinator in determining the best method of controlling weeds.

List B noxious weed species include the following:

- Bull thistle (*Cirsium vulgare*)
- Canada thistle (*Cirsium arvense*)
- Common Teasel (*Dipsacus fullonum)*
- Dalmatian toadflax (*Linaria dalmatica*) (both broad-leaved and narrowleaved)
- Diffuse knapweed (*Centaurea diffusa*)
- Houndstongue (*Cynoglossum officinale*)
- Leafy spurge (*Euphorbia esula*)
- Musk thistle (*Carduus nutans*)
- Russian knapweed (*Rhaponticum repens*)
- Saltcedar or tamarisk (*Tamarix ramosissima)*
- Scotch thistle (both *Onopordum tauricum* and *Onopordum acanthium*)
- Spotted knapweed (*Centaurea stoebe)*
- Yellow Toadflax (*Linaria vulgaris*)

Appendix II

Weed Control Program

GIR will comply with the State of Colorado and Boulder County Noxious Weed Control regulations. In addition, GIR will conduct routine surveys to identify noxious weeds and make timely arrangements for control and treatment. GIR will keep a record of mine site areas needing and having received noxious weed control.

Appendix II

Weed Control Program

GIR will comply with the State of Colorado and Boulder County Noxious Weed Control regulations. In addition, GIR will conduct routine surveys to identify noxious weeds and make timely arrangements for control and treatment. GIR will keep a record of mine site areas needing and having received noxious weed control.

Appendix III

Reclamation Cost

Enter Data Below in Green and Blue Spaces

STANDARDIZED RECLAMATION COST ESTIMATOR

Version 1.4.1
Build 017b (Revised 16 May 2019)

Approved for use in Nevada, August 1, 2012

COST DATA FILE INFORMATION

File Name:	Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Cost Data File:	SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Data Date:	August 1, 2020
Cost Data Basis:	User Data — Data Cost Units: Imperial
Author/Source:	Nevada Division of Environmental Protection (NDEP) & NV BLM

PROJECT INFORMATION

Property/Mine Name:	Cross and Caribou — Property Code:
Project Name:	Cross and Caribou Reclamation Estimator
Date of Submittal:	May 24, 2021 — Average Altitude: 9700 ft.
Select One:	○ Notice or Sm Exploration Plan ○ Lg Exploration Plan ◉ Mine Operation
Select One:	○ Private Land ◉ Public or Public/Private
Cost Estimate Type:	Surety
Cost Basis Category:	Northern Nevada
Cost Basis Description:	**Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties**

Closure Cost Estimate
Cost Summary

Project Name: Cross and Caribou Reclamation Estimator
Project Date: May 24, 2021
Model Version: Version 1.4.1
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm

A. Earthwork/Recontouring	Labor [1]	Equipment [2]	Materials	Total
Exploration	$0	$0	$0	$0
Exploration Roads & Drill Pads	$0	$0	$0	$0
Roads	$2,690	$6,162	$0	$8,852
Well Abandonment	$0	$0	$0	$0
Pits	$0	$0	N/A	$0
Quarries & Borrow Areas	$0	$0	$0	$0
Underground Openings	$3,076	$2,052	$5,976	$11,104
Process Ponds	$6,347	$12,539	$0	$18,886
Heaps	$0	$0	$0	$0
Waste Rock Dumps	$9,218	$26,682	$0	$35,900
Landfills	$0	$0	$0	$0
Tailings	$0	$0	$0	$0
Foundation & Buildings Areas	$1,092	$3,246	$0	$4,338
Yards, Etc.	$0	$0	$0	$0
Drainage & Sediment Control	$0	$0	$0	$0
Generic Material Hauling	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal	**$22,423**	**$50,681**	**$5,976**	**$79,080**
Mob/Demob if included in Other User sheet	$0	$0	$0	$0
Mob/Demob				$0
Subtotal "A"	**$22,423**	**$50,681**	**$5,976**	**$79,080**

B. Revegetation/Stabilization	Labor [1]	Equipment [2]	Materials	Total
Exploration	$0	$0	$0	$0
Exploration Roads & Drill Pads	$0	$0	$0	$0
Roads	$280	$100	$760	$1,140
Well Abandonment				N/A
Pits	$0	$0	$0	$0
Quarries & Borrow Areas	$0	$0	$0	$0
Underground Openings				N/A
Process Ponds	$700	$250	$643	$1,593
Heaps	$0	$0	$0	$0
Waste Rock Dumps	$420	$150	$1,018	$1,588
Landfills	$0	$0	$0	$0
Tailings	$0	$0	$0	$0
Foundation & Buildings Areas	$1,120	$400	$856	$2,376
Yards, Etc.	$799	$286	$7,065	$8,150
Drainage & Sediment Control	$0	$0	$0	$0
Generic Material Hauling	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "B"	**$3,319**	**$1,186**	**$10,342**	**$14,847**

C. Detoxification/Water Treatment/Disposal of Wastes**	Labor [1]	Equipment [2]	Materials	Total
Process Ponds/Sludge				$0
Heaps				$0
Dumps (Waste & Landfill)				$0
Tailings				$0
Surplus Water Disposal				$0
Monitoring				$0
Miscellaneous				$0
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "C"	**$905**	**$1,695**	**$0**	**$2,600**

D. Structure, Equipment and Facility Removal, and Misc.	Labor [1]	Equipment [2]	Materials	Total
Foundation & Buildings Areas	$4,912	$3,730	$0	$8,642
Other Demolition	$0	$0	$0	$0
Equipment Removal	$0	$0	$0	$0
Fence Removal	$0	$0		$0
Fence Installation	$1,355	$320	$9,500	$11,175
Culvert Removal	$388	$142	N/A	$530
Pipe Removal	$2,144	$357	N/A	$2,501
Powerline Removal	$0			$0
Transformer Removal	$0			$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Misc. Costs	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "D"	**$8,799**	**$4,549**	**$9,500**	**$22,848**

E. Monitoring	Labor [1]	Equipment [2]	Materials	Total
Reclamation Monitoring and Maintenance	$5,203	$14,170	$1,528	$20,901
Ground and Surface Water Monitoring	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Subtotal "E"	**$5,203**	**$14,170**	**$1,528**	**$20,901**

F. Construction Management & Support	Labor	Equipment [2]	Materials	Total
Construction Management	$0	$0	N/A	$0
Construction Support	$0	$0	$0	$0
Road Maintenance	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "F"	**$0**	**$0**	**$0**	**$0**

Subtotal Operational & Maintenance Costs	Labor [1]	Equipment [2]	Materials [3]	Total
Subtotal A through F	**$40,649**	**$72,281**	**$27,346**	**$140,276**

** Other Operator supplied costs - additional documentation required.

Closure Cost Estimate
Cost Summary

Project Name: Cross and Caribou Reclamation Estimator
Project Date: May 24, 2021
Model Version: Version 1.4.1
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm

Closure Cost Estimate
Cost Summary

Project Name: Cross and Caribou Reclamation Estimator
Project Date: May 24, 2021
Model Version: Version 1.4.1
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm

Indirect Costs				Include?	Total
1. Engineering, Design and Construction (ED&C) Plan (7)					$11,222
2. Contingency (8)					$14,028
3. Insurance (9)	$610				$610
4. Performance Bond (10)					$4,208
5. Contractor Profit (11)					$14,028
6. Contract Administration (12)					$14,028
7. Government Indirect Cost (13)					$2,946
Subtotal Add-On Costs					**$61,070**
Total Indirect Costs as % of Direct Cost					44%
GRAND TOTAL					**$201,346**

Administrative Cost Rates (%)

	Cost Ranges for Indirect Cost Percentages				
	<=	<=	<=	>	
1. Engineering, Design and Construction (ED&C) Plan (7)	$1,000,000	$25,000,000		$25,000,000	Small Plan
Variable Rate	8%	6%		4%	0%
	<=	<=	<=	>	
2. Contingency (8)	$500,000	$5,000,000	$50,000,000	$50,000,000	Small Plan
Variable Rate	10%	8%	6%	4%	0%
3. Insurance (9)	1.5%	of labor costs			
4. Bond (10)	3.0%	of the O&M costs if O&M costs are >$100,000			
5. Contractor Profit (11)	10%	of the O&M costs			
	<=	<=	<=	>	
6. Contract Administration (12)	$1,000,000	$25,000,000		$25,000,000	
Variable Rate	10%	8%		6%	
Government Indirect Cost (13)	21%	of contract administration			

RECLAMATION COST ESTIMATION SUMMARY SHEET FOOTNOTES

1. Federal construction contracts require Davis-Bacon wage rates for contracts over $2,000. Wage rate estimates may include base pay, payroll loading,
2. The reclamation cost estimate must include the estimated plugging cost of at least one drill hole for each active drill rig in the project area. Where the
3. Miscellaneous items should be itemized on accompanying worksheets.
4. Fluid management should be calculated only when mineral processing activities are involved. Fluid management represents the costs of maintaining
5. Handling of hazardous materials includes the cost of decontaminating, neutralizing, disposing, treating and/or isolating all hazardous materials used,
6. Any mitigation measures required in the Plan of Operations must be included in the reclamation cost estimate. Mitigation may include measures to avoid,
7. Engineering, design and construction (ED&C) plans are often necessary to provide details on the reclamation needed to contract for the required work. To
8. A contingency cost is included in the reclamation cost estimation to cover unforeseen cost elements. Calculate the contingency cost as a percentage of the
9. Insurance premiums are calculated at 1.5% of the total labor costs. Enter the premium amount if liability insurance is not included in the itemized unit
10. Federal construction contracts exceeding $100,000 require both a performance and a payment bond (Miller Act, 40 USC 270et seq.). Each bond premium
11. For Federal construction contracts, use 10% of estimated O&M cost for the contractor's profit.
12. To estimate the contract administration cost, use 6 to 10% of the operational and maintenance (O&M) cost. Calculate the contract administration cost as a
13. Government indirect cost rate is 21% of the contract administration costs.

Closure Cost Estimate
Reclamation Quantities

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Data Cost File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Reclamation Quantity Summary

	Description	Total Regrade or Haul Volume cy	Total Regrade or Haul Cost $	Total Cover Volume cy	Cover Placement Cost $	Total Growth Media Volume cy	Growth Media Placement Cost $	Total Surface Area acres	Total Scarify Cost $	Total Revetation Cost $	TOTALS $	Unit Costs: Regrade Unit Cost $/CY	Material Haul or Backfill Unit Cost $/CY	Cover Unit Cost $/CY	Growth Media Unit Cost $/CY	Scarify Unit Cost $/CY	Area Unit Cost $/acre
1	Waste Rock Dumps	1,711	$ 683	2,299	$ 21,690	766	$ 13,014	0.95	$ 513	$ 1,588	$ 37,488	$0.40	N/A	$9.43	$16.99	$540.00	$39,461.05
2	Tailings Impoundments		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
3	Heap Leach Pads		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
5	Open Pits		$ -							$ -	$ -		N/A				
4	Quarries & Borrow Pits		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
6	Roads	2,333	$ 1,914			1,032	$ 6,767	0.71	$ 171	$ 1,140	$ 9,992	$0.82	N/A		$6.56	$240.85	$14,073.24
7	Landfills		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
8	Buildings			8	$ 4,338		$ -	0.8	$ -	$ 2,376	$ 6,714		N/A	$542.25		$0.00	$8,392.50
9	Yards		$ -		$ -		$ -	4.71	$ -	$ 8,150	$ 8,150		N/A			$0.00	$1,730.36
10	Ponds	2,254	$ 4,852			783	$ 11,280	0.6		$ 1,593	$ 17,725	N/A	$2.15		$14.41		$29,541.67
11	Exploration Roads		$ -				$ -		$ -	$ -	$ -		N/A				
12	Exploration Trenches		$ -							$ -	$ -		N/A				
13	Diversion Ditches		$ -							$ -	$ -		N/A				
14	Sediment Ponds		$ -				$ -		$ -	$ -	$ -						
15	Generic Haulage/Backfill		$ -		$ -		$ -		$ -	$ -	$ -	N/A					
16	Adit/Decline Backfilling1		$ -								$ -	N/A					
17	Shaft Backfilling	120	$ 2,772								$ 2,772	N/A	$23.10				
	TOTALS	6,418	$ 10,221	2,307	$ 26,028	2,581	$ 31,061	7.77	$ 684	$ 14,847	$ 82,841						
	Average Costs	per CY	$1.59	per CY	$11.28	per CY	$12.03	per acre	$88.03	$21.71	$10,662	per acre					

Closure Cost Estimate
Waste Rock Dumps

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$276	$407	N/A	$683
Cover Placement Cost	$5,459	$16,231	N/A	$21,690
Topsoil Placement Cost	$3,276	$9,738	N/A	$13,014
Ripping/Scarifying Cost	$207	$306	N/A	$513
Subtotal Earthworks	**$9,218**	**$26,682**	**$0**	**$35,900**
Revegetation Cost	$420	$150	$1,018	$1,588
TOTALS	**$9,638**	**$26,832**	**$1,018**	**$37,488**

Waste Rock Dumps - User Input

You must fill in ALL green cells in this section for each dump, lift or dump category

	Facility Description			Physical - MANDATORY									Cover				Growth Media			
	Description (required)	ID Code	Type	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % Grade	Lift (dump) Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Dump Footprint acres	Regrade Volume (1) (if calculated elsewhere) cy	Cover Thickness Slopes in	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Dump to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Dump to Stockpile % grade
1	**Dump 1**		**Waste Rock Dump**	**2.0**	**2.0**	**3.0**	**0.0**	**15**	**104**	**20**	**0.11**		**18.0**	**18.0**	**22,704**	**-6.6**	**6.0**	**6.0**	**22,704**	**-6.6**
2	**Dump 2**		**Waste Rock Dump**	**5.0**	**2.0**	**3.0**	**0.0**	**35**	**240**	**20**	**0.72**		**18.0**	**18.0**	**22,704**	**-6.6**	**6.0**	**6.0**	**22,704**	**-6.6**
3	**Dump 3**		**Waste Rock Dump**	**2.0**	**2.0**	**3.0**	**0.0**	**15**	**192**	**20**	**0.17**		**18.0**	**18.0**	**22,704**	**-6.6**	**6.0**	**6.0**	**22,704**	**-6.6**

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$276	$407	N/A	$683
Cover Placement Cost	$5,459	$16,231	N/A	$21,690
Topsoil Placement Cost	$3,276	$9,738	N/A	$13,014
Ripping/Scarifying Cost	$207	$306	N/A	$513
Subtotal Earthworks	**$9,218**	**$26,682**	**$0**	**$35,900**
Revegetation Cost	$420	$150	$1,018	$1,588
TOTALS	**$9,638**	**$26,832**	**$1,018**	**$37,488**

Waste Rock Dumps - User Input (cont.) — You must fill in ALL green cells and relevant blue cells in this section for each dump, lift or dump category

		Grading				Cover		Growth Media		Revegetation								
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Slopes (select)	Seed Mix Flat Areas (select)	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)
1	**Dump 1**	**1**	**Stone - crushed**	**Small**	**No**	**Topsoil**	**Small Truck**	**Topsoil**	**Small Truck**	**Mix 4**	**Mix 4**	**Straw Mulch**	**None**	**None**	**None**	**Yes**	**Yes**	**Small Dozer**
2	**Dump 2**	**1**	**Stone - crushed**	**Small**	**No**	**Topsoil**	**Small Truck**	**Topsoil**	**Small Truck**	**Mix 4**	**Mix 4**	**Straw Mulch**	**None**	**None**	**None**	**Yes**	**Yes**	**Small Dozer**
3	**Dump 3**	**1**	**Stone - crushed**	**Small**	**No**	**Topsoil**	**Small Truck**	**Topsoil**	**Small Truck**	**Mix 4**	**Mix 4**	**Straw Mulch**	**None**	**None**	**None**	**Yes**	**Yes**	**Small Dozer**

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$276	$407	N/A	$683
Cover Placement Cost	$5,459	$16,231	N/A	$21,690
Topsoil Placement Cost	$3,276	$9,738	N/A	$13,014
Ripping/Scarifying Cost	$207	$306	N/A	$513
Subtotal Earthworks	**$9,218**	**$26,682**	**$0**	**$35,900**
Revegetation Cost	$420	$150	$1,018	$1,588
TOTALS	**$9,638**	**$26,832**	**$1,018**	**$37,488**

Waste Rock Dumps - Calculations

Regrading Volume Calculation

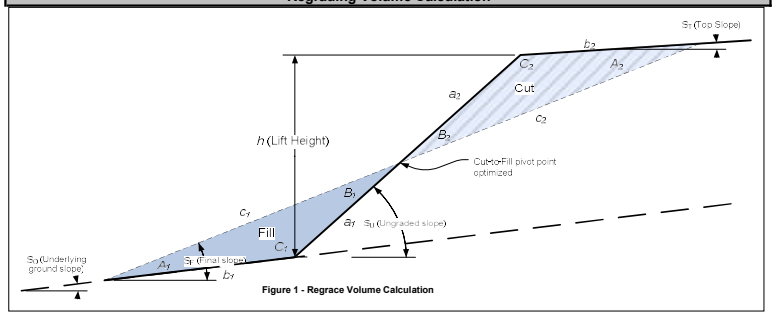

Figure 1 - Regrace Volume Calculation

Final Slope Area and Footprint Area Calculations

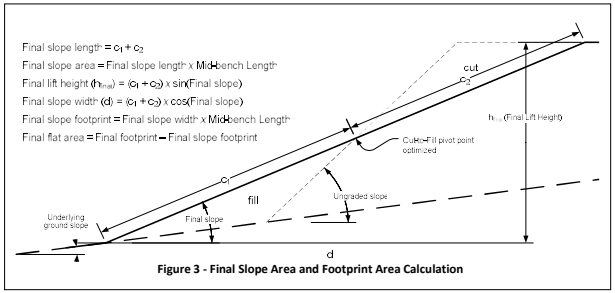

Figure 3 - Final Slope Area and Footprint Area Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

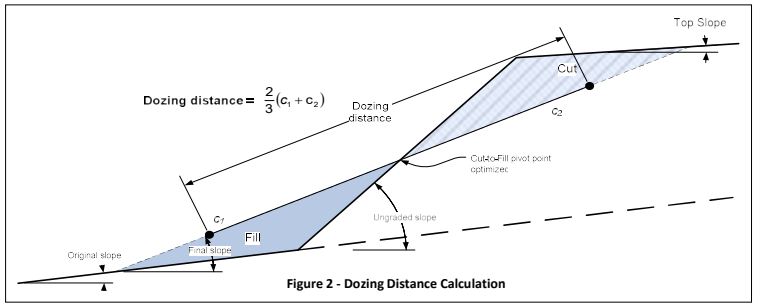

Figure 2 - Dozing Distance Calculation

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per dump

Slopes:
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Mid-bench length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr

Flat Areas:
Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

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Revegetation Cost	$420	$150	$1,018	$1,588
TOTALS	**$9,638**	**$26,832**	**$1,018**	**$37,488**

Waste Rock Dumps - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**Dump 1**	108	50	D7R	1,076	1.6	1.0	0.85	1.0	911	1	$69	$102	$171
2	**Dump 2**	1,404	64	D7R	888	1.6	1.0	0.85	1.0	752	2	$138	$203	$341
3	**Dump 3**	199	50	D7R	1,076	1.6	1.0	0.85	1.0	911	1	$69	$102	$171
		1,711									4	**$276**	**$407**	**$683**

Closure Cost Estimate
Waste Rock Dumps

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TOTALS	**$9,638**	**$26,832**	**$1,018**	**$37,488**

Waste Rock Dumps - Cover and Growth Media Costs

		Cover (lower layer)								Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost $	Cover Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**Dump 1**	266	725/966G/D7R	535	23	0	$1,092	$3,246	$4,338	89	725/966G/D7R	535	23	0	$1,092	$3,246	$4,338
2	**Dump 2**	1,525	725/966G/D7R	535	23	3	$3,275	$9,739	$13,014	508	725/966G/D7R	535	23	1	$1,092	$3,246	$4,338
3	**Dump 3**	508	725/966G/D7R	535	23	1	$1,092	$3,246	$4,338	169	725/966G/D7R	535	23	0	$1,092	$3,246	$4,338
		2,299				4	**$5,459**	**$16,231**	**$21,690**	766				1	**$3,276**	**$9,738**	**$13,014**

Closure Cost Estimate
Waste Rock Dumps

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Waste Rock Dumps - Scarifying/Revegetation Costs

	Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**Dump 1**	0.11		0.11	48	20	D7R	0		$69	$102	$171	$140	$50	$118	$308
2	**Dump 2**	0.63		0.63	114	20	D7R	1		$69	$102	$171	$140	$50	$675	$865
3	**Dump 3**	0.21		0.21	48	20	D7R	0		$69	$102	$171	$140	$50	$225	$415
		0.95		0.95				1		**$207**	**$306**	**$513**	**$420**	**$150**	**$1,018**	**$1,588**

Notes: 1) Minimum total ripping hours = 1 (i.e. If total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in in scarifying table.)

Closure Cost Estimate
Roads

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Roads - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$836	$1,078	N/A	$1,914
Cover Placement Cost	$1,785	$4,982	N/A	$6,767
Ripping/Scarifying Cost	$69	$102	N/A	$171
Subtotal Earthworks	**$2,690**	**$6,162**		**$8,852**
Revegetation Cost	$280	$100	$760	$1,140
TOTALS	**$2,970**	**$6,262**	**$760**	**$9,992**

Roads - User Input

You must fill in ALL green cells and relevant blue cells in this section for each road

	Facility Description			Physical (1) - MANDATORY						User Overrides		Growth Media		
	Description (required)	ID Code	Type	Underlying Ground Slope % grade	Ungraded Slope _H:1V	Cut Slope degrees	Road Width ft	Road Length ft	Slope Replacement Percent %	Regrade Volume (if calculated elsewhere) cy	Disturbed Area (if calculated elsewhere) acres	Growth Media Thickness in	Haul Distance from Growth Media Stockpile ft	Slope from Road to Stockpile % grade
1	**New Road**		**Project Road**				**30.0**	**885**	**7%**			**12.0**	**22,704**	**-7%**
2	**Caribou 300 Level Access Road**		**Access Road**				**20.0**	**100**	**0%**			**8.0**	**22,704**	**-7%**

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
3. Because the work required for building roads with a dozer is similar to that required to regrade a road with a dozer, this sheet could be used to provide a rough estimate of road construction costs if a dozer is selected as the grading fleet.

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TOTALS	**$2,970**	**$6,262**	**$760**	**$9,992**

Roads - User Input (cont.)

		Haul Road Safety Berms				
	Description (required)	Berm Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Number of Berms (2) (1 or 2 sides)
1	**New Road**	**300.0**	**6.0**	**50.0**	**2.5**	**1**
2	**Caribou 300 Level Access Road**	**0.0**	**0.0**	**0.0**	**0.0**	**1**

(2) Enter 1 if berm on only one side of road, 2 if both sides of road are bermed.

Closure Cost Estimate
Roads

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Roads - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each road

		Grading				Growth Media			Revegetation				
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	No. of Excavators if grade >30% (select)	Growth Media Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarifying/ Ripping? (select)	Ripping Fleet (select)
1	**New Road**	**1**	**Alluvium**	**Sm Excavator**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
2	**Caribou 300 Level Access Road**	**1**	**Alluvium**	**Sm Excavator**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**No**	

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
2. If original slope >30% only excavators are allowed.

