#5910

UtahAmerican Energy, Inc.

Lila Canyon Project
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May 5, 2019

Utah Division of Oil, Gas & Mining
Utah Coal Program
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, UT 84114-5801

Attn: Steve Christensen
Permit Supervisor

Re: Lila Canyon Mine, UtahAmerican Energy, Inc. C/007/013
Warehouse Pad Extension

Dear Mr. Christensen

Attached you will find the Clean Copies for the amendment made to address several aspects of the Lila Canyon Mine MRP. Text pages, maps, and a signed rider to the bond have been included in this submittal.

If you have any questions, or need any additional information regarding this submittal, please contact me directly at 435-888-4000.

Sincerely,

Karin Madsen
Engineering Tech
UtahAmerican Energy, Inc.

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Application for Permit Processing
Detailed Schedule of Changes to the MRP

L19-001 Warehouse Pad Extension	Permit Number: ACT/007/013 Mine: Lila Canyon Permittee: UtahAmerican Energy, Inc.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☐ REPLACE	☐ REMOVE	Chapter 2 pages 9 & 10
☐ ADD	☐ REPLACE	☐ REMOVE	Chapter 5 ALL pages (changes were made to text and approved by Division, however the additional text changed the page numbers significantly. To incorporate the new text and also keep the copy as clean as possible, all of Chapter 5 is being submitted for incorporation.
☐ ADD	☐ REPLACE	☐ REMOVE	Appendix 7-4
☐ ADD	☐ REPLACE	☐ REMOVE	Bonding Calculation Sheets
☐ ADD	☐ REPLACE	☐ REMOVE	Appendix 5-7 page 1
☐ ADD	☐ REPLACE	☐ REMOVE	Appendix 5-8 page 1
☐ ADD	☐ REPLACE	☐ REMOVE	<u>Plate</u> <u>Name</u> <u>Size</u> 5-2 As-Built Surface Facilities 24"x36" 5-8 Coal Handling Facilities 30"x42" 7-2 Watershed Boundaries 24"x36" 7-5 Sediment Control 24"x36" 7-6a Proposed Sediment Pond #1 24"x36" 7-6b Proposed Sediment Pond #2 24"x36" 8-1 Proposed Surface Facilities 24"x36"
☐ ADD	☐ REPLACE	☐ REMOVE	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

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Horse Canyon Extension
Lila Canyon Mine

Chapter 2
Soils

Volume 1 of 7

place for redistribution on the topsoil pile. Topsoil material will be removed from those areas of the mine yard where material will be excavated in order to achieve final yard configuration and which have been identified as suitable topsoil for reclamation based on the soil survey. This includes the access road to and around the topsoil pile. This material will be used to construct a berm around the topsoil pile.

The following volumes represent soil resources that may be available for salvage, storage and subsequent redistribution during reclamation. The actual amount salvaged will be reported to DOGM following topsoil removal and stockpiling operations.

AVAILABLE SOIL RESOURCES

Map Unit	Potential Salvage Depth In.	Potential Acres	Potential Estimated Volume YD3	**Actual Salvage Depth In.**	**Actual Salvaged Acres**	**Actual Salvaged Top Soil YD3**
SBG	48	12.93	83442	**18**	**11.87**	**29489**
VBJ	30	9.62	38801	**18**	**9.02**	**10192**
XBS	12	10.39	16763	**12**	**7.80**	**14435**
DSH	40	1.56	8389	**18**	**1.48**	**3420**
RBL	8	5.53	5948	**8**	**3.82**	**2340**
RBT	6	0.09	73	**6**	**0.00**	**452**
TOTAL		40.12	153415		**33.99**	**60328**
Bank to Loose Cubic Yards *1.18 (Amount topsoil pile is designed to hold.)						(1) **71987**

(1) An additional 800 yd^3 will come from the access road around the topsoil pile. This material will be placed in the berm around the topsoil pile.

The actual topsoil salvage will consist of removing a surface layer up to 18 inches thick over the disturbed area. If shale is encountered within 18 inches only the soil above the shale will be salvaged. (Plate 2-3). This would cover about 33.99 acres where soil would be salvaged and stored in the topsoil stockpile.

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Total volumes of soil stored in the topsoil pile would be

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approximately 71,987 bank cubic yards. Removal of stones and boulders would be considered in volume estimates where they are part of the soil layer removed.