Closure Cost Estimate
Roads

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Roads - Calculations

Regrading Volume and Footprint Volume

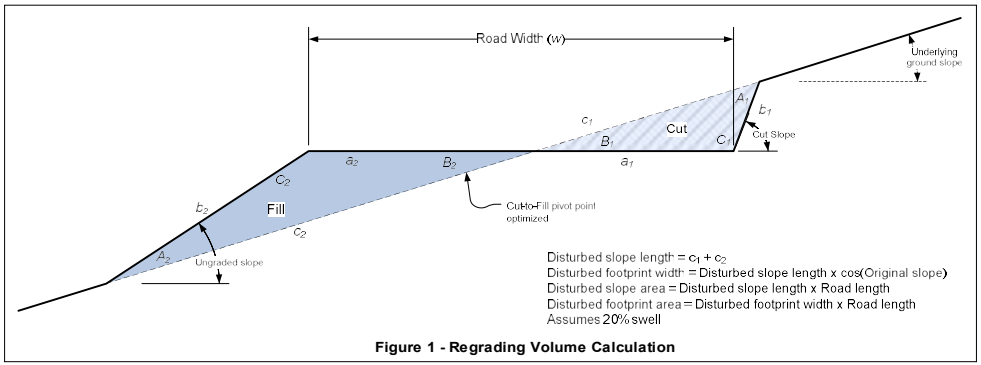


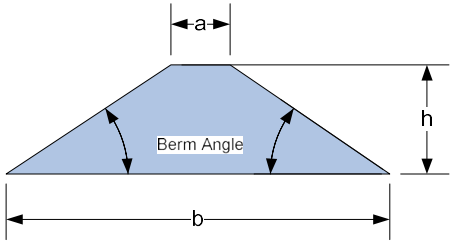
Figure 1 - Regrading Volume Calculation

Will not allow dozer for slopes greater than 30%
For dozer regrading push distance = road width
Assumes dozer push is uphill
Assumes minimum push distance of 100 ft

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a+b)}{2} \times h$

Berm Volume = Berm Length x Cross Sectional Area x No. Sides



Total berm volume doubled if both sides of road are bermed.
If length of berm on each side of road is different, input total length of both berms and input 1 for number of sides

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per area
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Road length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
For dozer regrading assumes push distance = 3 x road width

Revegetation Calculations

Minimum of 1 acre crew time per area

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TOTALS	**$2,970**	**$6,262**	**$760**	**$9,992**

Roads - Regrading Costs

	Description (required)	Regrading Volume cy	Recontouring Fleet	Fleet Productivity cy/hr	Total Fleet Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**New Road**	2,333	325C	398	6	$836	$1,078	$1,914
2	**Caribou 300 Level Access Road**	0				$0	$0	$0
		2,333			6	**$836**	**$1,078**	**$1,914**

Closure Cost Estimate
Roads

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TOTALS	**$2,970**	**$6,262**	**$760**	**$9,992**

Roads - Growth Media Costs

	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**New Road**	983	725/966G/D7R	511	11	2	$1,190	$3,321	$4,511
2	**Caribou 300 Level Access Road**	49	725/966G/D7R	511	11	1	$595	$1,661	$2,256
		1,032				3	**$1,785**	**$4,982**	**$6,767**

Closure Cost Estimate
Roads

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TOTALS	**$2,970**	**$6,262**	**$760**	**$9,992**

Roads - Scarifying/Revegetation Costs

	Description (required)	Total Surface Area acres	Final Slope Length ft	Ripping/ Scarifying Fleet	Ripping Hours hrs	Ripping Labor Costs $	Ripping Equipment Cost $	Total Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**New Road**	0.61	30.0	D7R	1	$69	$102	$171	$140	$50	$653	$843
2	**Caribou 300 Level Access Road**	0.10	20.0			$0	$0	$0	$140	$50	$107	$297
		0.71			1	**$69**	**$102**	**$171**	**$280**	**$100**	**$760**	**$1,140**

Closure Cost Estimate
Underground Openings

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Underground Openings Cost Summary

	Labor	Equipment	Materials	Totals
Adits, Portals & Declines Plugging	$2,188	$168	$5,976	$8,332
Shaft Backfill/Cover	$888	$1,884	N/A	$2,772
Shaft Capping	$0	$0	$0	$0
TOTALS	**$3,076**	**$2,052**	**$5,976**	**$11,104**

Adits, Portals & Declines - User Input

	Facility Description		Physical Characteristics				Backfill Material			
	Description (required)	ID Code	Height ft	Width ft	Backfill/ Plug Type	Distance to Bulkhead ft	Backfill Material Condition (select)	Backfill Material Type (select)	Distance to Backfill Borrow ft	Slope from Adit to Borrow Area % grade
1	Idaho Tunnel Portal		8.0	8.0	Concrete Bulkh	40	1	Gravel	484	-1.0
2	Caribou 300 Level Portal		8.0	8.0	Concrete Bulkh	40	1	Gravel	3,690	-5.0
3	Potosi Shaft		6.0	6.0	Bat Gate					
4	Cross Shaft		8.0	8.0	Concrete Bulkh	40	1	Gravel	402	4.0
5	Caribou Shaft		8.0	8.0	Concrete Bulkh	40	1	Gravel	440	3.0

Notes: 1) Foam (adit) option is for smaller openings that can be plugged with simple forms and a 5 ft thick plug.
2) Foam (production) option is for larger production openings (declines, etc.) and requires larger form construction and minimum 10 ft thick plug.
3) All foam plugs include minimum 15ft of backfill from opening to plug.
4) Bat gate option is for small openings and the material cost is the same for any size opening.
5) Backfilling assumes that small dozer will push material from nearby stockpile or dump
6) Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Closure Cost Estimate
Underground Openings

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Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Underground Openings Cost Summary

	Labor	Equipment	Materials	Totals
Adits, Portals & Declines Plugging	$2,188	$168	$5,976	$8,332
Shaft Backfill/Cover	$888	$1,884	N/A	$2,772
Shaft Capping	$0	$0	$0	$0
TOTALS	**$3,076**	**$2,052**	**$5,976**	**$11,104**

Shaft Openings - User Input — You must fill in ALL green cells and relevant blue cells in this section for each shaft

	Facility Description		Physical Characteristics			Backfill or Foundation Cover					
	Description (required)	ID Code	Diameter ft	Shaft Depth (for backfill method) ft	Backfill/ Plug Type (select)	Backfill Material Type (select)	Cover/ Backfill Fleet (select)	Thickness (if not complete backfill) ft	Distance to Backfill Borrow ft	Slope from Shaft to Borrow Area % grade	Maximum Fleet Size (user override)
1	**Ventilation Shaft 1 - Backfill**		**2.0**	**500**	**Backfill**	**Stone - crushed**	**Small Truck**	**460.0**	**595**	**-10.0**	**2**
2	**Ventilation Shaft 2 - Backfill**		**2.0**	**500**	**Backfill**	**Stone - crushed**	**Small Truck**	**460.0**	**500**	**-10.0**	**2**
3	**Ventilation Shaft 1 - Concrete Plug**		**2.0**	**500**	**Concrete Cap**	**Gravel**	**Small Truck**	**40.0**	**50**	**2.0**	**2**
4	**Ventilation Shaft 2 - Croncrete Plug**		**2.0**	**500**	**Concrete Cap**	**Gravel**	**Small Truck**	**40.0**	**50**	**2.0**	**2**

Notes:
1. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
2. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Closure Cost Estimate
Underground Openings

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
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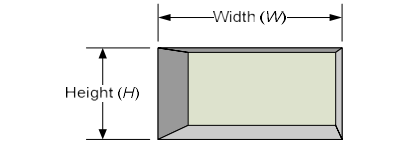
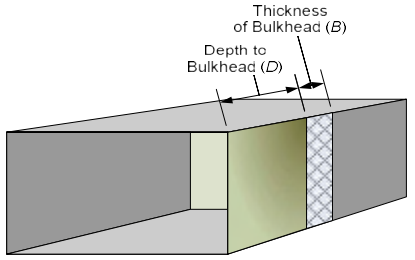
TOTALS	**$3,076**	**$2,052**	**$5,976**	**$11,104**

Underground Openings - Calculations

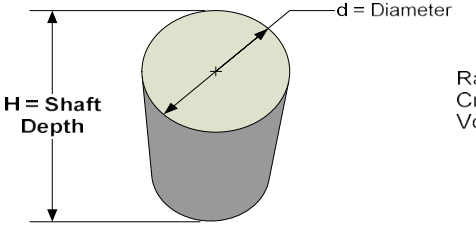
Adits, Declines and Portals - Volume Calculations





Cross-Sectional Area (A) = $W \times H$
Volume of Concrete Bulkhead = $A \times B$
Volume of Backfill = $A \times D$

Shaft Volume Calculations



Radius (r) = ½d
Cross-Sectional Area (A) = πr^2
Volume = A x H

Concrete Cover/Bulkhead Volume Calculation

Using Means Heavy Construction Cost Data (2004)
Estimage cover/bulkhead thickness
Assumes that all concrete works are reinforced
Productivity for crew from Means Heavy Construction Cost Data (2004) adjusted for supervision (addressed in Misc. Costs) and Davis-Bacon Wage Rates
Assumes 18 in thick slab

Backfill Calculations

Uses 1 large and 1 small dozer for adit backfill
Assumes max 400 foot push
Assumes average operator and 50 min/hr availability

Uses truck & loader load, haul place fleets for shafts
Concrete cap will be 1.5 feet thick, reinforced, structually supported.
If concrete cap is used, assume 10 feet of rock backfill on top of cap.
Assumes that all concrete works are reinforced
If backfill is used, assume overfill by 5 feet
Carpenter rate incl Fringe: 0 per hour

Closure Cost Estimate
Underground Openings

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Shaft Capping	$0	$0	$0	$0
TOTALS	**$3,076**	**$2,052**	**$5,976**	**$11,104**

Adits, Portals & Declines Plugging

Uses RS Means Heavy Construction Cost Data for bulkhead production rate, material costs and crews

							Bulkhead Construction				Backfill or Foam (1)				Bat Gate or Culvert (2,3,4)				
	Description (required)	Bulkhead Volume cy	Backfill (rock) Volume cy	Backfill Equipment Fleet	Backfill Productivity LCY/hr	Backfill Hours	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Bulkhead Cost $	Total Labor Cost $	Total Equipment Cost $	Material (Foam) Cost $	Total Backfill Cost $	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Bat Gate Cost $	Total Labor Cost $
1	**Idaho Tunnel Portal**	4					$547	$42	$652	$1,241	$0	$0	$0	$0	$0	$0	$0	$0	$547
2	**Caribou 300 Level Portal**	4					$547	$42	$652	$1,241	$0	$0	$0	$0	$0	$0	$0	$0	$547
3	**Potosi Shaft**						$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,368	$3,368	$0
4	**Cross Shaft**	4					$547	$42	$652	$1,241	$0	$0	$0	$0	$0	$0	$0	$0	$547
5	**Caribou Shaft**	4					$547	$42	$652	$1,241	$0	$0	$0	$0	$0	$0	$0	$0	$547
		16					**$2,188**	**$168**	**$2,608**	**$4,964**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$3,368**	**$3,368**	**$2,188**

Notes:
1) Foam costs include 1 hour move to and setup + 1 hr. minimum crew time
2) Assumes 1 hr walk-in/walk-out time for equipment
3) Batgate assumes 8 hr install time each
4) Bat culvert backfill costs based on one 8-hr day (i.e. backfilling hours = 8 hrs).

Closure Cost Estimate
Underground Openings

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Shaft Backfill/Cover	$888	$1,884	N/A	$2,772
Shaft Capping	$0	$0	$0	$0
TOTALS	**$3,076**	**$2,052**	**$5,976**	**$11,104**

Shaft Plugging

		Cover/Cap										Backfill/Cover		
	Description (required)	Cover Area ft2	Backfill or Cover Volume cy	Backfill Equipment Fleet	Number of Trucks	Backfill Productivity LCY/hr	Backfill Hours	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Shaft Cap Cost $	Total Labor Cost $	Total Equipment Cost $	Total Backfill Cost $
1	**Ventilation Shaft 1 - Backfill**	3	56	#REF!	2	377	1	$0	$0	$0	$0	$222	$471	**$693**
2	**Ventilation Shaft 2 - Backfill**	3	56	#REF!	2	392	1	$0	$0	$0	$0	$222	$471	**$693**
3	**Ventilation Shaft 1 - Concrete Plug**	3	4	#REF!	2	490	1	$0	$0	$0	$0	$222	$471	**$693**
4	**Ventilation Shaft 2 - Croncrete Plug**	3	4	#REF!	2	490	1	$0	$0	$0	$0	$222	$471	**$693**
		12	120				4	**$0**	**$0**	**$0**	**$0**	**$888**	**$1,884**	**$2,772**

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Buildings & Foundation Demolition Cost Summary

	Labor	Equipment	Materials	Totals
Building Demolition Cost	$4,773	$3,369	N/A	$8,142
Wall Demolition Cost	$0	$0	N/A	$0
Slab Demolition	$139	$361	N/A	$500
Subtotal Demolition	**$4,912**	**$3,730**	**$0**	**$8,642**
Cover Placement Cost	$1,092	$3,246	N/A	$4,338
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$1,092**	**$3,246**	**$0**	**$4,338**
Revegetation Cost	$1,120	$400	$856	$2,376
TOTALS	**$7,124**	**$7,376**	**$856**	**$15,356**

Buildings & Foundation - User Input

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

	Facility Description			Physical - MANDATORY								Foundation Cover (1)			Growth Media (1) (entire footprint)		
	Description (required)	ID Code	Type	Length ft	Width ft	Eve Height ft	Slab Thickness in	Foundation Wall Thickness in	Foundation Wall Height ft	Average Flat Area Long Dimension (ripping distance) ft	Building Area Footprint (including surrounding facilities) acres	Foundation Cover Thickness in	Distance from Foundation Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade
1	**Caribou Management Office Trailer**		Site Facilities - Buildings	10	42	12	6	0	0	0		6	22,704	-6.6	6	22,704	-6.6
2	**Caribou Storage Container 1**		Site Facilities - Mobile/Fixed E	20	8	8	0	0	0	0		0	0	0.0	8	22,704	-6.6
3	**Caribou Storage Container 2**		Site Facilities - Mobile/Fixed E	20	8	8	0	0	0	0		0	0	0.0	8	22,704	-6.6
4	**Cross Water Treatment Shed**		Site Facilities - Mobile/Fixed E	20	8	8	0	0	0	0		0	0	0.0	8	22,704	-6.6
5	**Caribou Water Treatment Shed**		Site Facilities - Mobile/Fixed E	20	8	8	0	0	0	0		0	0	0.0	8	22,704	-6.6
6	**Water Monitoring Station (Shed 1)**		Site Facilities - Structures	12	6	8	6	0	0	0		0	0	0.0	8	22,704	-6.6
7	**Water Monitoring Station (Shed 2)**		Site Facilities - Structures	8	4	10	6	0	0	0		0	0	0.0	8	22,704	-6.6
8	**Snow Shed**		Site Facilities - Buildings	164	13	8	0	0	0	0		0	0	0.0	8	22,704	-6.6

Notes:
1. Foundation cover only calculated to cover slab. Growth media estimated over entire footprint area
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

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Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$1,092**	**$3,246**	**$0**	**$4,338**
Revegetation Cost	$1,120	$400	$856	$2,376
TOTALS	**$7,124**	**$7,376**	**$856**	**$15,356**

Buildings & Foundation - User Input (cont.) — You must fill in ALL green cells and relevant blue cells in this section for each building or facility

		Construction Materials		Slab Demolition		Foundation Cover			Growth Media			Revegetation				
	Description (required)	Building Type (select)	Foundation Wall Type (select)	Slab Demo Method (select)	Slab Breaking Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)
1	**Caribou Management Office Trailer**	**Sm. steel**	**Conc 6 in (150 mm) thick**	**Break & bury**	**Sm Excavator**	**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
2	**Caribou Storage Container 1**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
3	**Caribou Storage Container 2**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
4	**Cross Water Treatment Shed**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
5	**Caribou Water Treatment Shed**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
6	**Water Monitoring Station (Shed 1)**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
7	**Water Monitoring Station (Shed 2)**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**
8	**Snow Shed**	**Sm. steel**				**Topsoil**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**	**Yes**	**Small Dozer**

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Buildings & Foundation Demolition Cost Summary

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Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$1,092**	**$3,246**	**$0**	**$4,338**
Revegetation Cost	$1,120	$400	$856	$2,376
TOTALS	**$7,124**	**$7,376**	**$856**	**$15,356**

Buildings & Foundation - Calculations

Building Volume Calculations

Using Means Heavy Construction Cost Data (2004) calculates cubic feet from building dimensions
Estimage slab thickness and wall thickness if not known
Assumes that all concrete slabs are reinforced
Productivity for crew from Means Heavy Construction Cost Data (2004) adjusted for supervision
(addressed in Misc. Costs) and Davis-Bacon Wage Rates
Demolition costs do not include hauling or disposing if debris - Use Waste Disposal module

Slab Demolition Calculations

Minimum 1 hr excavator time for slab demolition

Cover Volume Calculation

Foundation area x cover thickness
If "Bury in Place" is selected as slab demolition method, cover thickness is adjusted such that
total cover (cover + growth media) equals value entered in "Minimum thickness of cover over unbroken slab" cell above

Ripping/Scarifying Calculations

Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation

Minimum 1 acre revegetation crew time per area

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Revegetation Cost	$1,120	$400	$856	$2,376
TOTALS	**$7,124**	**$7,376**	**$856**	**$15,356**

Building & Foundation Demolition Costs

Uses RS Means Heavy Construction Cost Data for building and wall demolition cost calculations. Uses CAT Handbook for slab breaking production.

								Building Demolition			Wall Demolition			Slab Demolition			Total Costs		
	Description (required)	Building Footprint (slab area) sqft	Building Volume cu ft	Wall Length ft	Wall Area sq ft	Slab Demolition Fleet	Slab Volume cy	Total Labor Cost $	Total Equipment Cost $	Total Building Demolition Cost $	Total Labor Cost $	Total Equipment Cost $	Total Wall Demolition Cost $	Total Labor Cost $	Total Equipment Cost $	Total Slab Breaking Cost $	Total Labor Cost $	Total Equipment Cost $	Total Demolition Costs $
1	**Caribou Management Office Trailer**	420	5,040	104	0	325C	8	$857	$605	$1,462	$0	$0	$0	$139	$361	$500	$996	$966	$1,962
2	**Caribou Storage Container 1**	160	1,280	56	0	385BL	0	$218	$154	$372	$0	$0	$0	$0	$0	$0	$218	$154	$372
3	**Caribou Storage Container 2**	160	1,280	56	0	385BL	0	$218	$154	$372	$0	$0	$0	$0	$0	$0	$218	$154	$372
4	**Cross Water Treatment Shed**	160	1,280	56	0	385BL	0	$218	$154	$372	$0	$0	$0	$0	$0	$0	$218	$154	$372
5	**Caribou Water Treatment Shed**	160	1,280	56	0	385BL	0	$218	$154	$372	$0	$0	$0	$0	$0	$0	$218	$154	$372
6	**Water Monitoring Station (Shed 1)**	66	528	35	0	385BL	1	$90	$63	$153	$0	$0	$0	$0	$0	$0	$90	$63	$153
7	**Water Monitoring Station (Shed 2)**	32	320	24	0	385BL	1	$54	$38	$92	$0	$0	$0	$0	$0	$0	$54	$38	$92
8	**Snow Shed**	2,132	17,056	354	0	385BL	0	$2,900	$2,047	$4,947	$0	$0	$0	$0	$0	$0	$2,900	$2,047	$4,947
			28,064				10	**$4,773**	**$3,369**	**$8,142**	**$0**	**$0**	**$0**	**$139**	**$361**	**$500**	**$4,912**	**$3,730**	**$8,642**

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Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$1,092**	**$3,246**	**$0**	**$4,338**
Revegetation Cost	$1,120	$400	$856	$2,376
TOTALS	**$7,124**	**$7,376**	**$856**	**$15,356**

Building & Foundation - Foundation Cover and Growth Media Costs

		Foundation Cover								Growth Media								Total Cover & Growth Media Costs		
	Description (required)	Cover Volume cy	Cover Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $	Total Labor Cost $	Total Equipment Cost $	Total Costs $
1	**Caribou Management Office Trailer**	8	725/966G/D7R	535	23	1	$1,092	$3,246	$4,338						$0	$0	$0	$1,092	$3,246	$4,338
2	**Caribou Storage Container 1**						$0	$0	$0						$0	$0	$0	$0	$0	$0
3	**Caribou Storage Container 2**						$0	$0	$0						$0	$0	$0	$0	$0	$0
4	**Cross Water Treatment Shed**						$0	$0	$0						$0	$0	$0	$0	$0	$0
5	**Caribou Water Treatment Shed**						$0	$0	$0						$0	$0	$0	$0	$0	$0
6	**Water Monitoring Station (Shed 1)**						$0	$0	$0						$0	$0	$0	$0	$0	$0
7	**Water Monitoring Station (Shed 2)**						$0	$0	$0						$0	$0	$0	$0	$0	$0
8	**Snow Shed**						$0	$0	$0						$0	$0	$0	$0	$0	$0
		8				1	**$1,092**	**$3,246**	**$4,338**						**$0**	**$0**	**$0**	**$1,092**	**$3,246**	**$4,338**

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Buildings & Foundation Demolition Cost Summary

	Labor	Equipment	Materials	Totals
Building Demolition Cost	$4,773	$3,369	N/A	$8,142
Wall Demolition Cost	$0	$0	N/A	$0
Slab Demolition	$139	$361	N/A	$500
Subtotal Demolition	**$4,912**	**$3,730**	**$0**	**$8,642**
Cover Placement Cost	$1,092	$3,246	N/A	$4,338
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$1,092**	**$3,246**	**$0**	**$4,338**
Revegetation Cost	$1,120	$400	$856	$2,376
TOTALS	**$7,124**	**$7,376**	**$856**	**$15,356**

Building & Foundation - Scarifying/Revegetation Costs

					Scarifying/Ripping			Revegetation				Total Scarify & Revegation Costs			
	Description (required)	Flat Area acres	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Costs $
1	**Caribou Management Office Trailer**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
2	**Caribou Storage Container 1**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
3	**Caribou Storage Container 2**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
4	**Cross Water Treatment Shed**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
5	**Caribou Water Treatment Shed**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
6	**Water Monitoring Station (Shed 1)**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
7	**Water Monitoring Station (Shed 2)**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
8	**Snow Shed**	0.10	D7R	0	$0	$0	$0	$140	$50	$107	$297	$140	$50	$107	$297
		0.80			**$0**	**$0**	**$0**	**$1,120**	**$400**	**$856**	**$2,376**	**$1,120**	**$400**	**$856**	**$2,376**

Closure Cost Estimate
Process Ponds

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
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Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Process Ponds - Cost Summary

	Labor	Equipment	Materials	Totals
Backfilling Costs	$1,554	$3,298	N/A	$4,852
Growth Media Placement Costs	$2,975	$8,305	N/A	$11,280
Liner Cutting & Folding Costs	$1,818	$936	N/A	$2,754
Subtotal Earthworks	**$6,347**	**$12,539**	**$0**	**$18,886**
Revegetation Costs	$700	$250	$643	$1,593
TOTALS	**$7,047**	**$12,789**	**$643**	**$20,479**

Process Ponds - User Input

You must fill in ALL green cells and relevant blue cells in this section for each pond

	Facility Description		Pond Dimensions (1)					Backfill - (If trucks are used) (1)				Growth Media		
	Description (required)	ID Code	Pond Length ft	Pond Width ft	Pond Depth ft	Pond Sideslope Angle _H:1V	Disturbed Area (if calculated elsewhere) acres	Percent Backfill (100% if blank)	Distance from Backfill Borrow ft	Slope from Facility to Borrow Area % grade	Pond Volume (if calculated elsewhere) cy	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade
1	**Pond 1**		**54**	**28**	**6.0**			**67%**	**300**	**16%**		**24**	**22,704**	**-7%**
2	**Pond 2**		**113**	**61**	**8.0**			**75%**	**275**	**0%**		**24**	**22,704**	**-7%**
3	**Pond 3A**		**12**	**30**	**5.0**			**60%**	**230**	**0%**		**24**	**22,704**	**-7%**
4	**Pond 3B**		**15**	**35**	**6.0**			**67%**	**260**	**-5%**		**24**	**22,704**	**-7%**
5	**Pond 3C**		**32**	**40**	**10.0**			**80%**	**215**	**-3%**		**24**	**22,704**	**-7%**

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Closure Cost Estimate
Process Ponds

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Process Ponds - Cost Summary

	Labor	Equipment	Materials	Totals
Backfilling Costs	$1,554	$3,298	N/A	$4,852
Growth Media Placement Costs	$2,975	$8,305	N/A	$11,280
Liner Cutting & Folding Costs	$1,818	$936	N/A	$2,754
Subtotal Earthworks	**$6,347**	**$12,539**	**$0**	**$18,886**
Revegetation Costs	$700	$250	$643	$1,593
TOTALS	**$7,047**	**$12,789**	**$643**	**$20,479**

Process Ponds - User Input (cont.)

		Liner	Backfill			Growth Media			Revegetation		
	Description (required)	Crew Cut & Fold Time (2) hrs	Backfill Material Type (select)	Backfill Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)
1	**Pond 1**	**2.0**	**Stone - crushed**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**
2	**Pond 2**	**4.0**	**Stone - crushed**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**
3	**Pond 3A**	**2.0**	**Stone - crushed**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**
4	**Pond 3B**	**2.0**	**Stone - crushed**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**
5	**Pond 3C**	**2.0**	**Stone - crushed**	**Small Truck**		**Topsoil**	**Small Truck**		**Mix 4**	**Straw Mulch**	**None**

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
(2) Pond liner removal crew (2Clab + excavator) = 2 General Laborers + 325C Excavator

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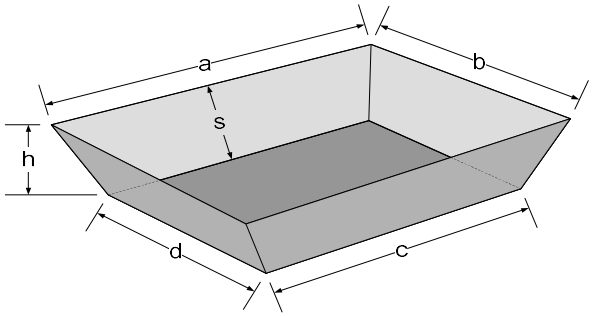
Process Ponds - Cost Summary

	Labor	Equipment	Materials	Totals
Backfilling Costs	$1,554	$3,298	N/A	$4,852
Growth Media Placement Costs	$2,975	$8,305	N/A	$11,280
Liner Cutting & Folding Costs	$1,818	$936	N/A	$2,754
Subtotal Earthworks	**$6,347**	**$12,539**	**$0**	**$18,886**
Revegetation Costs	$700	$250	$643	$1,593
TOTALS	**$7,047**	**$12,789**	**$643**	**$20,479**

Process Ponds - Calculations

Pond Volume Calculation



Area and Volume of the Frustrum of a Pyramid

$$\text{Surface Area} = ab + cd + (a+b+c+d) \times \frac{s}{2}$$

$$\text{Volume} = \frac{h\,(ab + cd + \sqrt{abcd})}{3}$$

Revegetation Calculations

Minimum 1 acre revegetation crew time per area

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Process Ponds - Cost Summary

	Labor	Equipment	Materials	Totals
Backfilling Costs	$1,554	$3,298	N/A	$4,852
Growth Media Placement Costs	$2,975	$8,305	N/A	$11,280
Liner Cutting & Folding Costs	$1,818	$936	N/A	$2,754
Subtotal Earthworks	**$6,347**	**$12,539**	**$0**	**$18,886**
Revegetation Costs	$700	$250	$643	$1,593
TOTALS	**$7,047**	**$12,789**	**$643**	**$20,479**

Process Ponds - Liner Cutting and Folding

	Description (required)	Crew Hours hrs	Total Labor Cost $	Total Equipment Cost $	Total Liner Removal Cost $
1	**Pond 1**	2	$303	$156	$459
2	**Pond 2**	4	$606	$312	$918
3	**Pond 3A**	2	$303	$156	$459
4	**Pond 3B**	2	$303	$156	$459
5	**Pond 3C**	2	$303	$156	$459
		12	**$1,818**	**$936**	**$2,754**

Closure Cost Estimate
Process Ponds

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Process Ponds - Cost Summary

	Labor	Equipment	Materials	Totals
Backfilling Costs	$1,554	$3,298	N/A	$4,852
Growth Media Placement Costs	$2,975	$8,305	N/A	$11,280
Liner Cutting & Folding Costs	$1,818	$936	N/A	$2,754
Subtotal Earthworks	**$6,347**	**$12,539**	**$0**	**$18,886**
Revegetation Costs	$700	$250	$643	$1,593
TOTALS	**$7,047**	**$12,789**	**$643**	**$20,479**

Process Ponds - Backfill and Growth Media Costs

		Pond Backfill								Growth Media							
	Description (required)	Backfill Volume cy	Backfill Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours hrs	Total Labor Cost $	Total Equipment Cost $	Total Backfill Cost $	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**Pond 1**	225	725/966G/D7R	458	2	1	$222	$471	$693	112	725/966G/D7R	511	11	1	$595	$1,661	$2,256
2	**Pond 2**	1,532	725/966G/D7R	461	2	3	$666	$1,414	$2,080	511	725/966G/D7R	511	11	1	$595	$1,661	$2,256
3	**Pond 3A**	40	725/966G/D7R	466	2	1	$222	$471	$693	27	725/966G/D7R	511	11	1	$595	$1,661	$2,256
4	**Pond 3B**	78	725/966G/D7R	460	2	1	$222	$471	$693	39	725/966G/D7R	511	11	1	$595	$1,661	$2,256
5	**Pond 3C**	379	725/966G/D7R	466	2	1	$222	$471	$693	95	725/966G/D7R	511	11	1	$595	$1,661	$2,256
		2,254				7	**$1,554**	**$3,298**	**$4,852**	783				5	**$2,975**	**$8,305**	**$11,280**

Closure Cost Estimate
Process Ponds

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Process Ponds - Cost Summary

	Labor	Equipment	Materials	Totals
Backfilling Costs	$1,554	$3,298	N/A	$4,852
Growth Media Placement Costs	$2,975	$8,305	N/A	$11,280
Liner Cutting & Folding Costs	$1,818	$936	N/A	$2,754
Subtotal Earthworks	**$6,347**	**$12,539**	**$0**	**$18,886**
Revegetation Costs	$700	$250	$643	$1,593
TOTALS	**$7,047**	**$12,789**	**$643**	**$20,479**

Process Ponds - Revegetation Costs

	Description (required)	Surface Area acres	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**Pond 1**	0.10	$140	$50	$107	$297
2	**Pond 2**	0.20	$140	$50	$215	$405
3	**Pond 3A**	0.10	$140	$50	$107	$297
4	**Pond 3B**	0.10	$140	$50	$107	$297
5	**Pond 3C**	0.10	$140	$50	$107	$297
		0.60	**$700**	**$250**	**$643**	**$1,593**

Closure Cost Estimate
Yards, Etc.

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**		**$0**
Revegetation Cost	$799	$286	$7,065	$8,150
TOTALS	**$799**	**$286**	**$7,065**	**$8,150**

Yards, Etc. - User Input

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

	Facility Description			Physical			Cover			Growth Media		
	Description (required)	ID Code	Type	Area acres	Average Flat Area Long Dimension (ripping distance) ft	Regrade Volume (calculated elsewhere) cy	Cover Thickness in	Distance from Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade
1	**Limber/Lodgepole Pine Revegetation**			**2.50**								
2	**Willow/Spruce/Fir Woodland Revegetation**			**0.50**								
3	**Willow Woodland Revegation**			**0.50**								
4	**Aspen Woodlands Revegetation**			**1.21**								

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Yards, Etc. - Cost Summary	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**		**$0**
Revegetation Cost	$799	$286	$7,065	$8,150
TOTALS	**$799**	**$286**	**$7,065**	**$8,150**

Yards, Etc. - User Input (cont.) — **You must fill in ALL green cells and relevant blue cells in this section for each building or facility**

		Grading			Cover			Growth Media			Revegetation				
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)
1	**Limber/Lodgepole Pine Revegetation**										**User Mix 1**				
2	**Willow/Spruce/Fir Woodland Revegetation**										**User Mix 2**				
3	**Willow Woodland Revegation**										**User Mix 3**				
4	**Aspen Woodlands Revegetation**										**User Mix 4**				

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**		**$0**
Revegetation Cost	$799	$286	$7,065	$8,150
TOTALS	**$799**	**$286**	**$7,065**	**$8,150**

Yards, Etc. - Calculations

Grading Calculations

Average push distance assumed to be 2/3 of the 600 feet maximum from Catepillar Handbook or 400 feet
Material assumed to be loose stockile (1.2 productivity factor)
Slope assumed to be 0 to 5% (1.0 productivity factor)

Cover Volume Calculation

Yard area x cover thickness

Ripping/Scarifying Calculations

Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr ripping/scarifying per area

Revegetation

Minimum 1 acre revegetation crew time per area

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**		**$0**
Revegetation Cost	$799	$286	$7,065	$8,150
TOTALS	**$799**	**$286**	**$7,065**	**$8,150**

Yards, Etc. - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**Limber/Lodgepole Pine Revegetation**			Dozing Materia							$0	$0	$0
2	**Willow/Spruce/Fir Woodland Revegetation**			Dozing Materia							$0	$0	$0
3	**Willow Woodland Revegation**			Dozing Materia							$0	$0	$0
4	**Aspen Woodlands Revegetation**			Dozing Materia							$0	$0	$0
											$0	**$0**	**$0**

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**		**$0**
Revegetation Cost	$799	$286	$7,065	$8,150
TOTALS	**$799**	**$286**	**$7,065**	**$8,150**

Yards, Etc. - Cover and Growth Media Costs

		Cover								Growth Media							
	Description (required)	Cover Volume cy	Topsoil Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**Limber/Lodgepole Pine Revegetation**						$0	$0	$0						$0	$0	$0
2	**Willow/Spruce/Fir Woodland Revegetation**						$0	$0	$0						$0	$0	$0
3	**Willow Woodland Revegation**						$0	$0	$0						$0	$0	$0
4	**Aspen Woodlands Revegetation**						$0	$0	$0						$0	$0	$0
							$0	**$0**	**$0**						**$0**	**$0**	**$0**

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**		**$0**
Revegetation Cost	$799	$286	$7,065	$8,150
TOTALS	**$799**	**$286**	**$7,065**	**$8,150**

Yards, Etc. - Scarifying/Revegetation Costs

	Description (required)	Surface Area acres	Area Long Dimension ft	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**Limber/Lodgepole Pine Revegetation**	2.50	0			$0	$0	$0	$350	$125	$3,750	$4,225
2	**Willow/Spruce/Fir Woodland Revegetation**	0.50	0			$0	$0	$0	$140	$50	$750	$940
3	**Willow Woodland Revegation**	0.50	0			$0	$0	$0	$140	$50	$750	$940
4	**Aspen Woodlands Revegetation**	1.21	0			$0	$0	$0	$169	$61	$1,815	$2,045
		4.71				**$0**	**$0**	**$0**	**$799**	**$286**	**$7,065**	**$8,150**

Closure Cost Estimate
Waste Disposal

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - User Input - Solid Waste

						Landfill (Bulk) Disposal			Dumpster
	Description (required)	ID Code	Waste Type (select)	Disposal Method (select)	Quantity cy	Distance to Landfill ft	Slope to Landfill % grade	Number of Trucks (user override)	Months Dumpster Rental months
1	**Sediment (Pond 1)**		**Waste Mgmt & Disposal**	**Landfill (bulk)**	**4**	**233872**	**2.2**		
2	**Sediment (Pond 2)**		**Waste Mgmt & Disposal**	**Landfill (bulk)**	**4**	**233872**	**2.2**		
3	**Sediment (Pond 3A)**		**Waste Mgmt & Disposal**	**Landfill (bulk)**	**2**	**233872**	**2.2**		
4	**Sediment (Pond 3B)**		**Waste Mgmt & Disposal**	**Landfill (bulk)**	**2**	**233872**	**2.2**		
5	**Sediment (Pond 3C)**		**Waste Mgmt & Disposal**	**Landfill (bulk)**	**4**	**233872**	**2.2**		

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Closure Cost Estimate
Waste Disposal

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Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - User Input - Hazardous Materials

	Description (required)	ID Code	Waste Type (select)	Container Type (select)	Vacuum Truck Size (select)	Liquid Quantity gallons	Soild Quantity cy	One Way Travel Distance to Disposal Site mi	One Way Travel Time to Disposal Site hr

Notes:
1. Use Other Demo & Equip Removal Sheet for tank removal

Closure Cost Estimate
Waste Disposal

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - User Input - Hydrocarbon Contaminated Soils

	Description (required)	ID Code	Waste Type (select)	Disposal Method (select)	Quantity cy	Travel Distance to Offsite Disposal mi

Notes:
1. Use Yards or Landfills Sheets for bioremediation facility reclamation

Closure Cost Estimate
Waste Disposal

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
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Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - Assumptions & Calculations

Solid Waste Disposal

Off site disposal assumes use of average rolloff dumpster [30 cy (m3), 10 ton (tonne)]
On site disposal assumes use of small loader/truck fleet for haulage
Average density for on site disposal = 2,600 lb/cy (1,540 kg/m3)
For on site disposal only 1 truck is required unless total truck hours > 8, only 2 trucks unless total truck hours are > 16

Hazardous Materials Disposal

Assumes all hazardous materials are known
Enter EITHER solid or liquid quantity each line.
If container type = 55 gallon (200 liter) drum then solid waste hauling costs apply
Average density for solids assumed to be 2,600 lb/cy (1,540 kg/m3)
Vacuum truck sizes: small = 2,200 gal (~8,300 litres), large = 5,000 gal (~19,000 litres)
Vacuum truck on site for 4 hours for each load

Hydrocarbon Contaminated Soils Disposal

Assumes all hazardous materials are known
On site disposal assumes biopad treatment
Exavation productivity =45 cy./hr (35 m3/hr) (Means Heavy Construction, 2006: 02315-424-0360)

Closure Cost Estimate
Waste Disposal

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Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - Solid Waste Disposal

	Description (required)	Waste Volume cy	Number of Off Site Dumpster Loads	Landfill Fleet Equipment	Landfill Fleet Productivity LCY/hr	Number of Trucks	Total Fleet Hours	Total Dumpster Cost $	Total Labor Cost $	Total Equipment Cost $
1	**Sediment (Pond 1)**	4		725/966G/D7R	6	1	1	$0	$181	$339
2	**Sediment (Pond 2)**	4		725/966G/D7R	6	1	1	$0	$181	$339
3	**Sediment (Pond 3A)**	2		725/966G/D7R	6	1	1	$0	$181	$339
4	**Sediment (Pond 3B)**	2		725/966G/D7R	6	1	1	$0	$181	$339
5	**Sediment (Pond 3C)**	4		725/966G/D7R	6	1	1	$0	$181	$339
		16					5	**$0**	**$905**	**$1,695**

Closure Cost Estimate
Waste Disposal

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - Hazardous Materials Disposal

	Description (required)	Liquid Waste Volume gallons	Solid Waste Volume cy	Number of Truck Loads	Tons of Waste Tons	Pick-up Fees $	Transport Fees $	Disposal Fees $	Total Hazardous Material Cost $
						$0	**$0**	**$0**	**$0**

Closure Cost Estimate
Waste Disposal

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary

	Labor	Equipment	Fees	Totals
Solid Waste - On Site	$905	$1,695	N/A	$2,600
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
TOTALS	**$905**	**$1,695**	**$0**	**$2,600**

Waste Disposal - Hydrocarbon Contaminated Soils

	Description (required)	Quantity cy	Disposal Equipment Fleet	Total Fleet Hours	Treatment Cost $	Transport Fees $	Disposal Fees $	Total Labor Cost $	Total Equipment Cost $	Total Waste Disposal Cost $
					$0	**$0**	**$0**	**$0**	**$0**	**$0**

Closure Cost Estimate
Misc. Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$1,355	$320	$9,500	$11,175
Culvert & Buried Pipe Removal	$388	$142	N/A	$530
Surface Pipe Removal	$2,144	$357	N/A	$2,501
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Costs	$0	$0	$0	$0
TOTALS	**$3,887**	**$819**	**$9,500**	**$14,206**

Fence Removal

You must fill in ALL green and blue cells

	Description (required)	ID Code	Length ft	Type (select type)	Costs: Labor Cost $	Costs: Equipment Cost $	Costs: Total Cost $
					$0	**$0**	**$0**

Notes:

Fence Installation

You must fill in ALL green and blue cells

	Description (required)	ID Code	Input: Length ft	Input: Type (select type)	Costs: Labor Cost $	Costs: Equipment Cost $	Costs: Material Cost ($)
1	**Idaho Tunnel Fence**		**50**	**Chain link 8-10ft**	$271	$64	$1,900
2	**Potosi Shaft Fence**		**50**	**Chain link 8-10ft**	$271	$64	$1,900
3	**Caribou 300 Level Fence**		**50**	**Chain link 8-10ft**	$271	$64	$1,900
4	**Cross Mine Portal**		**50**	**Chain link 8-10ft**	$271	$64	$1,900
5	**New Cross Mine Portal**		**50**	**Chain link 8-10ft**	$271	$64	$1,900
					$1,355	**$320**	**$9,500**

Notes:

Closure Cost Estimate
Misc. Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$1,355	$320	$9,500	$11,175
Culvert & Buried Pipe Removal	$388	$142	N/A	$530
Surface Pipe Removal	$2,144	$357	N/A	$2,501
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Costs	$0	$0	$0	$0
TOTALS	**$3,887**	**$819**	**$9,500**	**$14,206**

Culvert & Buried Pipe Removal

You must fill in ALL green and blue cells

			Input			Costs	
	Description (required)	ID Code	Length ft	Type (select type)	Location (select)	Labor Cost $	Equipment Cost $
1	**New Road Culvert**		**29**	**36 in (1m) Diame**	**On site**	$388	$142
						$388	**$142**

Notes:

Surface Pipe Removal

You must fill in ALL green and blue cells

			Input			Costs	
	Description (required)	ID Code	Length ft	Type (select type)	Location (select)	Labor Cost $	Equipment Cost $
1	**Segment 1**		**35**	**6 in (150 mm) - 8**	**On site**	$97	$16
2	**Segment 2**		**208**	**6 in (150 mm) - 8**	**On site**	$574	$96
3	**Segment 3**		**90**	**6 in (150 mm) - 8**	**On site**	$248	$41
4	**Segment 4**		**229**	**6 in (150 mm) - 8**	**On site**	$632	$105
5	**Segment 6**		**90**	**6 in (150 mm) - 8**	**On site**	$248	$41
6	**Segment 6**		**125**	**6 in (150 mm) - 8**	**On site**	$345	$58
						$2,144	**$357**

Notes:

Closure Cost Estimate
Misc. Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$1,355	$320	$9,500	$11,175
Culvert & Buried Pipe Removal	$388	$142	N/A	$530
Surface Pipe Removal	$2,144	$357	N/A	$2,501
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Costs	$0	$0	$0	$0
TOTALS	**$3,887**	**$819**	**$9,500**	**$14,206**

Power Line and Substation Removal

You must fill in ALL green and blue cells

	Input					
	Description (required)	**ID Code**	**Power Line Length** miles	**Power Line Type** (select)	**Number of Substations** #	**Location** (select)	**Power Line Removal** $
							$0

Notes: If substation owned by operator, use Other Demo & Equipment Removal sheet
User may need to add line items in Foundations & Buildings for substation slab demolition and fence removal
Labor/Equipment costs assume approximately 80% of cost are equipment and 20% are labor related costs

Closure Cost Estimate
Misc. Costs

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Cost Data: User Data
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$1,355	$320	$9,500	$11,175
Culvert & Buried Pipe Removal	$388	$142	N/A	$530
Surface Pipe Removal	$2,144	$357	N/A	$2,501
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Costs	$0	$0	$0	$0
TOTALS	**$3,887**	**$819**	**$9,500**	**$14,206**

Rip-Rap & Rock Lining

You must fill in ALL green and blue cells

			Input		Costs		
	Description (required)	ID Code	Area S.Y.	Type (select type)	Labor Cost $	Equipment Cost $	Material Cost $
					$0	**$0**	**$0**

Notes:

Closure Cost Estimate
Misc. Costs

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Cost Data: User Data
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$1,355	$320	$9,500	$11,175
Culvert & Buried Pipe Removal	$388	$142	N/A	$530
Surface Pipe Removal	$2,144	$357	N/A	$2,501
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Costs	$0	$0	$0	$0
TOTALS	**$3,887**	**$819**	**$9,500**	**$14,206**

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Reclamation Monitoring & Maintenance - Cost Summary

	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	$544	$194	$1,528	$2,266
Erosion Maintenance	$4,659	$13,976	N/A	$18,635
Reclamation Monitoring	$0	$0	N/A	$0
Subtotal Reclamation Monitoring	**$5,203**	**$14,170**	**$1,528**	**$20,901**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$5,203**	**$14,170**	**$1,528**	**$20,901**

Reclamation Maintenance

Description	Total Revegetation Surface Area (1,2) acres	% Area Requiring Reseeding	Seed Mix (select)	Area Requiring Reseeding acres	Seed $/acres	Labor $/acres	Equipment $/acres	Totals $
Revegetation Maintenance	8	**50%**	**Mix 4**	3.9	$393.25	$140.00	$50.00	
Labor								$544
Equipment								$194
Materials								$1,528
Cost/Acre								$583
							Subtotal	**$2,266**

Notes: 1) Surface area is NOT the same as footprint disturbance area typically used for permitting purposes.