The stockpile has been sized to allow for bulking or swell of the soil as it is removed from the bank state to the loose state. A bulking number of 1.18 has been used. The area allowed for topsoil storage is 56,000 bank cubic yards x 1.18 which equals 66,000 loose cubic yards to be placed on the topsoil pile.

Boulders of approximately three feet in diameter and larger will be separated from the topsoil and piled or placed at appropriate locations such as adjacent to roads, pads etc. No attempt will be made to collect the large boulders into common piles. Boulders above ground level are in addition to topsoil volumes and may account for approximately 10,000 cubic yards.

UEI is not stockpiling large stones "boulders". Boulders will be pushed to the side and left during construction and then upon reclamation the boulders will be pushed back into the approximate location form which they came. Rocks of 36" or less will be stored in the topsoil pile with the soil and will be redistributed with the soil.

The approximate 71,987 loose cubic yards of topsoil will be stored in a topsoil pile as shown on Plate 5-2. This topsoil pile will be approximately 350' long and 250' wide with 2:1 slopes. The height of topsoil pile needed is approximately 31 feet. The pile as designed has the capability of storing well over the required 71,987 cubic yards. See Figure 1 for topsoil pile calculations.

Soil from the proposed ventilation break out sites near the coal outcrop will not be salvaged. The slope above the north breakout fan is approximately 70%. Rock cover on the surface is approximately 60%. As a result of the very limited ground disturbance, and lack of access, soil cannot be reasonably salvaged. At these small isolated sites soil will

Horse Canyon Extension
Lila Canyon Mine

Chapter 5
Engineering

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Chapter 5

500. ENGINEERING

510. Introduction

This section presents the engineering portion for the Lila Canyon Extension to the Horse Canyon Mine Reclamation Plan and is based upon previous publications, permit applications for the adjacent Sunnyside and South Lease areas and design which follows basic engineering standards. The objective of this chapter is to provide sufficient engineering design to support the mining and reclamation plan for the Lila Canyon Mine (ACT/007/013) and to satisfy the rules found in R645-301-500. All of the activities associated with the coal mining and reclamation operations are designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plan. The engineering section of the permit application is divided into the introduction, the operation plan, operational design criteria, reclamation plan, and performance standards. All design criteria associated with the operation and reclamation plans have been met.

511. General Requirements.

511.100 The permit application includes a description of the proposed coal mining and reclamation operations with appropriate maps, plans, and cross sections.

511.200 A description of the proposed mining operation and its potential impacts to the environment as well methods and calculations utilized to achieve compliance with design criteria are addressed within this chapter.

511.300 A description of the proposed reclamation plan is included in this chapter.

512. Certification

512.100. Cross Sections and Maps that require certification have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, with assistance from experts in related fields when needed. Cross Sections and Maps will be updated as needed or required by the Division. Listed below are some of the maps and cross sections that have been certified by a qualified registered professional engineer.

512.110. A map showing the extent of known existing mine workings and the approximate year mined has been included and certified by a qualified registered professional engineer and included as Plate 5-1.

512.120. All Surface facilities (temporary and long-term) and operations are shown on the appropriate maps, and have been certified by a qualified registered professional engineer.

512.130 Maps showing final surface configuration with cross sections have been included and certified by a qualified registered professional engineer. (See Plate 5-6, 5-7c, and Appendix 5-4)

512.140 Appropriate hydrology drawings and cross sections have been certified by a qualified registered professional engineer. (See Chapter 7)

512.150 Geologic cross sections and maps that are required to be certified, have been certified by a qualified registered professional engineer. See Chapter 6 and Plate 7-1B.

512.200 Plans and Engineering Designs which may include: Excess spoil piles, durable rock fills, coal mine waste, impoundments, primary roads and variances from approximate original contour. These Plans and Designs have been certified by a qualified registered professional engineer if appropriate.

512.210 Lila Canyon Mine is an underground operation, therefore it is anticipated that no excess Spoil will be produced. This section does not apply.

512.220 The professional engineer experienced in the design of earth and rock fills has certified that the durable rock fill design will ensure the stability of the fill and that the fill meets design requirements.

512.230 The professional engineer experienced in the design of coal mine waste piles has certified the design of the coal mine waste disposal facility. (See Appendix 5-7)

512.240 Prudent engineering practices are used in the design and construction of impoundments in the permit area. The impoundment designs have been certified by a qualified registered professional engineer. (See Plates 7-6a and 7-6b)

512.250 The professional engineer has certified the design and construction or reconstruction of primary roads as meeting the appropriate design criteria.