	Total Volume Growth Media cy	% Volume Requiring Maintenance	Average Growth Media Placement Cost $/CY	Volume Requiring Replacement cy		Labor (assume: 25%) $/acres	Equipment (assume: 75%) $/acres	Total $
Erosion Maintenance	2,581	**60%**	$12.03	1,549		$4,659.00	$13,976.00	$18,635

Notes:

Reclamation Monitoring

Description	Hrs/Day	Days/Year	Number of Years	Rate $/hr		
Field Work						
Field Geologist/Engineer				$140.56		$0
Range Scientist				$125.56		$0
Reporting						
Field Geologist/Engineer				$140.56		$0
Range Scientist				$125.56		$0
					Subtotal	**$0**
Travel						
	Hrs/Trip hr	**Trips/Year**	**Years**	**Truck Cost** $/hr		
Travel				$28.83		$0
					Subtotal	**$0**
					Total Reclamation Monitoring	**$0**

Notes:

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
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Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Reclamation Monitoring & Maintenance - Cost Summary

	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	$544	$194	$1,528	$2,266
Erosion Maintenance	$4,659	$13,976	N/A	$18,635
Reclamation Monitoring	$0	$0	N/A	$0
Subtotal Reclamation Monitoring	**$5,203**	**$14,170**	**$1,528**	**$20,901**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$5,203**	**$14,170**	**$1,528**	**$20,901**

Water and Rock Sample Analysis

Description	Samples #	Events/Year	No. Years	First Sample Year closure year (1-100)	No. of Samplers	Days/Event	Hrs/Day	Analysis Cost $/sample	Supplies $/sample	Lab Cost $
										$0.00

Notes: Sampling labor cost = No. Samplers x Years x Events/year x Days/event x Hour/Day x Labor Rate
Sampling equipment costs include 1 pickup truck for every two samplers

Ground & Surface Water Monitoring

Pump Costs

Description	No. of units		Years		Cost $
Pump (purchased)		Replacement period (yrs):			$0
				Subtotal Field Work	**$0**

Notes: Replacement period = frequency of pump replacement

Reporting

Description	Hrs/Event	Rate $/hr	Cost $
Field Geologist/Engineer			
		Subtotal Reporting	

Notes:

Closure Cost Estimate
Labor Rates

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

ZONE ADJUSTMENTS		
Cost Basis/Project Region	Northern Nevada	Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties
Power Equipment Operators	50-150 miles	$0.00
Truck Drivers	50-150 miles	$0.00
Laborers	50-150 miles	$0.00

INDIRECT COSTS	
Unemployment (%)	3.00%
Retirement/SS/Medicare (%)	7.65%
Workman's Compensation (%)	7.60%
Other Indirects	
State Payroll Tax (13),(15),(17),(	
Total Other Indirects	**0.00%**

HOURLY LABOR RATE TABLE

EQUIPMENT TYPE (1) OR JOB DESCRIPTION	Labor Group	Base Rate ($/hr)	Zone Adjustment ($/hr)	Hourly Wage ($/hr)	Fringe ($/hr)	Retirement/ Medicare ($/hr)	Unemployment Insurance ($/hr)	Workman's Compensation ($/hr)	Other Indirect Costs ($/hr)	Total ($/hr)
Equipment Operators ($/hr) (2)										
Bulldozers										
D6R		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
D6R w/ Winch					$24.80					
D7R		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
D8R		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
D9R		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
D10R		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
D11R		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
Wheeled Dozers										
824G					$24.80					
834G					$24.80					
844					$24.80					
854G					$24.80					
Motor Graders										
120H		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
14G/H		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
16G/H		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
24M					$24.80					
Track Excavators										
312C		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
320C		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
325C		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
330C		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
345B		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
365BL					$24.80					
385BL		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
Scrapers										
631G		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
637G		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
Wheeled Loaders										
924G		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
928G		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
950G		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
966G		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
972G		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
980G		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
988G		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
990					$24.80					
992G		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
994D					$24.80					
L2350					$24.80					
Shovels										
PC2000					$24.80					
PC3000					$24.80					
PC4000					$24.80					
PC5500					$24.80					
PC8000					$24.80					
Hydraulic Hammers										
H-120 (fits 325)										
H-160 (fits 345)										
H-180 (fits 365/385)										
Demolition Shears										
S340 (fits 322/325/330)										
S365 (fits 330/345)										
S390 (fits 365/385)										
Demolition Grapples										
G315 (fits 322/325)										
G320 (fits 325/330)										
G330 (fits 345/365)										

Closure Cost Estimate
Labor Rates

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

ZONE ADJUSTMENTS		
Cost Basis/Project Region	Northern Nevada	Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties
Power Equipment Operators	50-150 miles	$0.00
Truck Drivers	50-150 miles	$0.00
Laborers	50-150 miles	$0.00

INDIRECT COSTS	
Unemployment (%)	3.00%
Retirement/SS/Medicare (%)	7.65%
Workman's Compensation (%)	7.60%
Other Indirects	
State Payroll Tax (13),(15),(17),(	
Total Other Indirects	**0.00%**

HOURLY LABOR RATE TABLE

Other Equipment										
420D 4WD Backhoe		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
428D 4WD Backhoe		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
CS533E Vibratory Roller		$36.92	$0.00	$36.92	$24.80	$1.11	$2.82	$2.81	$0.00	$68.46
CS633E Vibratory Roller					$24.80					
CP533E Sheepsfoot Compactor					$24.80					
CP633E Sheepsfoot Compactor					$24.80					
Light Truck - 1.5 Ton					$24.80					
Supervisor's Truck					$24.80					
Flatbed Truck					$24.80					
Air Compressor + tools		$35.46	$0.00	$35.46	$24.80	$1.06	$2.71	$2.69	$0.00	$66.73
Welding Equipment		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
Heavy Duty Drill Rig		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
Pump (plugging) Drill Rig		$37.51	$0.00	$37.51	$24.80	$1.13	$2.87	$2.85	$0.00	$69.16
Concrete Pump					$24.80					
Gas Engine Vibrator		$36.92	$0.00	$36.92	$24.80	$1.11	$2.82	$2.81	$0.00	$68.46
Generator 5KW					$24.80					
HDEP Welder (pipe or liner)					$24.80					
5 Ton Crane		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
20 Ton Crane		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
50 Ton Crane		$38.37	$0.00	$38.37	$24.80	$1.15	$2.94	$2.92	$0.00	$70.17
120 Ton Crane					$24.80					

NOTES:

(1) Equipment Type:	Catepillar model or equivalent, LeTourneau
(2) Equipment Operator Source:	D-B NV20200002 01/03/2020
(3) Zone Basis:	From Washoe Co. Courthouse

Truck Drivers ($/hr) (4)										
725	ruck Driver > 25 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
730	ruck Driver > 25 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
735	ruck Driver > 25 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
740	ruck Driver > 25 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
769D	ruck Driver > 25 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
773E					$4.16					
777D	ruck Driver > 60 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
785C					$4.16					
793C					$4.16					
797B					$4.16					
613E (5,000 gal) Water Wagon	ter Truck > 2,500 gall	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
621E (8,000 gal) Water Wagon	ter Truck > 2,500 gall	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41
777D Water Truck					$4.16					
785C Water Truck					$4.16					
Dump Truck (10-12 yd3)	Truck Driver > 8 yds <	$31.50	$0.00	$31.50	$4.16	$0.95	$2.41	$2.39	$0.00	$41.41

NOTES:

(4) Truck Driver Source:	D-B SUNV2017-001 10/1/2018
(5) Zone Basis:	From Washoe Co. Courthouse

Closure Cost Estimate
Equipment Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Monthly Rental Basis: 160 hrs month

EQUIPMENT RENTAL RATE TABLE

EQUIPMENT TYPE (1)	Monthly Owner/Rental Rate	Equipment Hourly Rate	Fuel/Lube/ Wear	Total Rate
Bulldozers				
D6R	$10,605.00	$66.28	$26.50	$92.78
D6R w/ Winch			$13.69	$13.69
D7R	$11,575.00	$72.34	$29.24	$101.58
D8R	$22,030.00	$137.69	$39.47	$177.16
D9R	$29,580.00	$184.88	$56.05	$240.92
D10R	$41,000.00	$256.25	$72.14	$328.39
D11R	$64,000.00	$400.00	$105.01	$505.01
Wheeled Dozers				
824G			$23.54	$23.54
834G			$27.59	$27.59
844			$32.85	$32.85
854G			$41.61	$41.61
Motor Graders				
120H	$9,790.00	$61.19	$29.81	$90.99
14G/H	$14,075.00	$87.97	$43.48	$131.45
16G/H	$22,000.00	$137.50	$54.50	$192.00
24M			$33.95	$33.95
Track Excavators				
312C	$5,380.00	$33.63	$12.51	$46.13
320C	$6,070.00	$37.94	$20.03	$57.97
325C	$8,490.00	$53.06	$25.00	$78.07
330C	$11,015.00	$68.84	$30.19	$99.03
345B	$14,565.00	$91.03	$37.48	$128.52
365BL			$28.91	$28.91
385BL	$22,950.00	$143.44	$58.28	$201.71
Scrapers				
631G	$25,295.00	$158.09	$62.93	$221.03
637G	$35,000.00	$218.75	$89.41	$308.16
Wheeled Loaders				
924G	$4,850.00	$30.31	$19.62	$49.93
928G	$5,300.00	$33.13	$22.02	$55.14
950G	$7,750.00	$48.44	$27.46	$75.89
966G	$11,115.00	$69.47	$36.01	$105.47
972G	$14,075.00	$87.97	$40.68	$128.65
980G	$14,075.00	$87.97	$45.83	$133.80
988G	$23,460.00	$146.63	$64.79	$211.42
990			$37.23	$37.23
992G	$63,000.00	$393.75	$121.76	$515.51
994D			$78.84	$78.84
L2350			$144.54	$144.54
Shovels				
PC2000			$81.03	$81.03
PC3000			$109.50	$109.50
PC4000			$153.30	$153.30
PC5500			$260.61	$260.61
PC8000			$326.31	$326.31
Hydraulic Hammers				
H-120 (fits 325)	$5,810.00	$36.31	$5.62	$41.93
H-160 (fits 345)	$12,240.00	$76.50	$10.98	$87.48
H-180 (fits 365/385)	$16,520.00	$103.25	$13.01	$116.26
Demolition Shears				
S340 (fits 322/325/330)				$0.00
S365 (fits 330/345)				$0.00
S390 (fits 365/385)				$0.00
Demolition Grapples				
G315 (fits 322/325)				$0.00
G320 (fits 325/330)				$0.00
G330 (fits 345/365)				$0.00
Other Equipment				
420D 4WD Backhoe	$2,700.00	$16.88	$15.26	$32.14
428D 4WD Backhoe	$3,450.00	$21.56	$15.13	$36.70
CS533E Vibratory Roller	$8,140.00	$50.88	$8.21	$59.09
CS633E Vibratory Roller			$10.40	$10.40
CP533E Sheepsfoot Compactor			$8.21	$8.21
CP633E Sheepsfoot Compactor			$10.40	$10.40
Light Truck - 1.5 Ton	$4,043.60	$25.27	$3.56	$28.83
Supervisor's Truck	$3,634.40	$22.72	$2.46	$25.18
Flatbed Truck	$4,043.60	$25.27	$11.81	$37.08
Air Compressor + tools	$5,749.04	$35.93	$2.19	$38.12
Welding Equipment	$3,036.00	$18.98	$4.38	$23.36
Heavy Duty Drill Rig	$32,802.00	$205.01	$26.28	$231.29
Pump (plugging) Drill Rig	$32,802.00	$205.01	$21.90	$226.91
Concrete Pump	$8,470.00	$52.94	$21.90	$74.84
Gas Engine Vibrator	$554.40	$3.47	$2.19	$5.66
Generator 5KW	$1,651.76	$10.32	$3.29	$13.61
HDEP Welder (pipe or liner)	$8,778.00	$54.86	$4.38	$59.24
5 Ton Crane	$7,779.20	$48.62	$6.57	$55.19
20 Ton Crane	$11,924.00	$74.53	$8.76	$83.29
50 Ton Crane	$11,924.00	$74.53	$10.29	$84.82
120 Ton Crane			$11.39	$11.39
Trucks				
725	$15,300.00	$95.63	$36.52	$132.14
730	$15,300.00	$95.63	$37.61	$133.24
735	$15,300.00	$95.63	$50.89	$146.51
740	$15,300.00	$95.63	$52.11	$147.73
769D	$21,650.00	$135.31	$37.23	$172.54
773E	$34,025.00	$212.66	$49.74	$262.39
777D	$55,700.00	$348.13	$70.98	$419.10
785C			$53.11	$53.11
793C			$91.43	$91.43
797B			$128.66	$128.66
613E (5,000 gal) Water Wagon	$6,630.00	$41.44	$22.07	$63.51
621E (8,000 gal) Water Wagon	$11,220.00	$70.13	$39.20	$109.33
777D Water Truck			$36.68	$36.68
785C Water Truck			$53.11	$53.11
Dump Truck (10-12 yd^3)	$11,814.00	$73.84	$12.42	$86.26

NOTES:

(1) Power Equipment Source:	
(2) Power Equipment Type:	Catepillar model or equivalent, LeTourneau loader, Komatsu shovels
(3) Drilling Equipment Source:	RS Means Heavy Construction (2020 Q2)
(4) Other Equipment Source:	RS Means Heavy Construction (2020 Q2)

(5) Drill rig includes support (pipe) truck

Closure Cost Estimate
Equipment Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm

FUEL, LUBE AND WEAR CALCULATIONS

EQUIPMENT TYPE	PM Cost Per Hour (1)	Under carriage or Tires (2)	G.E.T Consumption (3)	Fuel Use Rate gal/hr (4)	Cost@ 2.19/gal	Total Hourly Equipment Cost
Bulldozers						
D6R	$7.63		$5.18	6.25	$13.69	$26.50
D6R w/ Winch				6.25	$13.69	$13.69
D7R	$7.63		$5.18	7.50	$16.43	$29.24
D8R	$8.05		$10.07	9.75	$21.35	$39.47
D9R	$9.18		$15.66	14.25	$31.21	$56.05
D10R	$10.80		$21.92	18.00	$39.42	$72.14
D11R	$14.71		$32.26	26.50	$58.04	$105.01
Wheeled Dozers						
824G		$0.00		10.75	$23.54	$23.54
834G		$0.00		12.60	$27.59	$27.59
844		$0.00		15.00	$32.85	$32.85
854G		$0.00		19.00	$41.61	$41.61
Motor Graders						
120H	$4.64	$5.63	$10.78	4.00	$8.76	$29.81
14G/H	$5.78	$8.43	$15.58	6.25	$13.69	$43.48
16G/H	$6.04	$10.75	$21.28	7.50	$16.43	$54.50
24M				15.50	$33.95	$33.95
Track Excavators						
312C	$4.36		$4.03	1.88	$4.12	$12.51
320C	$4.65		$4.65	4.90	$10.73	$20.03
325C	$4.68		$5.87	6.60	$14.45	$25.00
330C	$5.77		$6.46	8.20	$17.96	$30.19
345B	$7.66		$6.61	10.60	$23.21	$37.48
365BL				13.20	$28.91	$28.91
385BL	$6.42		$13.53	17.50	$38.33	$58.28
Scrapers						
631G	$7.74	$13.86	$8.48	15.00	$32.85	$62.93
637G	$12.87	$13.86	$10.66	23.75	$52.01	$89.41
Wheeled Loaders						
924G	$3.53	$5.59	$4.47	2.75	$6.02	$19.62
928G	$4.14	$5.59	$4.62	3.50	$7.67	$22.02
950G	$5.15	$4.95	$8.60	4.00	$8.76	$27.46
966G	$5.37	$7.25	$10.79	5.75	$12.59	$36.01
972G	$6.07	$7.25	$13.67	6.25	$13.69	$40.68
980G	$6.07	$9.67	$13.67	7.50	$16.43	$45.83
988G	$11.37	$12.27	$14.65	12.10	$26.50	$64.79
990				17.00	$37.23	$37.23
992G	$12.59	$25.17	$33.63	23.00	$50.37	$121.76
994D				36.00	$78.84	$78.84
L2350				66.00	$144.54	$144.54
Shovels						
PC2000				37.00	$81.03	$81.03
PC3000				50.00	$109.50	$109.50
PC4000				70.00	$153.30	$153.30
PC5500				119.00	$260.61	$260.61
PC8000				149.00	$326.31	$326.31
Hydraulic Hammers						
H-120 (fits 325)	N/A		$5.62			$5.62
H-160 (fits 345)	N/A		$10.98			$10.98
H-180 (fits 365/385)	N/A		$13.01			$13.01
Demolition Shears						
S340 (fits 322/325/330)	N/A					$0.00
S365 (fits 330/345)	N/A					$0.00
S390 (fits 365/385)	N/A					$0.00
Demolition Grapples						
G315 (fits 322/325)	N/A					$0.00
G320 (fits 325/330)	N/A					$0.00
G330 (fits 345/365)	N/A					$0.00
Other Equipment						
420D 4WD Backhoe	$4.29	$0.81	$3.59	3.00	$6.57	$15.26
428D 4WD Backhoe	$4.06	$0.81	$3.69	3.00	$6.57	$15.13
CS533E Vibratory Roller			N/A	3.75	$8.21	$8.21
CS633E Vibratory Roller			N/A	4.75	$10.40	$10.40
CP533E Sheepsfoot Compactor			N/A	3.75	$8.21	$8.21
CP633E Sheepsfoot Compactor			N/A	4.75	$10.40	$10.40
Light Truck - 1.5 Ton		$0.27	N/A	1.50	$3.29	$3.56
Supervisor's Truck		$0.27	N/A	1.00	$2.19	$2.46
Flatbed Truck		$1.51	N/A	4.70	$10.29	$11.81
Air Compressor + tools			N/A	1.00	$2.19	$2.19
Welding Equipment			N/A	2.00	$4.38	$4.38
Heavy Duty Drill Rig			N/A	12.00	$26.28	$26.28
Pump (plugging) Drill Rig			N/A	10.00	$21.90	$21.90
Concrete Pump			N/A	10.00	$21.90	$21.90
Gas Engine Vibrator			N/A	1.00	$2.19	$2.19
Generator 5KW			N/A	1.50	$3.29	$3.29
HDEP Welder (pipe or liner)			N/A	2.00	$4.38	$4.38
5 Ton Crane			N/A	3.00	$6.57	$6.57
20 Ton Crane			N/A	4.00	$8.76	$8.76
50 Ton Crane			N/A	4.70	$10.29	$10.29
120 Ton Crane			N/A	5.20	$11.39	$11.39
Trucks						
725	$8.53	$14.47	$3.22	4.70	$10.29	$36.52
730	$8.53	$14.47	$3.22	5.20	$11.39	$37.61
735	$8.53	$23.04	$3.22	7.35	$16.10	$50.89
740	$8.53	$24.26	$3.22	7.35	$16.10	$52.11
769D	$6.32	$7.05	$3.60	9.25	$20.26	$37.23
773E	$7.82	$12.14	$4.04	11.75	$25.73	$49.74
777D	$11.19	$18.59	$4.51	16.75	$36.68	$70.98
785C				24.25	$53.11	$53.11
793C				41.75	$91.43	$91.43
797B				58.75	$128.66	$128.66
613E (5,000 gal) Water Wagon	$5.12	$3.82		6.00	$13.14	$22.07
621E (8,000 gal) Water Wagon	$7.24	$8.42		10.75	$23.54	$39.20
777D Water Truck				16.75	$36.68	$36.68
785C Water Truck				24.25	$53.11	$53.11
Dump Truck (10-12 yd3) (5)	N/A	$1.03	N/A	5.20	$11.39	$12.42

Notes:

(1) PM Source:	Cashman Equipment Company (July 2020) unless noted
(2) Undercarriage Source:	Purecell Tire Quote: June 2020
(3) G.E.T. Source:	Cashman Equipment Company (July 2020) unless noted
(4) Fuel Use Source:	Caterpillar Handbook, Edition 35, Ch. 20; or estimated average for smaller vehicles
(5) Dump Truck Oper. Cost Source:	Means Heavy Construction (2008)

Closure Cost Estimate
Equipment Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm

TIRE COST TABLES

Equipment	Tire Size	# of Tires Per Piece of Equipment	Cost Per Tire	Tire Cost (1)(2)	Life Expectency Hours (Low/Zone A) (3)	Tire Cost per Hour
Bulldozers						
D6R			N/A			
D6R w/ Winch			N/A			
D7R			N/A			
D8R			N/A			
D9R			N/A			
D10R			N/A			
D11R			N/A			
Wheeled Dozers						
824G	29.5R25	4		$0.00	3,500	$0.00
834G	35/65-R33	4		$0.00	3,500	$0.00
844	45/65-R39	4		$0.00	3,500	$0.00
854G	45/65-R45	4		$0.00	3,500	$0.00
Motor Graders						
120H	13PR24	6	$3,282.50	$19,695.00	3,500	$5.63
14G/H	20.5R25	6	$4,919.50	$29,517.00	3,500	$8.43
16G/H	23.5R25	6	$6,272.90	$37,637.40	3,500	$10.75
24M	23.5R25	6		$0.00	3,500	
Track Excavators						
312C			N/A			
320C			N/A			
325C			N/A			
330C			N/A			
345B			N/A			
365BL			N/A			
385BL			N/A			
Scrapers						
631G	37.25R35	4	$13,862.80	$55,451.20	4,000	$13.86
637G	37.25R35	4	$13,862.80	$55,451.20	4,000	$13.86
Wheeled Loaders						
924G	17.5R25	4	$6,292.00	$25,168.00	4,500	$5.59
928G	17.5R25	4	$6,292.00	$25,168.00	4,500	$5.59
950G	26.5R25	4	$5,565.40	$22,261.60	4,500	$4.95
966G	26.5R25	4	$8,160.20	$32,640.80	4,500	$7.25
972G	26.5R25	4	$8,160.20	$32,640.80	4,500	$7.25
980G	29.5R25	4	$10,873.40	$43,493.60	4,500	$9.67
988G	35/65-33	4	$13,808.70	$55,234.80	4,500	$12.27
990	41.25/70-39	4		$0.00	4,500	
992G	45/65R45	4	$28,316.00	$113,264.00	4,500	$25.17
994D	55/85R57	4		$0.00	4,500	
L2350	55/85R57	4		$0.00	4,500	
Shovels						
PC2000			N/A			
PC3000			N/A			
PC4000			N/A			
PC5500			N/A			
PC8000			N/A			
Hydraulic Hammers						
H-120 (fits 325)			N/A			
H-160 (fits 345)			N/A			
H-180 (fits 365/385)			N/A			
Demolition Shears						
S340 (fits 322/325/330)			N/A			
S365 (fits 330/345)			N/A			
S390 (fits 365/385)			N/A			
Demolition Grapples						
G315 (fits 322/325)			N/A			
G320 (fits 325/330)			N/A			
G330 (fits 345/365)			N/A			
Other Equipment						
420D 4WD Backhoe	340/80R18-19.5LR24	2	$1,221.10	$2,442.20	3,000	$0.81
428D 4WD Backhoe	340/80R18-16.9R28	2	$1,221.10	$2,442.20	3,000	$0.81
CS533E Vibratory Roller			N/A			
CS633E Vibratory Roller			N/A			
CP533E Sheepsfoot Compactor			N/A			
CP633E Sheepsfoot Compactor			N/A			
Light Truck - 1.5 Ton		4	206.2	$824.80	3,000	$0.27
Supervisor's Truck		4	206.2	$824.80	3,000	$0.27
Flatbed Truck		22	206.2	$4,536.40	3,000	$1.51
Air Compressor + tools			N/A			
Welding Equipment			N/A			
Heavy Duty Drill Rig		4		$0.00	3,000	
Pump (plugging) Drill Rig		4		$0.00	3,000	
Concrete Pump			N/A			
Gas Engine Vibrator			N/A			
Generator 5KW			N/A			
HDEP Welder (pipe or liner)			N/A			
5 Ton Crane		4		$0.00	3,000	
20 Ton Crane		4		$0.00	3,000	
50 Ton Crane		6		$0.00	3,000	
120 Ton Crane		6		$0.00	3,000	
Trucks						
725	23.5R25	6	$4,824.30	$28,945.79	2,000	$14.47
730	23.5R25	6	$4,824.30	$28,945.79	2,000	$14.47
735	26.5R25	6	$7,681.00	$46,086.00	2,000	$23.04
740	29.5R25	6	$8,086.20	$48,517.20	2,000	$24.26
769D	18.00R33	6	$7,054.80	$42,328.80	6,000	$7.05
773E	24.00R35	6	$10,119.20	$60,715.20	5,000	$12.14
777D	27.00R49	6	$15,494.70	$92,968.20	5,000	$18.59
785C	33.00R51	6		$0.00	4,000	
793C	40.00R57	6		$0.00	4,000	
797B	40.00R57	6		$0.00	4,000	
613E (5,000 gal) Water Wagon	23.5R25	6	$3,818.10	$22,908.60	6,000	$3.82
621E (8,000 gal) Water Wagon	33.25R29	6	$11,223.35	$67,340.10	8,000	$8.42
777D Water Truck	27.00R49	6		$0.00	5,000	
785C Water Truck	33.00R51	6		$0.00	4,000	
Dump Truck (10-12 yd3)		10	$619.90	$6,199.00	6,000	$1.03

Notes:

(1) Unit Cost Basis:	Cost per set
(2) Cost Basis:	Total cost for all required tires.
(3) Tire Cost Source:	Purecell Tire Quote: June 2020
(4) Tire Wear Source:	Caterpillar Handbook, Edition 35; Ch. 20

Closure Cost Estimate
Labor Rates

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

ZONE ADJUSTMENTS			
Cost Basis/Project Region	Northern Nevada	Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties	
Power Equipment Operators	50-150 miles	$0.00	
Truck Drivers	50-150 miles	$0.00	
Laborers	50-150 miles	$0.00	
INDIRECT COSTS			
Unemployment (%)	3.00%		
Retirement/SS/Medicare (%)	7.65%		
Workman's Compensation (%)	7.60%		
Other Indirects			
State Payroll Tax (13),(15),(17),(			
Total Other Indirects	0.00%		

HOURLY LABOR RATE TABLE

Laborers ($/hr) (6,7)

General Laborer	Group 1	$25.45	$0.00	$25.45	$10.56	$0.76	$1.95	$1.93	$0.00	$40.65
Skilled Laborer	Group 4	$25.95	$0.00	$25.95	$10.56	$0.78	$1.99	$1.97	$0.00	$41.25
Driller's Helper	Group 3	$25.70	$0.00	$25.70	$10.56	$0.77	$1.97	$1.95	$0.00	$40.95
Rodmen (reinforcing concrete)	Group 1	$25.45	$0.00	$25.45	$10.56	$0.76	$1.95	$1.93	$0.00	$40.65
Cement finisher	Group 3	$25.70	$0.00	$25.70	$10.56	$0.77	$1.97	$1.95	$0.00	$40.95
Carpenter		$35.88	$0.00	$35.88	$13.48	$1.08	$2.74	$2.73	$0.00	$55.91

NOTES:

(6) Laborer Source:	D-B LABO0169-034 10/1/2017
(7) Carpenter Source:	D-B Projected from Southern Nevada
(8) Zone Basis:	From Washoe Co. Courthouse

Project Management and Technical Labor ($/hr) (9)

Project Manager		$72.56		$72.56	$10.56	$2.18	$5.55	$5.51	$0.00	$96.37
Foreman		$67.50		$67.50	$10.56	$2.03	$5.16	$5.13	$0.00	$90.38
Field Geologist/Engineer		$109.94		$109.94	$10.56	$3.30	$8.41	$8.36	$0.00	$140.56
Field Tech/Sampler		$76.11		$76.11	$10.56	$2.28	$5.82	$5.78	$0.00	$100.56
Range Scientist		$97.25		$97.25	$10.56	$2.92	$7.44	$7.39	$0.00	$125.56
Senior Planning Engineer					$10.56					
Project Engineer					$10.56					
Mechanic/Fitter					$10.56					
					$10.56					
					$10.56					
					$10.56					
					$10.56					

NOTES:

(9) Project Manager:	R.S.Means 2020 Q2 (01 31 1320 0200 Total Incl.O&P-10%) Adjusted for Elko, NV
(9) Foreman Source:	R.S.Means 2020 Q2 (01 31 1320 0200 Total Incl.O&P-10%) Adjusted for Elko, NV
(9) Techical Labor Source:	Wood plc 2020 Adjusted for Zone,Tax and Ins.
Other Labor Source:	
Other Labor Source:	
†Additional User Markups	
(These are added by the user to the	
base rate to account for site-specific	
conditions or corporate requirements)	

Closure Cost Estimate
Material Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Revegetation Materials

Seed Mixes

Seed Mix	Description	Cost/Acre
None		
Mix 1	Basins	$302.50
Mix 2	Low Hills	$332.75
Mix 3	Uplands	$363.00
Mix 4	Riparian or Custom	$393.25
User Mix 1	**Limber/Lodgepole Pine**	**$1,500.00**
User Mix 2	**Willow/Spruce/Fir Woodland**	**$1,500.00**
User Mix 3	**Willow Woodland**	**$1,500.00**
User Mix 4	**Aspen Woodlands**	**$1,500.00**

	Cost/lb	lbs/Acre	Cost/Acre
User Mix 5 (from Seed Mix sheet	$0.00	$25.97	$0.00

Notes:

Mulch

Item	Cost/lb	lbs/Acre	Cost/Acre
None			
Straw Mulch	$0.17	**4000**	$677.78
Hydro Mulch	$0.25	**3000**	$750.00
Timber Mulch			

Notes:
Granite Seed $500 per Ton in 50 lb bag Wood (Hydro) Mulch (June 2020)

Closure Cost Estimate
Material Costs

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Amendments			
Item	**Cost/lb**	**lbs/Acre**	**Cost/Acre**
None			
Organic Matter	$0.70		$0.00
Treated Sludge			
Chemical	$0.59		$0.00
Notes:	Western Nevada Supply $29.34 per 50 lb. bag 15-15-15 (June 2020)		

Closure Cost Estimate
Material Costs

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Well Abandonment Materials

Description	Cost/50lb bag	Units	Cost/unit*
Cement	$7.57	cy	$36.07
Grout (Low Grade Bentonite)	$8.85	cy	$42.14
Inert Material/Cuttings		cy	
		cy	
		cy	

(1) Jentech Drilling Supply quote (June 2020) Type I,II Cement at $14.24 per 94 lb. bag
(2) Jentech Drilling Supply (June 2020) 3/8 in. Chunk Bentonite Hole Plug at $8.85 per 50 lb. bag (5.75 cf/bag at

* Assumes 1 bag mixes with water to make 0.21 y3 or 0.16 m3 of grout/cement slurry.

Monitoring Costs

Description	Units	Cost/unit
Monitor Well Pump	ea.	$2,788.41
Sampling Supplies	ea.	$6.51
Water Analysis (Profile I) (1)	ea.	$411.00
Leach Test (MWMP) w/ analysis	ea.	$483.40
ABA + S speciation	ea.	$150.00
WAD Cyanide in water	ea.	$56.00
Water Analysis (Profile II) (1)	ea.	$461.00
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	

(1) WET Lab, Reno, Nevada (July 2020)
Well pump and Sample supply costs adjusted to 2020.
Original source unknown.

Closure Cost Estimate
Material Costs

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Fuel, Etc.

Description	Units	Cost/unit
Off-road Diesel - delivered (1)	$/gal	$2.190
Pickup Truck Mileage	$/mi	$0.575
Electical Power	$/kWh	$0.079

(1) Source: Oil Price Infomration Service , average annual cost including freight to Nevada (July 2020).
Source: Federal Government Vehicle Allowance Rate 2020
Source: NV Energy (July 2020) $0.07872

Closure Cost Estimate
Material Costs

Revegetation Method				
Slopes				
Disturbance Type	**Seed Application Method**	**Labor** Cost/Acre	**Equipment** Cost/Acre	**Total** Cost/Acre
Waste Rock Dumps	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Heap Leach	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Tailings	**Hand Broadcast**	$140.00	$50.00	$190.00
Quarries & Borrow Pits	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Flat Areas and Undifferentiated				
Disturbance Type	**Seed Application Method**	**Labor** Cost/Acre	**Equipment** Cost/Acre	**Total** Cost/Acre
Exploration Trenches	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Exploration Roads	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Waste Rock Dumps	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Heap Leach	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Tailings	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Quarries & Borrow Pits	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Roads	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Pits	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Haul Material	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Foundations & Buildings	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Sediment & Drainge Control	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Process Ponds	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Landfills	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Yards, Etc.	**Mechanical Broadcast**	$140.00	$50.00	$190.00
Revegetation Maintenance	**Mechanical Broadcast**	$140.00	$50.00	$190.00

Closure Cost Estimate
Misc. Unit Costs

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Revegetation

	Means Number	Unit	Crew	Daily Output	Daily Output User	Materials	Labor	Equipment	Total	Notes
Seeding - Broadcast Hand (1)		acres					$140.00	$50.00	$190.00	
Seeding - Broadcast Mechanical (1)		acres					$140.00	$50.00	$190.00	
Seeding - Drill (1)		acres		365			$140.00	$120.00	$260.00	
Seeding - Hydroseeding (1)				365			$250.00	$150.00	$400.00	
Shrub Planting - bare root 6-10 in (150- 250mm) (2)	02910-400-0561	ea.	1 Clab	365					$0.00	
Tree Planting - bare root 11-16 in (270- 400mm) (3)	02910-400-0562	ea.	1 Clab	260					$0.00	
Cactus Planting (4)		ea.	1 Clab						$0.00	
NOTES:										
(1) Seeding Source:	Source: Kelley Erosion Control (July 2020).									
(2) Shrub Source:										
(3) Tree Source:										
(4) Cactus Source:										

Building and Wall Demolition

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Daily Output User	Labor	Equipment	Premium	Total	Notes
Building Demolition										
Lg. steel	02220-110-0012	C.F.	B-8	21500		$0.15	$0.12		$0.27	
Lg. concrete	02220-110-0050	C.F.	B-8	15300		$0.21	$0.16		$0.37	
Lg. masonry	02220-110-0080	C.F.	B-8	20100		$0.16	$0.12		$0.28	
Lg. mixed	02220-110-0100	C.F.	B-8	20100		$0.16	$0.12		$0.28	
Sm. steel	02220-110-0500	C.F.	B-3	14800		$0.17	$0.12		$0.29	
Sm. concrete	02220-110-0600	C.F.	B-3	11300		$0.23	$0.16		$0.39	
Sm. masonry	02220-110-0650	C.F.	B-3	14800		$0.17	$0.12		$0.29	
Sm. wood	02220-110-0700	C.F.	B-3	14800		$0.17	$0.12		$0.29	
Wall Demolition										
Block 4 in (100 mm) thick	02220-130-2000	S.F.	1 Clab	180		$1.81	$0.00	20%	$2.17	
Block 6 in (150 mm) thick	02220-130-2040	S.F.	1 Clab	170		$1.91	$0.00	20%	$2.29	
Block 8 in (200 mm) thick	02220-130-2080	S.F.	1 Clab	150		$2.17	$0.00	20%	$2.60	
Block 12 in (300 mm) thick	02220-130-2100	S.F.	1 Clab	150		$2.17	$0.00	20%	$2.60	
Conc 6 in (150 mm) thick	02220-130-2400	S.F.	B-9	160		$15.99	$1.91	10%	$19.69	
Conc 8 in (200 mm) thick	02220-130-2420	S.F.	B-9	140		$18.27	$2.18	10%	$22.50	
Conc 10 in (250 mm) thick	02220-130-2440	S.F.	B-9	120		$21.31	$2.54	10%	$26.24	
Conc 12 in (300 mm) thick	02220-130-2500	S.F.	B-9	100		$25.58	$3.05	10%	$31.49	

Closure Cost Estimate
Misc. Unit Costs

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal

Unit rates from Means Heavy Construction 2006 Edition by permission of R.S.Means/Reed Construction Data .

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment		Total	Notes
Rubbish Handling										
Dumpster delivery (average for all sizes)	02220-350-0910	ea.			$51.50				$51.50	
Haul (average for all sizes)	02220-350-0920	ea.			$161.00				$161.00	
Rent per month (average for all sizes)	02220-350-0940	ea.			$55.00				$55.00	
Disposal fee per ton (tonne) (average for all sizes)	02220-350-0950	ton			$60.50				$60.50	
NOTES:										
Dumpster Cost Source	R.S. Means Heavy Construction (2020 Q2).									
Dumpster Disposal Fee Source:	R.S. Means Heavy Construction (2020 Q2).									
Hazardous Material Handling - Solids (+ Liquids in drums)										
Pickup fees 55 gal (200 L). drums	02110-300-1100	ea.			$251.00				$251.00	
Bulk material (average)	02110-300-1220/1230	ton			$409.50				$409.50	
Transport - truck load (80 drums, 25 cy (m3), 18 tons)	02110-300-1260/1270	mile			$5.88				$5.88	
Dump site solid disposal fee	02110-300-6000/6020	ton			$288.50				$288.50	
NOTES:										
Solid Handling Cost Source	R.S. Means Heavy Construction (2019 Q2).									
Solid Disposal Fee Source:	2019 Q2 R.S. Means Heavy Const. ave. 02 81									
Hazardous Material Handling - Liquids										
Vacuum Truck Pickup (2200 gal/8300 L)	02110-300-3110	hr.			$147.00				$147.00	
Vacuum Truck Pickup (5000 gal/19000 L)	02110-300-3120	hr.			$213.00				$213.00	
Dump site liquid disposal fee	02110-300-6000/6020	ton			$288.50				$288.50	
NOTES:										
Liquid Handling Cost Source	R.S. Means Heavy Construction (2020 Q2).									
Liquid Disposal Fee Source:	2020 Q2 R.S. Means Heavy Const. ave. 02 81									
Hydrocarbon Contaminated Soils (HCS)										
Insitu Biotreatment	02115-200-2020/2021	C.Y.			$17.64				$17.64	
HCS disposal fee	02115-200-2050/2055	C.Y.			$278.50				$278.50	
NOTES:										
Insitu Treatement Cost Source	2020 Q2 R.S. Means Heavy Const., ave. 02 65									
HCS Disposal Fee Source:	2020 Q2 R.S. Means Heavy Const., ave. 02 65									

Closure Cost Estimate
Misc. Unit Costs

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
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Concrete Structure Installation

Weekly dumpster rental rates from Means Heavy Construction 2005 Edition with permission by R.S.Means/Reed Construction Data .
Weekly dumpster rental rates include haul to off-site disposal site and disposal fees

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Reinforced Concrete Bulkheads and Shaft Covers										
Grade walls - 15 in (400mm) thick, 8 ft (2.5m) high	03310-240-4300	C.Y.	C-14D	80.02	$163.00	$136.84	$10.57		$310.41	includes reinforcing
Grade walls - 15 in (400mm) thick, 12 ft (3.7m) high	03310-240-4350	C.Y.	C-14D	26.2	$163.00	$417.95	$32.27		$613.22	includes reinforcing
Elevated conc, 1-way beam & slab - 15ft (4.6m) span	03310-240-2700	C.Y.	C-14B	20.59	$278.00	$535.87	$41.06		$854.93	includes reinforcing
Elevated conc, 1-way beam & slab - 25ft (7.5m) span	03310-240-2750	C.Y.	C-14B	28.36	$265.00	$389.06	$29.81		$683.87	includes reinforcing
Bat Gate/Foam Plug Installation										
Bat Gate (5)		ea.			$3,367.61					materials $/ea. Installed
Culvert Gate (5)		ea.			$6,735.21					materials $/ea. Installed
Adit Foam Plug (6)		ea./C.Y.			$336.76					materials $/cy placed
Production Opening Foam Plug (6)		ea./C.Y.			$336.76					materials $/cy placed

NOTES:

(5) Bat Gate Source:	NV BLM, 2/2006: 8 hr + 1hr mob/demob + 1hr setup per gate (adjusted to 2020)
(6) Foam Plug Source:	NV BLM, 2/2006: 8 hr+ 1hr mob/demob + 1hr setup per adit; 16 hrs per production opening (adjusted to 2020)

Closure Cost Estimate
Misc. Unit Costs

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Misc. Linear Projects

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Fencing Installation										
Barbed 3-strand	02820-170-1650	L.F.	B-80A	760	$0.51	$1.28	$0.30		$2.09	
Barbed 4-strand	extrapolated	L.F.	B-80A	570	$0.68	$1.71	$0.40		$2.79	
Barbed 5-strand	02820-130-0920	L.F.	B-80A	456	$0.85	$2.14	$0.51		$3.50	
Chain link 8-10ft (2.5-3m) Install	02820-130-0920	L.F.	B-80C	180	$38.00	$5.42	$1.28		$44.70	
Wood stockade fence 6 ft (2 m) high - Install	02820-510-1240	L.F.	B-80C	150	$16.00	$6.50	$1.54		$24.04	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
Fencing Removal										
Barbed 3-strand Removal	02220-220-1600	L.F.	2 Clab	430		$1.51	$0.54		$2.05	
Barbed 4-strand Removal	extrapolated	L.F.	2 Clab	355		$1.83	$0.65		$2.48	
Barbed 5-strand Removal	02220-220-1650	L.F.	2 Clab	280		$2.32	$0.82		$3.14	
Chain link 8-10 ft (2.5-3 m) Removal	02220-220-1700	L.F.	B-6	445		$2.70	$0.99		$3.69	
Wood, all types 4-6 ft ("1.5-2 m) high - Removal	02220-220-1775	L.F.	2 Clab	430		$1.51	$0.54		$2.05	
	user	L.F.								
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
Culvert Removal										
12 in (300 mm) Diameter	02220-220-2900	L.F.	B-6	175		$6.88	$2.52		$9.40	
18 in (450 mm) Diameter	02220-220-2930	L.F.	B-6	150		$8.02	$2.94		$10.96	
24 in (600 mm) Diameter	02220-220-2960	L.F.	B-6	120		$10.03	$3.68		$13.71	
36 in (1m) Diameter	02220-220-3000	L.F.	B-6	90		$13.37	$4.90		$18.27	
Pipeline Removal										
0.75 in (20mm) - 4 in (100 mm) diameter	02220-381-1600	L.F.	B-20	700		$1.97	$0.33		$2.30	
6 in (150 mm) - 8 in (200 mm)	02220-381-1700	L.F.	B-20	500		$2.76	$0.46		$3.22	
10 in (250 mm) - 18 in (450 mm)	02220-381-1800	L.F.	B-20	300		$4.59	$0.77		$5.36	
20 in (500 mm) - 36 in (1 m)	02220-381-1900	L.F.	B-20	200		$6.89	$1.15		$8.04	
Pipe and Drainpipe Installation										
Water 4in (100mm) 40ft (12m) length, welded HDPE	02510-760-0100	L.F.	B-22A	400	$2.70	$5.24	$4.71		$12.65	
Water 6in (150mm) 40ft (12m) length, welded HDPE	02510-760-0200	L.F.	B-22A	380	$5.85	$5.51	$4.96		$16.32	
Water 12in (300mm) 40ft (12m) length, welded HDPE	02510-760-0500	L.F.	B-22A	260		$8.06	$7.24		$15.30	
Drain 4in (100mm) perforated PVC	02620-630-2100	L.F.	B-14	315	$1.74	$8.21	$1.55		$11.50	
Drain 6in (150mm) perforated PVC	02620-630-2110	L.F.	B-14	300	$4.22	$8.62	$1.63		$14.47	
Drain 4in (100mm) corrugated, perf or plain	02620-660-0040	L.F.	2 Clab	1200	$0.78	$0.54	$0.19		$1.51	
Drain 6in (150mm) corrugated., perf or plain	02620-660-0060	L.F.	2 Clab	900	$2.18	$0.72	$0.26		$3.16	

Closure Cost Estimate
Misc. Unit Costs

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Drain Rock Preparation										
Crushing		C.Y.							$0.50	
Screening		C.Y.							$0.50	
TOTAL									$1.00	
Misc.										
Backhoe work	02210-700-0120	C.Y.	B-11M	28		$20.05	$9.18		$29.23	
Powerline and Transformer Removal										
Single Pole		mile							$46,803.69	
Double Pole		mile							$53,489.93	
Transformer (9)		ea.							$58,997.31	
NOTES:										
(7) Single Pole Source:	NV Energy estimate (2009) Adjusted to 2020									
(8) Double Pole Source:	NV Energy estimate (2009) Adjusted to 2020									
(9) Transformer Source:	NV Energy estimate (2018) adjusted to 2020									

Erosion and Sedimentation Control

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Rip-Rap & Rock Lining										
Rip-Rap 3/8 to 1/4 CY (m3) pieces, grouted	02370-450-0110	S.Y.	B-13	80	$25.00	$32.32	$8.33		$65.65	assumes on-site source of rip-rap
Rip-Rap 18 in (450 mm) min thick, no grout	02370-450-0200	S.Y.	B-13	53	$7.65	$48.78	$12.57		$69.00	assumes on-site source of rip-rap
Gabions, 6 in (150 mm) deep	02370-450-0400	S.Y.	B-13	200	$7.05	$12.93	$3.33		$23.31	assumes on-site source rock fill for gabions
Gabions, 9 in (250 mm) deep	02370-450-0500	S.Y.	B-13	163	$9.85	$15.86	$4.09		$29.80	assumes on-site source rock fill for gabions
Gabions, 12 in (300 mm) deep	02370-450-0200	S.Y.	B-13	153	$14.30	$16.90	$4.36		$35.56	assumes on-site source rock fill for gabions
Gabions, 18 in (450 mm) deep	02370-450-0200	S.Y.	B-13	102	$18.35	$25.35	$6.53		$50.23	assumes on-site source rock fill for gabions
Gabions, 36 in (1m) deep	02370-450-0200	S.Y.	B-13	60	$31.00	$43.09	$11.11		$85.20	assumes on-site source rock fill for gabions
HDEP Liner Installation										
Finish grading large area	2310-100-0100	S.F.	B-11L	18000		$0.05	$0.06		$0.11	
Compaction-riding, vibrating roller - 12in (300mm) lifts	2315-310-5100	C.Y.	B-10Y	2600		$0.34	$0.18		$0.52	
60 mil HDPE	2660-610-0010	S.F.	3 Skwk	1600	$0.57	$0.97	$0.46		$2.00	
80 mil HDPE	user	S.F.	3 Skwk	149		$10.41	$4.91		$15.32	
40 mil VLDPE	user	S.F.	3 Skwk	150		$10.34	$4.87		$15.21	
	user	S.F.	3 Skwk	149		$10.41	$4.91		$15.32	
	user	S.F.	3 Skwk	149		$10.41	$4.91		$15.32	

Closure Cost Estimate
Misc. Unit Costs

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Construction Management Support											
Office Trailer, Furnished, no hook-ups		0150-500-0250	mo.			$198.00				$198.00	
Toilet Portable, chemical		1590-400-6410	mo.			$214.20				$214.20	
TOTAL						$412.20				$412.20	
Pump and Casing Removal											
	Pump Type	**Measurement**	**Unit**				**Labor**	**Equipment**		**Total**	**Notes**
Pump Removal											
Submersible		ft to pump	L.F.				$7.65	$18.86		$26.51	
Line Shaft		ft to pump	L.F.				$7.65	$18.86		$26.51	
NOTES:											
(10) Pump Removal Source:		Boart Longyear Quote: June 2020									

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
RIPPING					
Rip road					
Waste rock dumps, heaps, tails - rip flat surfaces					
Surface preparation					
Scarify					
Small Dozer w/ multi-shank					
D7R		1	$101.58	$69.16	$170.74
Totals			$101.58	$69.16	$170.74
Medium Dozer w/ multi-shank					
D9R		1	$240.92	$69.16	$310.08
Totals			$240.92	$69.16	$310.08
Large Dozer w/ multi-shank					
D10R		1	$328.39	$69.16	$397.55
Totals			$328.39	$69.16	$397.55
Grader w/ multi-shank					
16G/H		1	$192.00	$70.17	$262.17
Totals			$192.00	$70.17	$262.17
GRADING					
Grading storage and structure areas					
Grading waste rock dumps and heaps					
Grading landfills					
Constructing pit safety berms					
Small Dozer Fleet					
D7R		1	$101.58	$69.16	$170.74
Totals			$101.58	$69.16	$170.74
Medium Dozer Fleet					
D9R		1	$240.92	$69.16	$310.08
Totals			$240.92	$69.16	$310.08
Large Dozer Fleet					
D10R		1	$328.39	$69.16	$397.55
Totals			$328.39	$69.16	$397.55
EXPLORATION GRADING					
Backfilling and grading exploration trenches					
Grading flat exploration roads					
Small Dozer Fleet					
D6R		1	$92.78	$69.16	$161.94
Totals			$92.78	$69.16	$161.94
Medium Dozer Fleet					
D7R		1	$101.58	$69.16	$170.74
Totals			$101.58	$69.16	$170.74
Large Dozer Fleet					
D8R		1	$177.16	$69.16	$246.32
Totals			$177.16	$69.16	$246.32

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
EXCAVATING					
Earthen Berms					
Diversion ditch excavation and backfill					
Underground openings backfill - excavate and place					
Pit berm construction (excavator option)					
Small Excavator					
325C		1	$78.07	$70.17	$148.24
Totals			$78.07	$70.17	$148.24
Medium Excavator					
345B		1	$128.52	$70.17	$198.69
Totals			$128.52	$70.17	$198.69
Large Excavator					
385BL		1	$201.71	$70.17	$271.88
Totals			$201.71	$70.17	$271.88
EXCAVATE AND RECONTOUR					
Recontour large roads (haul roads, access roads, etc.)					
Ponds - Excavate and pull liner and bury					
Small Excavator + Dozer					
325C		1	$78.07	$70.17	$148.24
D7R		1	$101.58	$69.16	$170.74
Total Equipment			$179.65	$139.33	$318.98
Medium Excavator + Dozer					
345B		1	$128.52	$70.17	$198.69
D9R		1	$240.92	$69.16	$310.08
Totals			$369.44	$139.33	$508.77
Large Excavator + Dozer					
385BL		1	$201.71	$70.17	$271.88
D10R		1	$328.39	$69.16	$397.55
Totals			$530.10	$139.33	$669.43
EXPLORATION ROAD/PAD RECONTOUR					
Recontour small roads (exploration roads, service roads, etc.)					
Cut and Fill reclamation on slopes					
Drill pad recountour					
Drill sump backfill					
Small Dozer					
D6R		1	$92.78	$69.16	$161.94
Totals			$92.78	$69.16	$161.94
Large Dozer					
D8R		1	$177.16	$69.16	$246.32
Totals			$177.16	$69.16	$246.32
Grader					
14G/H		1	$131.45	$70.17	$201.62
Totals			$131.45	$70.17	$201.62
Small Excavator					
320C		1	$57.97	$70.17	$128.14
Totals			$57.97	$70.17	$128.14
Medium Excavator					
325C		1	$78.07	$70.17	$148.24
Totals			$78.07	$70.17	$148.24