512.260 The operator is not requesting a variance from the approximate original contours (AOC).

513. Compliance With MSHA Regulations and MSHA Approvals.

513.100 Neither Coal processing waste dams nor embankments are anticipated during the term of this permit. Therefore, this section is not applicable.

513.200 Planned impoundments and sedimentation ponds do not meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a). Therefore, this section is not applicable.

513.300 Underground development waste transported to the surface, coal processing waste and excess spoil will not be disposed of underground. However, material such as overcast material, rock falls, and slope material, not transported to the surface, may be disposed of underground according to the appropriate MSHA regulations.

513.400 Refuse piles meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215 and all appropriate R645 regulations. (See Appendix 5-7)

513.500 Shafts, drifts, adits, tunnels, exploratory holes, entryways or other opening to the surface from the underground will be capped, sealed, backfilled or otherwise properly managed consistent with MSHA, 30 CFR 75.1711.

513.600 Surface water discharges into the underground mine workings is not anticipated or planned, Therefore, this section is not applicable.

513.700 Surface mining within 500 feet to an active underground mine is not planned nor anticipated. Therefore, this section does not apply.

513.800 Coal mine waste fires plans will be submitted to MSHA and the Division for their approval prior to extinguishing any coal mine waste fires. (See Appendix 5-3)

514. Inspections

All engineering inspections, except the quarterly inspections of impoundments not subject to MSHA, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

514.100 Lila Canyon is an underground operation and it is not anticipated that any spoil will be produced. Therefore, this section does not apply.

514.200 Refuse Piles. A professional engineer or specialist experienced in the construction of similar earth and waste structures will inspect the refuse pile during construction.

514.210 Regular inspections by the engineer or specialist will also be conducted during placement and compaction of coal mine waste materials. If it has been determined that a danger of harm exists to the public health and safety or the environment, more frequent inspections will be conducted. Inspections will continue until the refuse pile has been finally graded and revegetated or until a later time as required by the Division.

514.220 The refuse pile inspections will be performed at least quarterly throughout construction and during the following construction periods:

514.221 In addition to quarterly inspections, an inspection will be performed during foundation preparation which includes the removal of all organic material and topsoil;

514.222 Since no under-drain or protective filter systems are planned, this section is not applicable.

514.223 In addition to quarterly inspections, an inspection will be performed during the installation of the final surface drainage systems.

514.224 In addition to quarterly inspections, an inspection will be performed after the final grading and the facility has been revegetated.

514.230 The division will be provided a certified report prepared by, or under the supervision of, the qualified registered professional engineer after each inspection. The report will certify that the refuse pile has been constructed and maintained as designed and in accordance with the approved plan and R645 Rules. This report will include statements stating the appearances of instability, structural weakness, and other hazardous conditions if found. (See Appendix 5-1)

514.240 Since protective filters and under-drain are not required in the current design criteria this section is not applicable.

514.250 Required refuse pile reports will be retained at or near the mine site in an area convenient to the resident agent and the qualified registered professional engineer. Appendix 5-1 is an example of the refuse pile inspection form.

514.300 Impoundments

514.310 A professional engineer or specialist experienced in the construction of impoundments will inspect impoundments.

514.311 During construction, inspections will be made on a regular basis, and upon completion of the ponds. The inspections will be performed at least yearly. Inspections will continue yearly until the pond is removed or the performance bond is released.

514.312 After each inspection the qualified registered professional engineer will promptly provide to the Division a certified report. This report will state that the impoundment has or has not been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules. The report will include a discussion of any appearances of instability, structural weakness or other hazardous conditions. All so included in the report will be the depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation and any other aspects of the structure affecting stability.

514.313 Required impoundment inspection reports will be retained at or near the mine site in an area convenient to the resident agent and the qualified registered professional engineer. Appendix 5-2 is an example of the impoundment inspection form.

514.320 Since the pond contained in the Lila Canyon Project is less than 20 feet high and stores less than 20 acre-feet of water, it is not subject to MSHA, 30 CFR 77.216. Therefore, this section does not apply.

515. Reporting and Emergency Procedures.

515.100 If a slide occurs, the operator will telephone DOGM to notify them of the situation and recommend remedial measures to be taken to alleviate the problem. Additional remedial measures required by DOGM will be implemented.

515.200 During impoundment inspections, any potential hazards noted will be reported to DOGM, along with measures to be implemented to eliminate the hazard.