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
LOAD, HAUL AND PLACE MATERIAL					
Rock placement					
Haul overburden for backfill					
Haul borrow for backfill					
Haul cover or growth media					
Small Truck/Loader Fleet					
725		Calculated	$132.14	$41.41	$173.55
966G	**Loader**	1	$105.47	$70.17	$175.64
D7R		1	$101.58	$69.16	$170.74
Totals			$339.19	$180.74	$519.93
Medium Truck/Loader Fleet					
740		Calculated	$147.73	$41.41	$189.14
988G	**Loader**	1	$211.42	$70.17	$281.59
D8R		1	$177.16	$69.16	$246.32
Totals			$536.31	$180.74	$717.05
Large Truck/Loader Fleet					
769D		Calculated	$172.54	$41.41	$213.95
988G	**Loader**	1	$211.42	$70.17	$281.59
D7R		1	$101.58	$69.16	$170.74
Totals			$485.54	$180.74	$666.28
Extra Large Truck/Loader Fleet					
777D		Calculated	$419.10	$41.41	$460.51
992G	**Loader**	1	$515.51	$70.17	$585.68
D7R		1	$101.58	$69.16	$170.74
Totals			$1,036.19	$180.74	$1,216.93
Scraper/Dozer Fleet					
631G		Calculated	$221.03	$69.16	$290.19
D10R		1	$328.39	$69.16	$397.55
D7R		1	$101.58	$69.16	$170.74
Totals			$651.00	$207.48	$858.48
Tandem Scraper Fleet					
637G		2	$308.16	$70.17	$378.33
D7R		1	$101.58	$69.16	$170.74
Totals			$409.74	$139.33	$549.07
MISC. LOAD AND HAUL AND EARTHWORKS					
Sludge removal					
Drainage controls					
Misc. - Cat 325B Excavator / 10-12 yd3 Truck					
325C		1	$78.07	$70.17	$148.24
Dump Truck (10-12 yd3)		1	$86.26	$41.41	$127.67
Totals			$164.33	$111.58	$275.91
Misc. - Cat D9R Dozer/ Loader (5 yd3) / 10-12 yd3 Truck					
D9R		1	$240.92	$69.16	$310.08
966G		1	$105.47	$70.17	$175.64
Dump Truck (10-12 yd3)		1	$86.26	$41.41	$127.67
Totals			$432.65	$180.74	$613.39
Misc. - Cat D6 Dozer / Cat 966 Loader / 10-12 yd3 Truck					
D6R		1	$92.78	$69.16	$161.94
966G		1	$105.47	$70.17	$175.64
Dump Truck (10-12 yd3)		1	$86.26	$41.41	$127.67
Totals			$284.51	$180.74	$465.25

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
CONCRETE BREAKING					
Slab demolition					
Footing demolition					
Wall demolition					
Small - Cat 325B Excavator w/ H140D s Hammer					
325C		1	$78.07	$70.17	$148.24
H-120 (fits 325)		1	$41.93	$0.00	$41.93
D9R		1	$240.92	$69.16	$310.08
Totals			$360.92	$139.33	$500.25
Medium - Cat 345B Excavator w/ H180D s Hammer					
345B		1	$128.52	$70.17	$198.69
H-160 (fits 345)		1	$87.48	$0.00	$87.48
D9R		1	$240.92	$69.16	$310.08
Totals			$456.92	$139.33	$596.25
Large - Cat 385B Excavator w/ H180D s Hammer					
385BL		1	$201.71	$70.17	$271.88
H-180 (fits 365/385)		1	$116.26	$0.00	$116.26
D9R		1	$240.92	$69.16	$310.08
Totals			$558.89	$139.33	$698.22
DRILL HOLE ABANDONMENT					
Drill Hole - Grout or Cement					
Pump (plugging) Drill Rig		1	$226.91	$69.16	$296.07
Driller's Helper		2	$0.00	$81.90	$81.90
Totals			$226.91	$151.06	$377.97
Drill Hole - Inert Media (Means Crew B-11M+ 1 Laborer)					
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
General Laborer		1	$0.00	$40.65	$40.65
Totals			$32.14	$110.82	$142.96
Drill Hole - Casing Perforation or Removal					
Heavy Duty Drill Rig		1	$231.29	$69.16	$300.45
Driller's Helper		2	$0.00	$81.90	$81.90
Totals			$231.29	$151.06	$382.35
MAINTENANCE FLEET					
Road Grading, Dust Suppression, Clean Up					
Maintenance - Small Water Truck and Cat 14G Grader					
613E (5,000 gal) Water Wagon		1	$63.51	$41.41	$104.92
120H		1	$90.99	$70.17	$161.16
Totals			$154.50	$111.58	$266.08
Maintenance - Medium Water Truck and Cat 16G Grader					
613E (5,000 gal) Water Wagon		1	$63.51	$41.41	$104.92
14G/H		1	$131.45	$70.17	$201.62
Totals			$194.96	$111.58	$306.54
Maintenance - Large Water Truck and Cat 16G Grader					
621E (8,000 gal) Water Wagon		1	$109.33	$41.41	$150.74
16G/H		1	$192.00	$70.17	$262.17
Totals			$301.33	$111.58	$412.91
PROJECT SUPERVISION					
Foreman		1	$0.00	$90.38	$90.38
Supervisor's Truck		1	$25.18	$0.00	$25.18
Totals			$25.18	$90.38	$115.56

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
Date of Submittal: May 24, 2021
File Name: Cross And Caribou Reclamation Cost Estimator_revD.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
MEANS CREW DEFINITIONS					
Crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data . For use with misc. unit costs where Means is the source for productivity					
1 Clab - Seedling Planting/Block Wall Demolition					
General Laborer		1	$0.00	$40.65	$40.65
Totals			$0.00	$40.65	$40.65
2 Clab - Barbed Wire/Wood Fence Removal, Drainpipe Installation, Pumping, Evaporation					
General Laborer		2	$0.00	$81.30	$81.30
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$28.83	$81.30	$110.13
2 Clab + Excavator - Pond Liner Cut and Fold					
General Laborer		2	$0.00	$81.30	$81.30
325C		1	$78.07	$70.17	$148.24
Totals			$78.07	$151.47	$229.54
2 Clab + Welder - Bat Gates					
General Laborer		2	$0.00	$81.30	$81.30
Welding Equipment		1	$23.36	$70.17	$93.53
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$52.19	$151.47	$203.66
3 Clab - Foam Adit Plugs					
General Laborer		2	$0.00	$81.30	$81.30
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$60.97	$151.47	$212.44
3 Clab + Welder - Culvert Bat Gate					
General Laborer		2	$0.00	$81.30	$81.30
Welding Equipment		1	$23.36	$70.17	$93.53
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$84.33	$221.64	$305.97
3 Clab D - 3 Laborers + Foreman - Decontamination					
General Laborer		3	$0.00	$121.95	$121.95
Foreman		1	$0.00	$90.38	$90.38
Supervisor's Truck		1	$25.18	$0.00	$25.18
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$54.01	$212.33	$266.34
3 SKWK - Liner Installation					
Skilled Laborer		3	$0.00	$123.75	$123.75
HDEP Welder (pipe or liner)		1	$59.24	$0.00	$59.24
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
Totals			$91.38	$193.92	$285.30

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Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-3 - Small Building Demoltion					
LABOR					
General Laborer		2	$0.00	$81.30	$81.30
Foreman		1	$0.00	$90.38	$90.38
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
EQUIPMENT					
928G		1	$55.14	$69.16	$124.30
Dump Truck (10-12 yd3)		2	$172.52	$82.82	$255.34
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
Totals			$227.66	$323.66	$551.32
B-6 - Chain Link Fence/Culvert Removal					
General Laborer		2	$0.00	$81.30	$81.30
928G		1	$55.14	$69.16	$124.30
Totals			$55.14	$150.46	$205.60
B-8 - Large Building Demolition					
LABOR					
General Laborer		2	$0.00	$81.30	$81.30
Foreman		1	$0.00	$90.38	$90.38
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
EQUIPMENT					
928G		1	$55.14	$69.16	$124.30
20 Ton Crane		1	$83.29	$70.17	$153.46
Dump Truck (10-12 yd3)		2	$172.52	$82.82	$255.34
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
Totals			$310.95	$393.83	$704.78
B-9 - Concrete Wall Demolition					
General Laborer		4	$0.00	$162.60	$162.60
Foreman		1	$0.00	$90.38	$90.38
Air Compressor + tools			$38.12	$66.73	$104.85
Totals			$38.12	$319.71	$357.83

Project Name: Cross and Caribou Reclamation Estimator - Reclamation Plan
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Cost Data File: SRCE_Cost_Data_File_1_12_Std_2020.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-10Y - General Compaction					
General Laborer		1	$0.00	$40.65	$40.65
CS533E Vibratory Roller		1	$59.09	$68.46	$127.55
Totals			$59.09	$109.11	$168.20
B-11L - Fine Grading for Evaporation Pond Liner Base					
General Laborer		1	$0.00	$40.65	$40.65
14G/H		1	$131.45	$70.17	$201.62
Totals			$131.45	$110.82	$242.27
B-11M - Backhoe Work					
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
Totals			$32.14	$70.17	$102.31
B-12G - Rip-Rap Machine Placed (Modified)					
966G		1	$105.47	$70.17	$175.64
325C		1	$78.07	$70.17	$148.24
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$212.37	$140.34	$352.71
B-13 - Grouted Rip-Rap & Gabion Baskets					
General Laborer		4	$0.00	$162.60	$162.60
Foreman		1	$0.00	$90.38	$90.38
20 Ton Crane		1	$83.29	$70.17	$153.46
Totals			$83.29	$323.15	$406.44
B-14 PVC Drain Pipe Installation					
Foreman		1	$0.00	$90.38	$90.38
General Laborer		4	$0.00	$162.60	$162.60
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$60.97	$323.15	$384.12
B-20 - Remove Pipelines					
Foreman		1	$0.00	$90.38	$90.38
Skilled Laborer		1	$0.00	$41.25	$41.25
General Laborer		1	$0.00	$40.65	$40.65
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$28.83	$172.28	$201.11
B-22A - HDEP Installation - Pipe or Liner					
Skilled Laborer		1	$0.00	$41.25	$41.25
General Laborer		2	$0.00	$81.30	$81.30
D7R		1	$101.58	$69.16	$170.74
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
420D 4WD Backhoe		1	$32.14	$70.17	$102.31
Generator 5KW		1	$13.61	$0.00	$13.61
HDEP Welder (pipe or liner)		1	$59.24	$0.00	$59.24
Totals			$235.40	$261.88	$497.28
B-80A - Install Barbed Wire Fence					
General Laborer		3	$0.00	$121.95	$121.95
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$28.83	$121.95	$150.78

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Cost Estimate Type: Surety Cost Basis: Northern Nevada

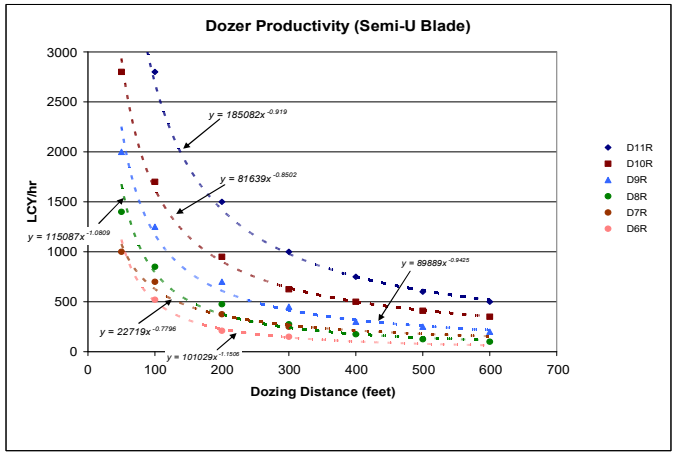
EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-80C - Install Chain Link Fence (Flatbed truck has small crane)					
General Laborer		3	$0.00	$121.95	$121.95
Light Truck - 1.5 Ton		1	$28.83	$0.00	$28.83
Totals			$28.83	$121.95	$150.78
C-14B - Elevated Concrete Slabs (Reinforced Concrete Shaft Covers)					
Foreman		1	$0.00	$90.38	$90.38
Supervisor's Truck		1	$25.18	$0.00	$25.18
Carpenter		16	$0.00	$894.56	$894.56
General Laborer		2	$0.00	$81.30	$81.30
Rodmen (reinforcing concrete)		4	$0.00	$162.60	$162.60
Cement finisher		2	$0.00	$81.90	$81.90
Gas Engine Vibrator		1	$5.66	$68.46	$74.12
Concrete Pump		1	$74.84	$0.00	$74.84
Totals			$105.68	$1,379.20	$1,484.88
C-14D - Concrete Walls Formed in Place (Reinforced Concrete Adit Bulkheads)					
Foreman		1	$0.00	$90.38	$90.38
Supervisor's Truck		1	$25.18	$0.00	$25.18
Carpenter		18	$0.00	$1,006.38	$1,006.38
General Laborer		2	$0.00	$81.30	$81.30
Rodmen (reinforcing concrete)		2	$0.00	$81.30	$81.30
Cement finisher		1	$0.00	$40.95	$40.95
Gas Engine Vibrator		1	$5.66	$68.46	$74.12
Concrete Pump		1	$74.84	$0.00	$74.84
Totals			$105.68	$1,368.77	$1,474.45

Productivity - Bulldozers

Dozer Specifications						
Description	**D11R**	**D10R**	**D9R**	**D8R**	**D7R**	**D6R**
Blade Width (SU) (ft)	18.33	15.92	14.17	12.92	12.08	10.67
Shank Guage (3 shanks) (ft)	9.83	8.67	7.67	7.08	6.5	6.5
Pocket Spacing (ft)	4.75	4.33	3.87	3.58	3.25	3.25
Ripping Width (Ripper + 1 Pocket) (ft)	14.58	13	11.54	10.66	9.75	9.75
Ripping Speed (mph)	1	1	1	1	1	1
Ripping Maneuver (turn) Time (min)	0.25	0.25	0.25	0.25	0.25	0.25
Altitude Deration Factor	0.93	1	0.93	0.93	1	1
Ripping Hourly Production (excluding maneuvering time) (ft)	4,910	5,280	4,910	4,910	5,280	5,280
Source: Caterpillar Performance Handbook Edition 35						

Dozer Productivity vs. Grading Distance						
Average Dozing Distance (feet)	**Production (LCY/hr)**					
	D11R	**D10R**	**D9R**	**D8R**	**D7R**	**D6R**
50	4,800	2,800	2,000	1,400	1,000	
100	2,800	1,700	1,250	850	700	520
200	1,500	950	700	475	375	210
300	1,000	625	450	275	250	150
400	750	500	300	175		
500	600	410	250	125		
600	500	350	200	100		
Source: Caterpillar Performance Handbook Edition 35						
dozer productivity = k x Dozing Distance^{p} (see graph)						
k =	185082	81639	89889	115087	22719	101029
p =	-0.919	-0.8502	-0.9425	-1.0809	-0.7796	-1.1506

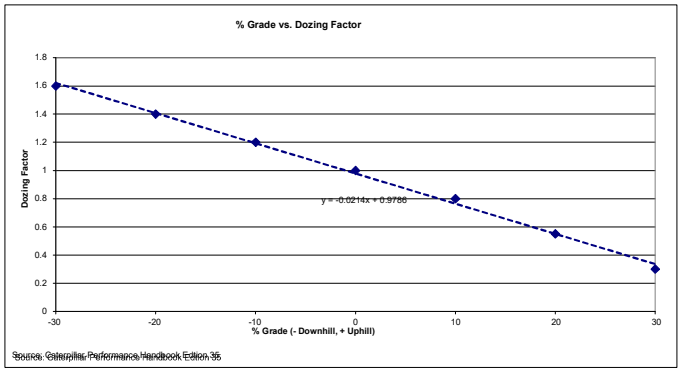


Productivity - Bulldozers (cont.)

% Grade vs. Dozing Factor	
% Grade	**Dozing Factor**
-30	1.6
-20	1.4
-10	1.2
0	1
10	0.8
20	0.55
30	0.3

Source: Caterpillar Performance Handbook Edition 35

% Grade Dozing Factor = -0.0214x + 0.9786
(see graph)



Source: Caterpillar Performance Handbook Edition 35

Job Condition Correction Factors - Bulldozers	
OPERATOR	
Average	0.75
MATERIAL (1)	
Loose stockpile	1.2
Normal	1
Hard to cut; frozen — with tilt cylinder	0.8
Hard to drift; "dead" (dry,non-cohesive material) or very sticky material	0.8
Rock, ripped or blasted	0.6
SLOT DOZING OR SIDE BY SIDE (1)	1.2
VISIBILITY	
Good conditions	1
JOB EFFICIENCY	
50 min/hr	0.83

(1) Selected in facility worksheets.
Other factors included as standard factors.
Source: Caterpillar Performance Handbook Edition 35

Material Densities(1)		
Material	**lb/cy**	**kg/m^3**
Alluvium	2,900	1,720
Basalt	3,300	1,960
Clay - Dry	2,500	1,480
Granite - broken	2,800	1,660
Gravel	2,550	1,510
LS - broken	2,600	1,540
LS - crushed	2,600	1,540
Sandstone	2,550	1,510
Shale	2,100	1,250
Stone - crushed	2,700	1,600
Tailings - Coarse (dry, loose sand)	2,400	1,420
Tailings - Slimes (loose sand & clay)	2,700	1,600
Topsoil	1,600	950

(1) Source: Caterpillar Performance Handbook Edition 35

Note: uses Sand & Gravel - Dry from Caterpillar Handbook

Productivity - Scrapers

Scraper Specifications		
Description	**631G**	**637G**
Empty Weight	100,600	112,760
Payload Capacity (cy)		
Struck	24	24
Heaped	34	34
Average	29	29
Loaded by	One D10R	Self*
Load Time (min)	1	1
Maneuver and Spread (min)	1	1
Job Efficiency	1	1
Rolling Resistance**	3	3
Altitude Deration Factor	1	1

* Requires pair

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials			Downhill Scraper Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)											
			631G						637G PP					
Material	**lb/cy**	**Scraper Load lb**	**Loaded Weight (lbs)**	**22**	**16**	**10**	**5**	**1**	**Loaded Weight (lbs)**	**25**	**15**	**10**	**5**	**1**
Alluvium	2,900	84,100	184,700	7.5	10	13	33	33	196,860	7	10	18.5	34	34
Basalt	3,300	95,700	196,300	7.5	10	13	24.5	33	208,460	7	10	18.5	25	34
Clay - Dry	2,500	72,500	173,100	7.5	10	13	33	33	185,260	7	10	18.5	34	34
Granite - broken	2,800	81,200	181,800	7.5	10	13	33	33	193,960	7	10	18.5	34	34
Gravel	2,550	73,950	174,550	7.5	10	13	33	33	186,710	7	10	18.5	34	34
LS - broken	2,600	75,400	176,000	7.5	10	13	33	33	188,160	7	10	18.5	34	34
LS - crushed	2,600	75,400	176,000	7.5	10	13	33	33	188,160	7	10	18.5	34	34
Sandstone	2,550	73,950	174,550	7.5	10	13	33	33	186,710	7	10	18.5	34	34
Shale	2,100	60,900	161,500	7.5	10	18	33	33	173,660	10	13.5	18.5	34	34
Stone - crushed	2,700	78,300	178,900	7.5	10	13	33	33	191,060	7	10	18.5	34	34
Tailings - Coarse (dry, loose sand)	2,400	69,600	170,200	7.5	10	13	33	33	182,360	7	10	18.5	34	34
Tailings - Slimes (loose sand & clay)	2,700	78,300	178,900	7.5	10	13	33	33	191,060	7	10	18.5	34	34
Topsoil	1,600	46,400	147,000	7.5	10	18	33	33	159,160	10	13.5	18.5	34	34
			Empty	10	18	24.5	33	33	Empty	10	13.5	18.5	34	34

Source: Caterpillar Performance Handbook Edition 34

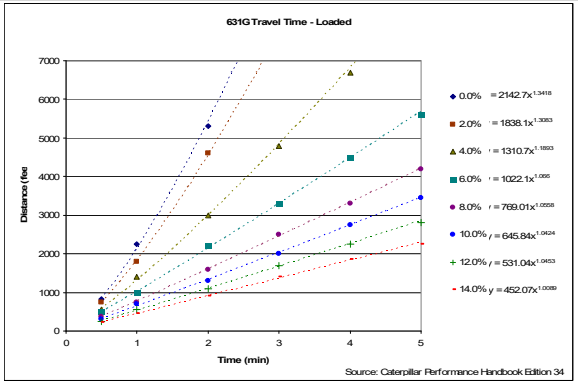
Productivity - Scrapers (cont.)

631G Scraper Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	825	2,250	5,300				2142.7	1.3418
2	750	1,800	4,600				1838.1	1.3083
4	550	1,400	3,000	4,800	6,700		1310.7	1.1893
6	490	1,000	2,200	3,300	4,500	5,600	1022.1	1.066
8	375	750	1,600	2,500	3,300	4,200	769.01	1.0558
10	300	700	1,300	2,000	2,750	3,450	645.84	1.0424
12	250	550	1,100	1,700	2,250	2,800	531.04	1.0453
14	225	450	900	1,400	1,850	2,250	452.07	1.0089

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



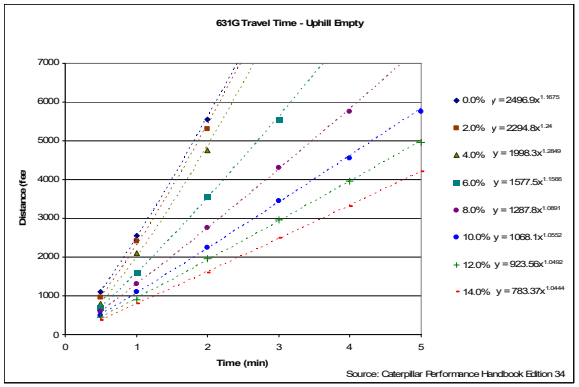
Source: Caterpillar Performance Handbook Edition 34

631G Scraper Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,100	2,550	5,550				2496.9	1.1675
2	950	2,400	5,300				2294.8	1.24
4	800	2,100	4,750				1998.3	1.2849
6	700	1,600	3,550	5,550			1557.5	1.1566
8	600	1,300	2,750	4,300	5,750		1287.8	1.0891
10	500	1,100	2,250	3,450	4,550	5,750	1068.1	1.0552
12	450	900	1,950	2,950	3,950	4,950	923.56	1.0492
14	375	800	1,600	2,500	3,300	4,200	783.37	1.0444

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

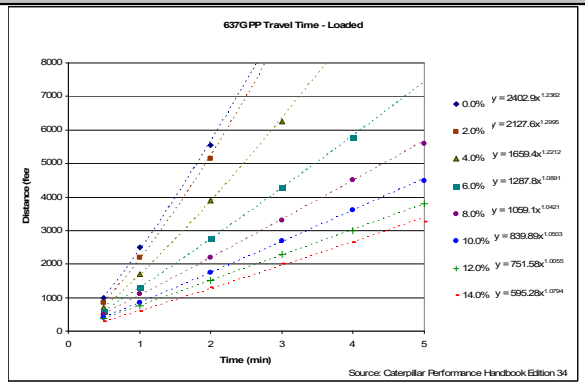
Productivity - Scrapers (cont.)

637G Push-Pull Scraper Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,000	2,500	5,550				2402.9	1.2362
2	850	2,200	5,150				2127.6	1.2995
4	700	1,700	3,900	6,250			1659.4	1.2212
6	600	1,300	2,750	4,300	5,750		1287.8	1.0891
8	500	1,100	2,200	3,300	4,500	5,600	1059.1	1.0421
10	400	850	1,750	2,700	3,600	4,475	839.89	1.0503
12	375	750	1,500	2,300	3,000	3,800	751.58	1.0055
14	275	600	1,300	2,000	2,650	3,250	595.28	1.0794

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



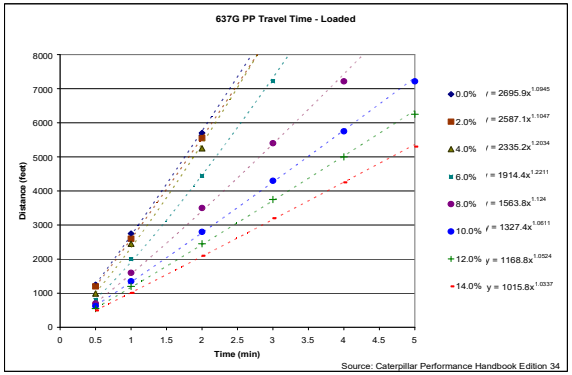
Source: Caterpillar Performance Handbook Edition 34

637G Push-Pull Scraper Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,250	2,750	5,700				2695.9	1.0945
2	1,200	2,600	5,550				2587.1	1.1047
4	990	2,450	5,250				2335.2	1.0234
6	800	2,000	4,450	7,216			1914.4	1.2211
8	700	1,600	3,500	5,400	7,216		1563.8	1.124
10	625	1,350	2,800	4,300	5,750	7,216	1327.4	1.0611
12	550	1,200	2,450	3,750	5,000	6,250	1168.8	1.0524
14	495	1,010	2,100	3,200	4,250	5,300	1015.8	1.0337

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

Productivity - Haul Trucks

Haul Truck Specifications

Description	769D	773E	777D	785C	793C	797B
Chassis Weight (lb)	53,506	70,330	113,160	170,000	259,500	473,600
Body Weight (lb)	17,350	20,300	34,785	36,788	70,785	104,200
Standard Liner Weight (lb)	7,000	8,600	12,040	16,846	24,418	8,800
Total Truck Weight (lb)	77,856	99,230	159,985	223,634	354,703	586,600
Payload Capacity (cy)						
Struck	21.6	34.8	55	78.5	126	228
Heaped	31.7	46	78.6	102	169	290
Average	26.65	40.4	66.8	90.25	147.5	259
Maneuver to Load Time (min)	0.7	0.7	0.7	0.7	0.7	0.7
Maneuver and Dump Time (min)	1.1	1.1	1.1	1.1	1.1	1.1
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5	2.5
Altitude Deration Factor	0.93	1	1	0.93	1	1

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials

Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

Material	lb/cy	Truck (769D) Load lb	Truck (773E) Load lb	Truck (777D) Load lb	769D Loaded Weight (lbs)	769D 20	769D 15	769D 10	769D 5	773E Loaded Weight (lbs)	773E 20	773E 15	773E 10	773E 5	777D Loaded Weight (lbs)	777D 20	777D 15	777D 10	777D 5
Alluvium	2,900	77,285	117,160	193,720	155,141	11	11	15	26	216,390	7	7	13	23	353,705	7	9	12	29
Basalt	3,300	87,945	133,320	220,440	165,801	11	11	11	20	232,550	7	7	13	23	380,425	7	7	12	21
Clay - Dry	2,500	66,625	101,000	167,000	144,481	11	11	15	26	200,230	7	9	13	23	326,985	7	9	16	29
Granite - broken	2,800	74,620	113,120	187,040	152,476	11	11	15	26	212,350	7	7	13	23	347,025	7	9	12	29
Gravel	2,550	67,958	103,020	170,340	145,814	11	11	15	26	202,250	7	9	13	23	330,325	7	9	16	29
LS - broken	2,600	69,290	105,040	173,680	147,146	11	11	15	26	204,270	7	9	13	23	333,665	7	9	12	29
LS - crushed	2,600	69,290	105,040	173,680	147,146	11	11	15	26	204,270	7	9	13	23	333,665	7	9	12	29
Sandstone	2,550	67,958	103,020	170,340	145,814	11	11	15	26	202,250	7	9	13	23	330,325	7	9	16	29
Shale	2,100	55,965	84,840	140,280	133,821	11	11	15	26	184,070	7	9	13	31	300,265	7	9	16	29
Stone - crushed	2,700	71,955	109,080	180,360	149,811	11	11	15	26	208,310	7	7	13	23	340,345	7	9	12	29
Tailings - Coarse (dry, loose sand)	2,400	63,960	96,960	160,320	141,816	11	11	15	26	196,190	7	9	13	23	320,305	7	9	16	29
Tailings - Slimes (loose sand & clay)	2,700	71,955	109,080	180,360	149,811	11	11	15	26	208,310	7	7	13	23	340,345	7	9	12	29
Topsoil	1,600	42,640	64,640	106,880	120,496	11	11	15	26	163,870	7	9	17	31	266,865	9	12	16	29
					Empty	15	15	26	36	Empty	13	17	23	42	Empty	16	16	29	39

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials

Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

Material	lb/cy	Truck (785C) Load lb	Truck (793C) Load lb	Truck (797B) Load lb	785C Loaded Weight (lbs)	785C 20	785C 15	785C 10	785C 5	793C Loaded Weight (lbs)	793C 20	793C 15	793C 10	793C 5	797B Loaded Weight (lbs)	797B 20	797B 15	797B 10	797B 5
Alluvium	2,900	261,725	427,750	751,100	485,359	8	8	14	27	782,453	7	7	10	17	1,337,700	7	7	9	17
Basalt	3,300	297,825	486,750	854,700	521,459	8	8	14	27	841,453	7	7	10	17	1,441,300	7	7	9	17
Clay - Dry	2,500	225,625	368,750	647,500	449,259	8	11	14	36	723,453	7	7	10	25	1,234,100	7	7	9	23
Granite - broken	2,800	252,700	413,000	725,200	476,334	8	8	14	27	767,703	7	7	10	17	1,311,800	7	7	9	17
Gravel	2,550	230,138	376,125	660,450	453,772	8	8	14	36	730,828	7	7	10	25	1,247,050	7	7	9	23
LS - broken	2,600	234,650	383,500	673,400	458,284	8	8	14	27	738,203	7	7	10	25	1,260,000	7	7	9	23
LS - crushed	2,600	234,650	383,500	673,400	458,284	8	8	14	27	738,203	7	7	10	25	1,260,000	7	7	9	23
Sandstone	2,550	230,138	376,125	660,450	453,772	8	8	14	36	730,828	7	7	10	25	1,247,050	7	7	9	23
Shale	2,100	189,525	309,750	543,900	413,159	8	11	14	36	664,453	7	7	10	25	1,130,500	7	7	13	23
Stone - crushed	2,700	243,675	398,250	699,300	467,309	8	8	14	27	752,953	7	7	10	17	1,285,900	7	7	9	23
Tailings - Coarse (dry, loose sand)	2,400	216,600	354,000	621,600	440,234	8	11	14	36	708,703	7	7	10	25	1,208,200	7	7	9	23
Tailings - Slimes (loose sand & clay)	2,700	243,675	398,250	699,300	467,309	8	8	14	27	752,953	7	7	10	17	1,285,900	7	7	9	23
Topsoil	1,600	144,400	236,000	414,400	368,034	8	11	19	36	590,703	7	10	13	25	1,001,000	7	9	13	23
					Empty	14	19	36	36	Empty	10	13	17	33	Empty	13	17	23	42

Source: Caterpillar Performance Handbook Edition 35

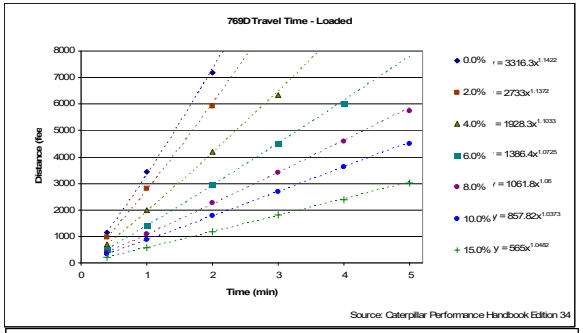
Productivity - Haul Trucks (cont.)

769D Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,148	3,428	7,183				3316.3	1.1422
4	689	1,984	4,198	6,330			1928.3	1.1033
6	508	1,427	2,952	4,510	6,002		1386.4	1.0725
8	394	1,082	2,263	3,411	4,592	5,740	1061.8	1.06
10	328	869	1,771	2,690	3,608	4,510	857.82	1.0373
15	213	574	1,181	1,804	2,394	3,018	565	1.0482

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



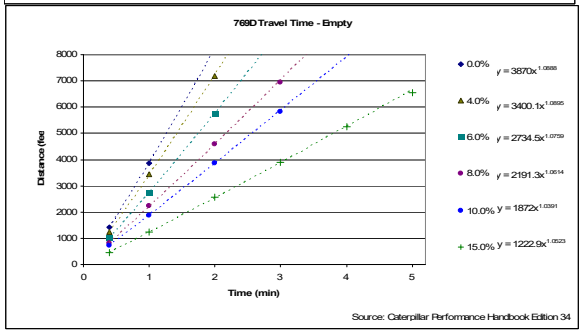
Source: Caterpillar Performance Handbook Edition 34

769D Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,427	3,870					3870	1.0888
4	1,246	3,444	7,183				3400.1	1.0895
6	1,017	2,755	5,740				2734.5	1.0759
8	820	2,230	4,592	6,954			2191.3	1.0614
10	722	1,870	3,870	5,838			1872	1.0391
15	459	1,246	2,558	3,903	5,248	6,560	1222.9	1.0523

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

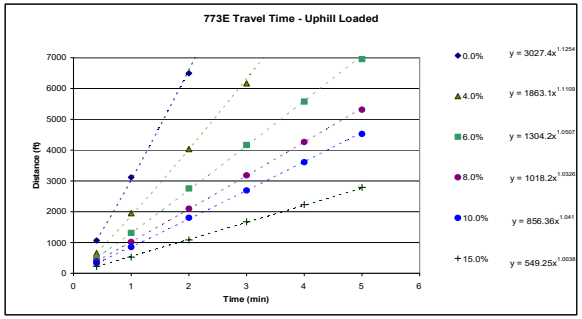
Productivity - Haul Trucks (cont.)

773E Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,066	3,117	6,496				3027.4	1.1254
4	656	1,952	4,035	6,168			1863.1	1.1109
6	492	1,312	2,756	4,167	5,577	6,955	1304.2	1.0507
8	394	1,017	2,100	3,182	4,265	5,315	1018.2	1.0326
10	328	853	1,804	2,690	3,609	4,528	856.36	1.041
15	226	525	1,083	1,673	2,231	2,789	549.25	1.0038

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

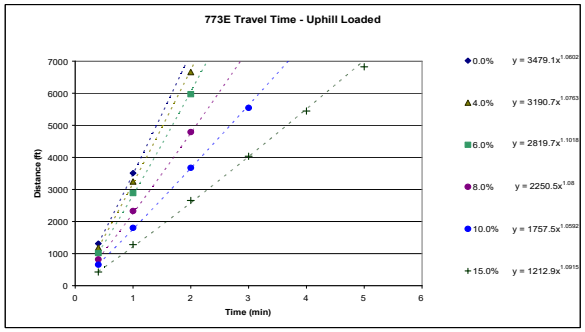


773E Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,312	3,510	7,218				3479.1	1.0602
4	1,181	3,248	6,660				3190.7	1.0763
6	1,017	2,887	5,971				2819.7	1.1018
8	820	2,329	4,790	7,218			2250.5	1.08
10	656	1,804	3,675	5,545			1757.5	1.0592
15	427	1,280	2,657	4,035	5,446	6,824	1212.9	1.0915

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



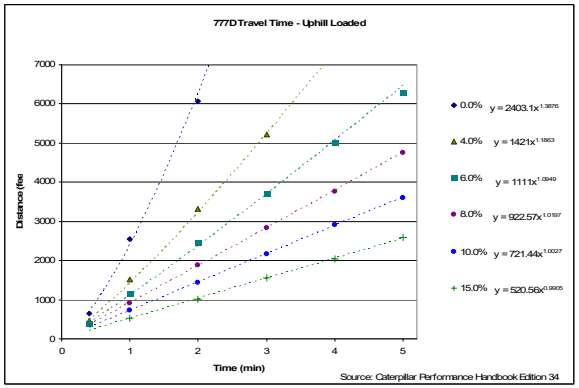
Productivity - Haul Trucks (cont.)

777D Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	656	2,558	6,068				2403.1	1.3876
4	459	1,509	3,313	5,215	7,085		1412	1.1863
6	394	1,148	2,460	3,706	5,018	6,298	1111	1.0949
8		918	1,886	2,837	3,772	4,756	922.57	1.0197
10		722	1,443	2,165	2,919	3,608	721.44	1.0027
15		525	1,017	1,558	2,034	2,591	520.56	0.9905

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

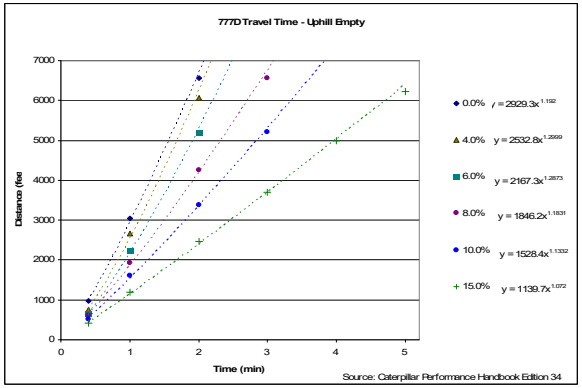


777D Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	968	3,034	6,560				2929.3	1.192
4	754	2,657	6,068				2532.8	1.2999
6	656	2,247	5,182				2167.3	1.2873
8	607	1,935	4,248	6,560			1846.2	1.1831
10	525	1,607	3,378	5,215	7,282		1528.4	1.1332
15	410	1,197	2,460	3,706	4,986	6,232	1139.7	1.072

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



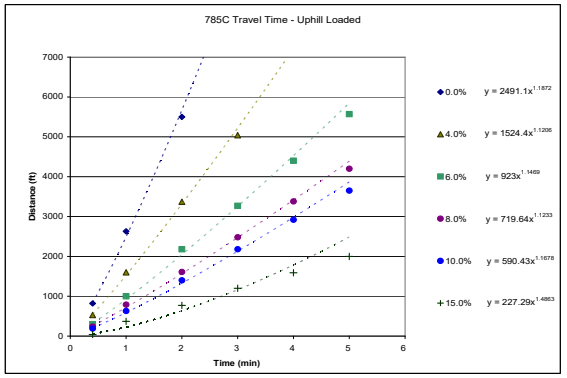
Productivity - Haul Trucks (cont.)

785C Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	820	2,630	5,500				2491.1	1.1872
4	530	1,600	3,370	5,040			1524.4	1.1206
6	300	1,000	2,180	3,270	4,400	5,570	923	1.1469
8	240	790	1,610	2,480	3,380	4,200	719.64	1.1233
10	190	630	1,400	2,180	2,920	3,650	590.43	1.1678
15	40	370	770	1,200	1,590	2,000	227.29	1.4863

Travel Time (min) = $\sqrt[p]{\frac{distance}{k}}$

Source: Caterpillar Performance Handbook Edition 35

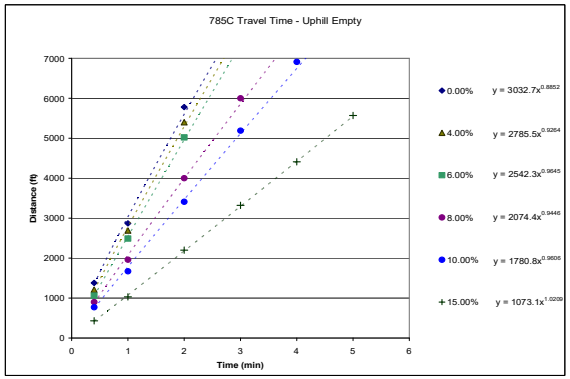


785C Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,380	2,870	5,780				3032.7	0.8852
4	1,210	2,690	5,400				2785.5	0.9264
6	1,060	2,490	5,020				2542.3	0.9645
8	900	1,960	4,000	6,000			2074.4	0.9446
10	770	1,670	3,410	5,190	6,910		1780.8	0.9606
15	430	1,030	2,200	3,320	4,410	5,570	1073.1	1.0209

Travel Time (min) = $\sqrt[p]{\frac{distance}{k}}$

Source: Caterpillar Performance Handbook Edition 35



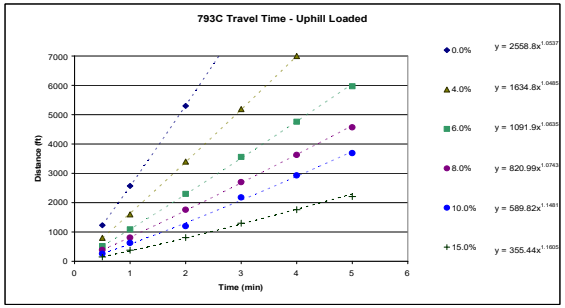
Productivity - Haul Trucks (cont.)

793C Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,230	2,570	5,300				2558.8	1.0537
4	800	1,600	3,400	5,190	7,000		1634.8	1.0485
6	520	1,090	2,300	3,560	4,760	5,970	1091.9	1.0635
8	390	810	1,760	2,700	3,630	4,570	820.99	1.0743
10	260	630	1,200	2,180	2,930	3,690	589.82	1.1481
15	150	380	810	1,300	1,760	2,210	355.44	1.1605

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

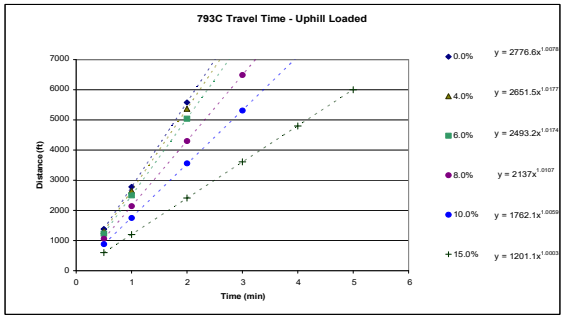


793C Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,380	2,780	5,580				2776.6	1.0078
4	1,310	2,650	5,370				2651.5	1.0177
6	1,230	2,500	5,040				2493.2	1.0174
8	1,060	2,140	4,300	6,490			2137	1.0107
10	880	1,750	3,560	5,310			1762.1	1.0059
15	600	1,200	2,410	3,610	4,800	6,000	1201.1	1.0003

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



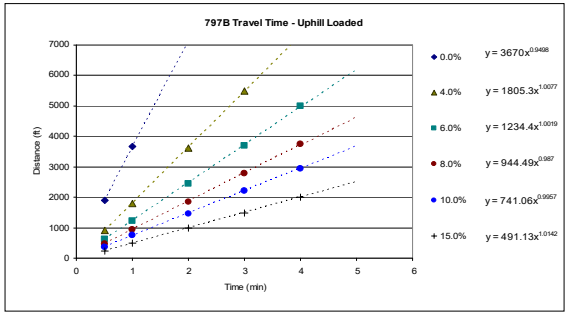
Productivity - Haul Trucks (cont.)

797B Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,900	3,670					3670	0.9498
4	900	1,800	3,620	5,480			1805.3	1.0077
6	620	1,230	2,450	3,700	5,000		1234.4	1.0019
8	480	940	1,850	2,790	3,750		944.49	0.987
10	370	750	1,460	2,220	2,950		741.06	0.9957
15	240	500	1,000	1,480	2,000		491.13	1.0142

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

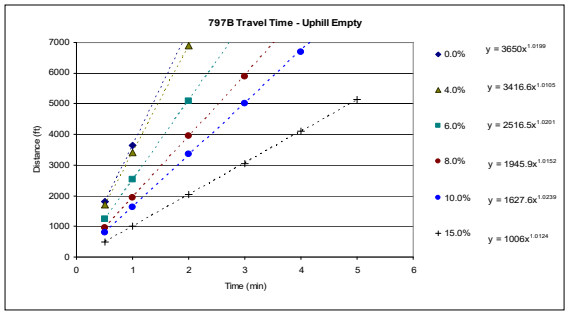


797B Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,800	3,650					3650	1.0199
4	1,700	3,400	6,900				3416.6	1.0105
6	1,240	2,520	5,100				2516.5	1.0201
8	960	1,950	3,960	5,900			1945.9	1.0152
10	800	1,620	3,350	5,000	6,700		1627.6	1.0239
15	500	1,000	2,040	3,050	4,100	5,130	1006	1.0124

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



Productivity - Articulated Trucks

Articulated Truck Specifications				
Description	**725**	**730**	**735**	**740**
Chassis Weight (lb)				
Body Weight (lb)				
Standard Liner Weight (lb)				
Operating Weight (Empty) (lb)	50,120	51,220	65,830	72,070
Payload Capacity (cy)				
Struck	14.5	17.1	19.3	23.3
Heaped	18.8	22.1	31.8	30.2
Average	16.65	19.6	25.55	26.75
Maneuver to Load Time (min)	0.7	0.7	0.7	0.7
Maneuver and Dump Time (min)	1.1	1.1	1.1	1.1
Job Efficiency	0.83	0.83	0.83	0.83
Rolling Resistance**	2.5	2.5	2.5	2.5
Altitude Deration Factor	1	1	1	1

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials				Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)									
				725					730				
Material	**lb/cy**	**Truck (725) Load lb**	**Truck (730) Load lb**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**
Alluvium	2,900	48,285	56,840	98,405	9	9	13	30	108,060	5	8	13	29
Basalt	3,300	54,945	64,680	105,065	5	9	13	22	115,900	5	8	13	29
Clay - Dry	2,500	41,625	49,000	91,745	9	13	13	30	100,220	8	8	13	29
Granite - broken	2,800	46,620	54,880	96,740	9	13	13	30	106,100	5	8	13	29
Gravel	2,550	42,458	49,980	92,578	9	13	13	30	101,200	8	8	13	29
LS - broken	2,600	43,290	50,960	93,410	9	13	13	30	102,180	8	8	13	29
LS - crushed	2,600	43,290	50,960	93,410	9	13	13	30	102,180	8	8	13	29
Sandstone	2,550	42,458	49,980	92,578	9	13	13	30	101,200	8	8	13	29
Shale	2,100	34,965	41,160	85,085	9	13	22	30	92,380	8	13	13	29
Stone - crushed	2,700	44,955	52,920	95,075	9	13	13	30	104,140	8	8	13	29
Tailings - Coarse (dry, loose sand)	2,400	39,960	47,040	90,080	9	13	13	30	98,260	8	8	13	29
Tailings - Slimes (loose sand & clay)	2,700	44,955	52,920	95,075	9	13	13	30	104,140	8	8	13	29
Topsoil	1,600	26,640	31,360	76,760	9	13	22	30	82,580	8	13	22	35
				Empty	13	13	22	30	Empty	13	13	22	35

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials				Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)									
				735					740				
Material	**lb/cy**	**Truck (735) Load lb**	**Truck (740) Load lb**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**
Alluvium	2,900	74,095	77,575	139,925	7	9	13	27	149,645	7	9	17	23
Basalt	3,300	84,315	88,275	150,145	7	9	13	27	160,345	7	9	13	23
Clay - Dry	2,500	63,875	66,875	129,705	7	9	13	27	138,945	9	13	17	31
Granite - broken	2,800	71,540	74,900	137,370	7	9	13	27	146,970	7	9	17	23
Gravel	2,550	65,153	68,213	130,983	7	9	13	27	140,283	7	9	17	31
LS - broken	2,600	66,430	69,550	132,260	7	9	13	27	141,620	7	9	17	31
LS - crushed	2,600	66,430	69,550	132,260	7	9	13	27	141,620	7	9	17	31
Sandstone	2,550	65,153	68,213	130,983	7	9	13	27	140,283	7	9	17	31
Shale	2,100	53,655	56,175	119,485	9	9	18	27	128,245	7	13	17	31
Stone - crushed	2,700	68,985	72,225	134,815	7	9	13	27	144,295	7	9	17	23
Tailings - Coarse (dry, loose sand)	2,400	61,320	64,200	127,150	7	9	13	27	136,270	9	13	17	31
Tailings - Slimes (loose sand & clay)	2,700	68,985	72,225	134,815	7	9	13	27	144,295	7	9	17	23
Topsoil	1,600	40,880	42,800	106,710	9	13	18	36	114,870	9	13	17	31
				Empty	13	18	27	42	Empty	17	17	23	31

Source: Caterpillar Performance Handbook Edition 35

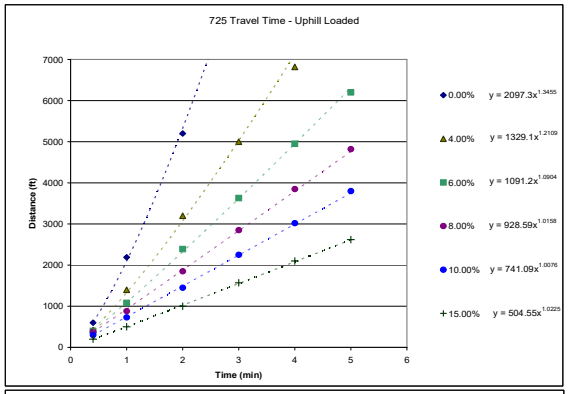
Productivity - Articulated Trucks (cont.)