515.300 In the case of temporary cessation of operations the following will apply:

515.310 All provisions of the approved permit will be complied with during temporary cessation or abandonment.

515.311 In case of temporary cessation, the operator will support and maintain all surface access openings to underground operations, and secure surface facilities in areas in which there are no current operations, but operations are to be resumed under an approved permit.

515.312 Since Lila Canyon Mine is an underground operation, this section does not apply.

515.320 Prior to a temporary cessation of coal mining and reclamation operations which is expected to last longer than 30 days, or when a temporary cessation is extended longer than 30 days, the operator will submit to the Division a notice of intention to cease or abandon operations. The following will be included in the notice of temporary cessation.

515.321 The temporary cessation notice will contain the exact number of surface acres and the horizontal and vertical extent of subsurface strata included in the permit area. In addition, a description of the reclamation activities accomplished and activities such as backfilling regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

515.322 Since the Lila Canyon Mine is an underground operation, this section does not apply.

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516. Prevention of Slides: Since the Lila Canyon Mine is an underground operation, this section does not apply.

520. Operation Plan.

At first glance it would appear to a non-mining person that the best access to UEI's leases would be from the existing (sealed) Horse Canyon portals using the current Horse Canyon surface disturbance. However, the existing Horse Canyon site is not suitable for a large longwall operation. The old Horse Canyon Mine was not designed to produce 4.5 million tons as will be Lila. Some strategic pillars in the old mains were extracted upon retreat preventing any future access. The number of entries in the old works is not adequate for ventilation purposes. Portions of the old mine are flooded preventing reentry. The distance from the old portals to the current leases would result in unacceptable travel times for crews and supplies. Rehabilitating and maintaining an old mine is extremely hazardous and expensive. As a result of the conditions described above it has been determined that new portals at the Lila Canyon site are the most logical and only feasible access to the permittee's coal leases.

Lila Canyon Current Temporary / Long-term Mine Facilities List

Current temporary and long-term structures and facilities are shown on Plate 5-2. The Keyed Mine Facilities from Plate 5-2 are numbered as follows:

Buildings

1) Temporary Bath House
2) Temporary Office Trailer
3) Temporary Office / Shop Building
4) Temporary Storage Shed (Wooden)
5) Temporary Storage Building (Metal)
7) Temporary Office Building
9) Temporary Storage Tent with concrete floor
22) Temporary Crusher/Screen Building
33) Shop / Warehouse Building

Utilities

No Number *Mine Substation*
8) Potable Water Tank
10) Power Poles
11) Electrical Transformer
12) Overhead Power Transmission Lines
13) Buried Power Transmission Lines
28) Electrical Grounding Field

37) Non-Potable Water Storage Tanks
40) Concrete Electrical Junction Box
41) Temporary Concrete Septic Tank

Mine Facilities

14) Rock Dust Silo
16) Temporary Underground Reclaim Room
17) Temporary Concrete Retaining Wall
18) Temporary Loadout Conveyor (48")
19) Temporary Loadout MCC Building
20) Temporary Loadout Structure
21) Temporary Crusher Conveyor (48")
23) Temporary Crushed Coal Conveyor (48")
24) Temporary Crusher MCC Building
25) Temporary Concrete Dozer Trap
27) Temporary Concrete Equipment Pad
30) Existing ROM Coal Conveyor from Underground (60")
31) Steel Portal Canopy Structure
32) Concrete Conveyor Bay at Belt Portal
34) Mine MCC Building / Electrical Tower
35) Backup Ventilation Fans
36) Main Mine Ventilation Fan / Electrical Tower
39) Chain Link Fencing
43) Temporary Conveyor Counterweight Structure
44) Jersey Barrier Guard Rails
45) Concrete Trash Chute
46) Gantry Lift Assembly

Support Facilities

No Number *Mine Facilities Access Road / Truck Loadout Road*
No Number *Rock Slopes*
No Number *Sediment Ponds*
No Number *Slope Access Road / Portal Access Road*
No Number *New Storage Pad*
No Number *New Storage Pad Access Road*
No Number *New Storage Pad Service Road*
No Number *Topsoil Pile*
6) Temporary Concrete Walkway
15) Temporary Fuel Storage Tanks
29) Sediment Pond Spillway Structure
42) Temporary Loadout Light Board
38) Powder and Cap Magazines

Note: Long-Term Underground Pipes are not shown.
Note: Culvert locations are shown on Plate 7-5.