725 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	600	2,190	5,200				2097.3	1.3455
4	420	1,400	3,200	5,000	6,820		1329.1	1.2109
6	400	1,080	2,390	3,630	4,950	6,200	1091.2	1.0904
8	380	880	1,850	2,850	3,850	4,820	928.59	1.0158
10	300	729	1,450	2,250	3,020	3,800	741.09	1.0076
15	200	500	1,000	1,570	2,100	2,620	504.55	1.0225

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

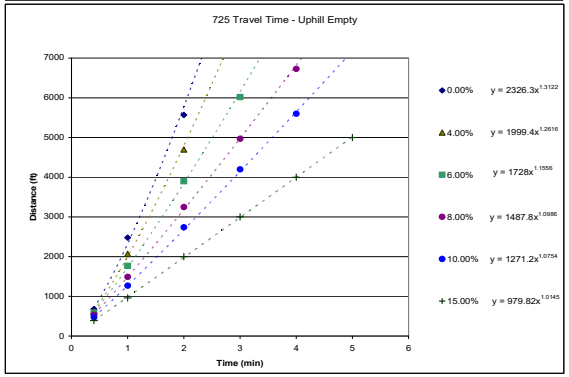


725 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	680	2,480	5,570				2326.3	1.3122
4	620	2,070	4,700				1999.4	1.2616
6	590	1,770	3,900	6,020			1728	1.1556
8	540	1,490	3,250	4,970	6,730		1487.8	1.0986
10	470	1,270	2,740	4,200	5,600	7,050	1271.2	1.0754
15	390	960	2,000	3,000	4,000	5,000	979.82	1.0145

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



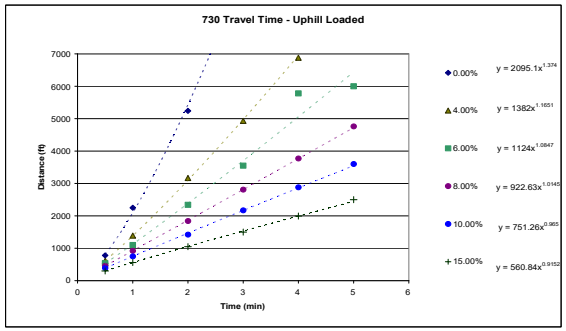
Productivity - Articulated Trucks (cont.)

730 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	780	2,250	5,240				2095	1.374
4	610	1,390	3,170	4,930	6,880		1382	1.1651
6	540	1,100	2,340	3,550	5,780	6,000	112	1.0847
8	460	920	1,840	2,810	3,770	4,760	922.63	1.0145
10	390	750	1,420	2,170	2,880	3,600	751.26	0.965
15	300	560	1,050	1,500	1,995	2,500	560.84	0.9152

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

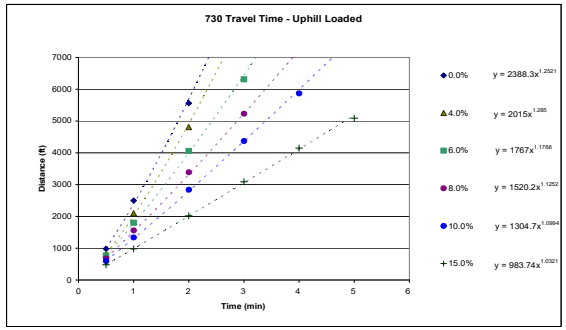


730 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	980	2,500	5,560				2388	1.25621
4	810	2,100	4,810				2015	1.285
6	770	1,800	4,060	6,310			1767	1.1766
8	680	1,560	3,390	5,230	7,070		1520.2	1.1252
10	595	1,340	2,840	4,370	5,870		1304.7	1.0994
15	480	980	2,020	3,090	4,150	5,090	983.74	1.0321

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



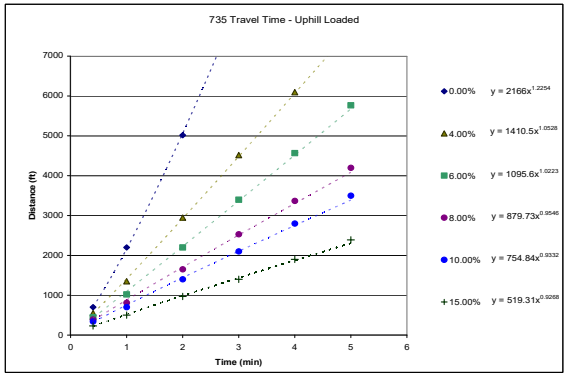
Productivity - Articulated Trucks (cont.)

735 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	700	2,200	5,020				2166	1.2254
4	550	1,350	2,950	4,520	6,100		1410.5	1.0528
6	450	1,020	2,200	3,400	4,570	5,770	1095.6	1.0223
8	390	810	1,650	2,530	3,370	4,200	879.73	0.9546
10	340	700	1,400	2,100	2,800	3,500	754.84	0.9332
15	230	500	970	1,400	1,900	2,390	519.31	0.9268

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

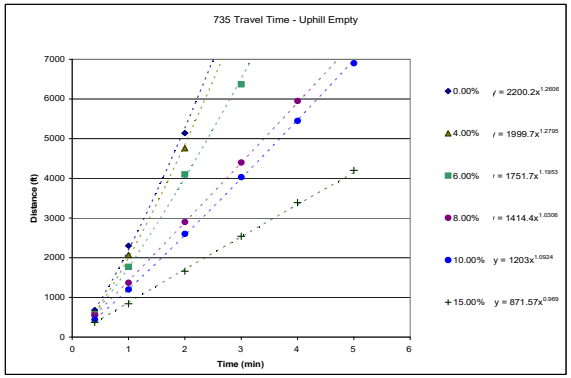


735 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	680	2,300	5,140				2200.2	1.2606
4	610	2,070	4,760				1999.7	1.2795
6	580	1,770	4,100	6,370			1751.7	1.1953
8	560	1,370	2,900	4,400	5,950		1414.4	1.0306
10	440	1,200	2,600	4,030	5,450	6,900	1203	1.0924
15	370	840	1,660	2,540	3,390	4,200	871.57	0.969

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



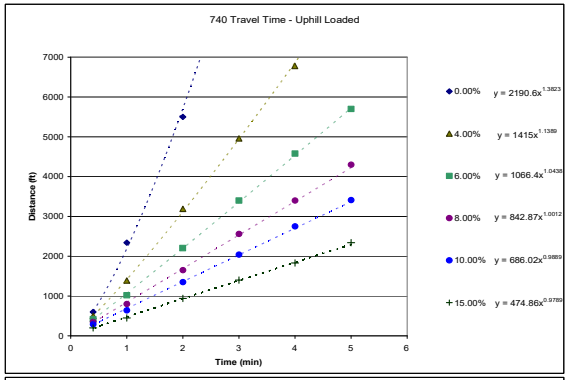
Productivity - Articulated Trucks (cont.)

740 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	600	2,340	5,500				2190.6	1.3823
4	500	1,390	3,190	4,960	6,780		1415	1.1389
6	420	1,020	2,200	3,400	4,580	5,700	1066.4	1.0438
8	350	800	1,650	2,560	3,400	4,300	842.87	1.0012
10	290	640	1,350	2,040	2,750	3,410	686.02	0.9889
15	200	450	940	1,400	1,830	2,340	474.86	0.9789

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

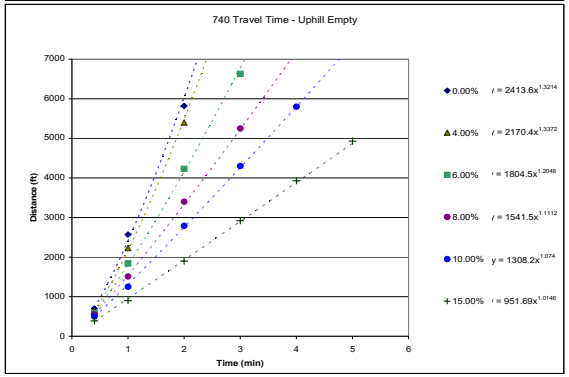


740 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	700	2,570	5,820				2413.6	1.3214
4	630	2,230	5,400				2170.4	1.3372
6	590	1,840	4,230	6,630			1804.5	1.2048
8	560	1,510	3,400	5,250	7,120		1541.5	1.1112
10	500	1,250	2,790	4,300	5,800		1308.2	1.074
15	390	900	1,900	2,920	3,930	4,930	951.69	1.0146

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



Productivity - Wheel Loaders

Wheel Loader Specifications

Description	924G	928G	950G	966G	972G	972G (2)	980G	988G	988G(2)	990	992G	992G(2)	994D	L2350
Payload Capacity (cy)														
Struck	2.2	2.5	3.46	4.46	4.71	4.71	6.34	6.9	6.9	9.5	13.2	13.2	18	
Heaped	2.7	3.25	4	5.25	5.5	5.5	7.25	8.33	8.33	11.25	16	16	22.5	
Average	2.45	2.875	3.73	4.855	5.105	5.105	6.795	7.615	7.615	10.375	14.6	14.6	20.25	53
Matched Truck	N/A	N/A	N/A	725	730	735	N/A	740	769D	773D	777D	785C	793C	797B
Average Cycle Time (min)	0.45	0.45	0.5	0.5	0.5	0.5	0.55	0.55	0.55	0.55	0.6	0.6	0.6	0.75
Passes to Fill Truck	N/A	N/A	N/A	3	4	5	N/A	4	3	4	5	6	7	5
Altitude Deration Factor	1	1	1	1	0.84	0.84	1	0.95	0.95	1	1	1	1	1
Operator Efficiency	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Time to Fill Truck	N/A	N/A	N/A	1.5	1.68	2.1	N/A	2.09	1.57	2.2	3	3.6	4.2	3.75
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Loader matched to small truck fleet
Loader matched to medium truck fleet
Loader matched to large truck fleet
Loader matched to extra large truck fleet

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered
992G (2) - can be used to load 785 with 6 passes

Source: Caterpillar Performance Handbook Edition 35; LeTourneau/actual Chilean mine operating data for L2350.

Wheeled Loaders	General Purpose	Spade Nose-Rock
928G	3.25 cubic yard	not available
966G	5.0 cubic yard	not available
972G	5.5 cubic yard	not available
988G	not available	8.3 cubic yard
992G	not available	16.0 cubic yard

note: capacities are 2:1 heaped, SAE standards
NOTES: Buckets for both Track Excavators and Wheel Loaders are offered by CECo & available for the rental rates quoted. Bucket sizes and capacities obtained from CATERPILLAR PERFORMANCE HANDBOOK, ED 34; Section 12, Wheel Loader and Section 4, Excavators

Bucket capacity and width dictated by material weight and configuration, ie., shot, loose, tight bank, stockpile, rock, etc. Typical Nevada applications were used to determine above bucket capacities as related to materials & densities. Job site specifics may alter specific bucket requirements. (Cashman Equipment, Elko, Nevada - February 21, 2005)

Productivity - Shovels

Shovel Specifications (Komatsu equivalent)

Description	PC2000	PC3000	PC4000	PC5500	PC8000
Payload Capacity (cy)					
Struck	10.46	18.84	26.16	33.48	47.09
Heaped	14.39	25.9	35.97	46.04	64.75
Average	12.43	22.37	31.07	39.76	55.92
Matched Truck	740	777D	785C	793C	797B
Average Cycle Time (min)	0.49	0.49	0.59	0.59	0.69
Passes to Fill Truck	2.05	2.84	3.38	4.69	5.11
Altitude Deration Factor	1	1	0.9	1	1
Operator Efficiency	1	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83	0.83
Time to Fill Truck	1.68	2.33	3.32	4.61	5.86
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5

Shovel matched to small truck fleet
Shovel matched to medium truck fleet
Shovel matched to large truck fleet
Shovel matched to extra large truck fleet

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered
992G (2) - can be used to load 785 with 6 passes

Source: Caterpillar Performance Handbook Edition 35; Komatsu actual Peruvian mine (Lagunas Norte) operating data for PC4000.

Productivity - Motor Graders

Motor Grader Specifications

Description	120H	14G/H	16G/H	24M
Grader Width (ft)	8	9.25	10.08	14.04
Blade Width (ft)	12	14	16	16
Ripper Width (7 shanks) (ft)	7.6	8.5	9.75	12.83
Road Maintence Speed (mph)				
Minimum	3	3	3	3
Maximum	9.5	9.5	9.5	9.5
Average	6.25	6.25	6.25	6.25
Hourly Production	33,000	33,000	33,000	33,000
Ripping Speed (mph)	1	1	1	1
Minimum	0	0	0	0
Maximum	3	3	3	3
Average	1.5	1.5	1.5	1.5
Altitude Deration Factor	1	1	1	1

Hourly Production (with job efficiency correction & altitude deration factors) (excluding manuever time)	6,574	6,574	6,574	6,574
Maneuver time per pass (min)	0.5	0.5	0.5	0.5
Operator Efficiency	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83

Source: Caterpillar Performance Handbook Edition 35

Productivity - Excavators

Track Excavator Specifications							
Description	**312C**	**320C**	**325C**	**330C**	**345B**	**365BL**	**385BL**
Bucket Capacity (cy)	0.68	1.57	2.22	2.22	3	4.6	7.3
Fill Factor	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Average Bucket Load (cy)	0.612	1.413	1.998	1.998	2.7	4.14	6.57
Soil Type	packed earth	hard clay	hard clay	hard clay	hard clay	hard clay	hard clay
Job Condition	med-hard	med-hard	med-hard	med-hard	med-hard	med-hard	med-hard
Cycle Times (minutes) - based on hard clay							
Load Bucket	0.07	0.09	0.09	0.09	0.13	0.1	0.19
Swing Loaded	0.06	0.06	0.06	0.07	0.07	0.09	0.06
Dump Bucket	0.03	0.03	0.04	0.04	0.02	0.04	0.03
Swing Empty	0.05	0.05	0.06	0.07	0.06	0.07	0.07
Total Cycle Time	0.21	0.23	0.25	0.27	0.28	0.3	0.35
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Operator Efficiency	1	1	1	1	1	1	1
Altitude Deration Factor	0.83	0.87	1	1	1	0.86	0.93
Corrected Productivity (LCY/hr)	120	266	398	369	480	591	869
Exploration Road Cycle Time (1) (min)	N/A	0.38	0.4	N/A	0.42	N/A	N/A
Exploration Road Corr Prod (LCY/hr)	N/A	161	249	N/A	320	N/A	N/A
Track Width (ft)	8.17	9.17	9.83	10.5	11.42	11.5	11.5
Ditch/Trench Excavation							
Bucket Capacity (cy)	0.42	0.58	0.88	0.89	2.09	3.27	2.75
Fill Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Corrected Productivity (LCY/hr)	41	55	88	82	186	233	182

Source: Caterpillar Performance Handbook Edition 35

Track Excavators	Hvy Duty Rock	Extreme Service Exc (e.g. haulroad recontour)	Hvy Duty Trench
312C	30", 0.68 cubic yd	47", 0.94 cubic yd	22", .42 cubic yd
320C	30", 0.90 cubic yd	55.1", 1.57 cubic yd	23.6", .58 cubic yd
325C	36", 1.25 cubic yd	60", 2.22 cubic yd	30", .88 cubic yd
330C	36", 1.25 cubic yd	60", 2.22 cubic yd	30", .89 cubic yd
345B	43.2", 1.69 cubic yd	65", 3.0 cubic yd	48", 2.09 cubic yd
365BL	60", 3.25 cubic yd	82", 4.6 cubic yd	59", 3.27 cubic yd
385BL	85", 6.30 cubic yd.	96.0, 7.30 cubic yd	57", 2.75 cubic yd

Note: capacities are 2:1 heaped, SAE standards
NOTES: Buckets for both Track Excavators and Wheel Loaders are offered by CECo &

available for the rental rates quoted. Bucket sizes and capacities obtained from CATERPILLAR PERFORMANCE HANDBOOK, ED 34; Section 12, Wheel Loader and Section 4, Excavators
Bucket capacity and width dictated by material weight and configuration, ie., shot, loose, tight bank, stockpile, rock, etc. Typical Nevada applications were used to determine above bucket capacities as related to materials & densities. Job site specifics may alter specific bucket requirements (Cashman Equipment, Elko, Nevada - February 21, 2005)

(1) Exploration cycle time assumes feathering/smoothing performed by excavator

Concrete Breaking Production

Track Excavator w/Hammer Specifications			
Description	**325C**	**345B**	**385BL**
Hydraulic Hammer	H120D s	H160D s	H180D s
Material	reinforced concrete		
Min Shift Production (yd3/8hr)	160	300	350
Max Shift Production (yd3/8hr)	300	850	1,550
Avg Shift Production (8hr)	230	575	950
Job Efficiency	0.83	0.83	0.83
Altitude Deration Factor	1	1	0.93

Source: Caterpillar Performance Handbook Edition 35

Drill Hole Plugging Productivity

Drill Hole Plugging Productivity		
Description	**Drill Rig**	**Pump Rig**
Move-to-hole, set-up, tear-down [1]	2	2
Trip in tremmie pipe [1]	500	
Pulling casing (threaded, not	200	
Single-pass perforating (water wells)	Productivity(all p	Passes
4	60	4
6	60	4
8	50	4
12	45	6
18	40	9
24	28	12
Perforation setup,trip in/out,tear-down	2	
Perforation tool cost (wear cost)[3]	2.5	
Inert Material Placement (backfill)		
Grouting/Cement [4] (cy/hr)		5.33
Cuttings (see below) (cy/hr)		3.5

Sources:
1. Drillers daily logs from Newmont, Barrick, New West Gold, Agnico Eagle, Idaho General Mines Inc.
2. Drillers daily logs from Newmont, Barrick, Target Minerals
3. Drillers daily logs from Newmont
4. WDC Exploration, Dec 2005

Soumce: WDC Exploration, Dec 2005

Cuttings Placement Productivity		
Shift productivity (Means 02210-700-0120; Crew B11M)	28	cy / shift
Shift length	8	hours
Estimated Hourly Productivity	3.5	cy / hour

Altitude Deration Table

MODEL	Elevation 0-760 m (0-2500') CAT	User	760-1500 m (2500-5000') CAT	User	1500-2300 m (5000-7000') CAT	User	2300-3000 m (7500-10,000') CAT	User	3000-3800 m (10,000-12,000') CAT	User	3800-4600 m (12,500-15,000') CAT	User
Bulldozers												
D6R	100		100		100		100		92		84	
D6R w/ Winch	100		100		100		100		92		84	
D7R	100		100		100		100		100		96	
D8R	100		100		100		93		85		77	
D9R	100		100		100		93		85		77	
D10R	100		100		100		100		97		89	
D11R	100		100		100		93		85		77	
Wheeled Dozers												
824G	100		100		100		100		92		84	
834G	100		100		100		100		92		84	
844	100		100		100		100		100		96	
854G	100		100		100		93		85		77	
Graders												
120H	100		100		100		100		96		93	
14G/H	100		100		100		100		98		96	
16G/H	100		100		100		100		98		96	
24M	100		100		100		100		98		96	
Excavators												
312C	100		100		100		83		78		73	
320C	100		100		90		87		83		76	
325C	100		100		100		100		100		100	
330C	100		100		100		100		100		100	
345B	100		100		100		100		93		93	
365BL	100		100		100		86		86		86	
385BL	100		100		100		93		85		78	
Scrapers												
631G	100		100		100		100		97		90	
637G	100		100		100		95		87		80	
Loaders												
924G	100		100		100		100		97		89	
928G	100		100		100		100		92		85	
950G	100		100		100		100		100		100	
966G	100		100		100		100		96		88	
972G	100		100		92		84		77		70	
980G	100		100		100		100		96		88	
988G	100		100		100		95		85		75	
990	100		100		100		100		92		85	
992G	100		100		100		100		93		87	
994D	100		100		100		100		96		88	
L2350	100		100		100		100		96		90	
Shovels												
PC2000	100		100		100		100		96		90	
PC3000	100		100		100		100		96		90	
PC4000	100		100		100		100		96		90	
PC5500	100		100		100		100		96		90	
PC8000	100		100		100		100		96		90	
Other Equipment												
420D 4WD Backhoe	99		97		95		91		91		91	
428D 4WD Backhoe	99		97		95		91		91		91	
CS533E Vibratory Roller	100		100		98		95		91		86	
CS633E Vibratory Roller	100		100		100		100		91		86	
CP533E Sheepsfoot Compactor	100		100		98		95		91		100	
CP633E Sheepsfoot Compactor	100		100		100		100		91		86	
Light Truck - 1.5 Ton												
Supervisor's Truck												
Flatbed Truck												
Air Compressor + tools												
Welding Equipment												
Heavy Duty Drill Rig												
Pump (plugging) Drill Rig												
Concrete Pump												
Gas Engine Vibrator												
Generator 5KW												
HDEP Welder (pipe or liner)												
5 Ton Crane												
20 Ton Crane												
50 Ton Crane												
120 Ton Crane												
Trucks												
725	100		100		100		100		100		95	
730	100		100		100		100		100		95	
735	100		100		100		100		99		91	
740	100		100		100		100		99		91	
769D	100		100		100		93		88		82	
773E	100		100		100		100		93		85	
777D	100		100		100		100		93		87	
785C	100		100		100		93		86		80	
793C	100		100		100		100		100		93	
797B	100		100		100		100		100		93	
613E (5,000 gal) Water Wagon	100		100		100		100		95		87	
621E (8,000 gal) Water Wagon	100		100		100		100		97		90	
777D Water Truck	100		100		100		100		93		87	
785C Water Truck	100		100		100		93		86		80	
Dump Truck (10-12 yd^3) (5)												

Notes:
User entered deration value will override values from CAT Performance Handbook, except L2350 Loader: data from actual mine performance in Chile.

Attachment I

USACE No Permit Required Verification

Corps File No. NWO-2021-00388-DEN

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD
LITTLETON, COLORADO 80128-6901

March 3, 2021

SUBJECT: No Permit Required Verification – Corps File No. NWO-2021-00388-DEN, Planned Road Project in Boulder County

Greg Miller
Grand Island Resources, LLC
P.O. Box 3395
Nederland, CO 80466

Dear Mr. Miller:

Reference is made to the above-mentioned proposed project located at approximately 39.978682°N, -105.572736, in Boulder County, Colorado. The work as described in your submittal would consist of constructing a temporary mining road crossing near the headwaters of Coon Track Creek to facilitate the trucking of mined material offsite. The road would be removed and reclaimed once the mining area is exhausted.

This project has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the discharge of dredge and fill material and certain excavation activities in waters of the United States. Waters of the U.S. includes ephemeral, intermittent and perennial streams, their surface connected wetlands and adjacent wetlands and certain lakes, ponds, drainage ditches and irrigation ditches that have a nexus to interstate commerce. Based on the information provided, a Department of the Army permit will not be required for this activity.

Although a Department of the Army permit will not be required for this activity, this does not eliminate the requirements that other applicable federal, state, tribal, and local permits are obtained if needed. Please be advised that deviations from the original plans and specifications of this project could require additional authorization from this office.

If there are any questions please feel free to contact Nicholas Franke at (303) 979-4120 or by e-mail at Nicholas.A.Franke@usace.army.mil, and reference **Corps File No. NWO-2021-00388-DEN**.

Attachment II

Composite Rock Analysis

General Site Mineralization:

The mining district is located near the northeastern exposed limit of the Colorado Mineral Belt. The deposits of the Caribou district have been described by the U.S. Geological Survey (USGS) as "polymetallic veins with abundant carbonates or the associated wall rock has been altered to contain carbonates." The vein structures occur as steeply dipping northeast-striking veins that cut the east/west striking veins. The vein mineralization was emplaced during multiple phases (up to seven) and includes early and persistent pyrite, copper, zinc, lead, and silver sulfides and gold. A relatively early carbonate-rich phase resulted in common dolomite, calcite, rhodochrosite, and other carbonate minerals in the veins. These carbonates are indicative of the acid-neutralizing potential of the ore body, and therefore the lack of any acid rock drainage potential. Baseline water sampling over the last twenty years confirms these conclusions with consistently low metal loading and pH levels in the range of 6.4 to 7.6.

Potential for Acid Rock Drainage:

Given the nature of the host rock and ore body, acid rock drainage (ARD) should not occur. (Prior analyses submitted and reviewed by the DRMS have shown the host rock and ore body to be non-acid producing.)

Sincerely,

Kiel Downing
Chief, Denver Regulatory Office