A description of current temporary and long-term structures and facilities:

BUILDINGS

1) Temporary Bath House

The temporary bath house is shown on Plate 5-2. This complex is made up of interconnected portable structures (trailers and metal intermodal structures) and a concrete and wood-framed shower area. Shower and toilet facilities for all male employees are at this location. Female employees utilize a separate, nearby temporary trailer for showers and toilet facilities (see #2 below). The bath house provides a location for underground miners to change from clean street clothes to clothing suitable for underground use. The area provides showers for employees for use after their scheduled work shifts so they can clean up prior to returning home. The trailers and metal intermodal structures rest upon stacked concrete blocks for stability and leveling purposes. Once the long-term bath house (per Plate 8-1) is constructed, the temporary bath house and all supporting structures will be removed.

2) Temporary Office Trailer

The temporary office trailer is a prefabricated, self-contained, modular trailer, similar to those often seen on construction sites. The trailer can be moved using a vehicle with a tow hitch. Each trailer typically contains two (2) or three (3) offices and one (1) restroom. Each trailer is equipped with a waste water storage tank for the rest room. The waste water storage tank is emptied on a regular basis. One (1) temporary office trailer has been modified to provide shower and toilet facilities for female employees similarly to the temporary bath house (see #1 above). The office trailers are used by mine personnel in support positions to mine operations. Multiple trailers are currently used. The locations of these trailers are shown on Plate 5-2. Once long-term office areas are constructed, the temporary office trailers and all supporting structures will be removed.

3) Temporary Office / Shop Building

The Temporary Office / Shop Building is shown on Plate 5-2. The building is a prefabricated metal building on a concrete foundation system, with a 4" thick concrete floor slab. The building is split down the middle width-wise with one side being the shop area, and the other office space for mine personnel in support positions to mine operations. The shop area is used to perform minor equipment repairs. The building measures approximately 30' by 62'. Once long-term offices and the long-term Shop/Warehouse have been constructed, the temporary office / shop building will be razed.

4) Temporary Storage Shed (Wooden)

The temporary wooden storage shed measures approximately 10' by 20' by 8' high, with a wooden floor structure. The shed is used to store various equipment and supplies needed for mine operations. Multiple sheds are currently used. The locations of these sheds are shown on Plate 5-2. Once the long-term Shop/Warehouse has been constructed, the temporary storage sheds will be removed.

5) Temporary Storage Building (Metal)

The temporary metal storage building is a prefabricated, metal, intermodal container used for storage. These structures are sometimes referred to as "conex containers." The containers are typically 20' to 40' long by 8' wide by 8.5' high. These structures are used to store various equipment and supplies needed for mine operations. The metal storage structures typically provide a higher level of security than do wooden sheds. Multiple metal storage buildings are currently used. The locations of these buildings are shown on Plate 5-2. Once the long-term Shop/Warehouse has been constructed, the temporary storage buildings will be removed.

7) Temporary Office Building

The temporary office / storage building is shown on Plate 5-2. The office space is used by mine personnel in support positions to mine operations. The building measures 20' by 12' by 10' high. The building is a wood frame on a concrete foundation. The floor is a 4" thick concrete slab. Once the long-term office areas and Shop/Warehouse have been constructed, the temporary office building will be razed.

9) Temporary Storage Tent with Concrete Floor

The temporary storage tent is constructed of an arched metal wall/roof structure covered with a canvas overlay. The tent rests on a 6" concrete floor slab. Two tents are currently in use at the mine site. One tent measures 30' by 30'. The other measures 70' by 48'. The tents are used to store large wares and supplies needed for mining operations that need some protection from the weather. The temporary storage tents with concrete floors are shown on Plate 5-2. Once the long-term Shop/Warehouse has been constructed, the temporary storage tents and associated concrete floor slabs will be removed.

22) Temporary Crusher / Screen Building

The temporary crusher / screen building is shown on Plate 5-2, and houses the screen and crusher assemblies. The screen assembly sorts the coal as it enters the building, via the temporary crusher conveyor (see #21 below), between the larger lump sizes that need to be crushed (2"-8" in size) and the smaller nuggets that do not need to be crushed (less than 2" in size). The crusher assembly reduces the larger 2" to 8" sized coal lumps to nuggets measuring less than 2" in size. The coal that is now 2" or less in size falls onto the crushed coal conveyor (see #23 below) and exits the building. The building itself is constructed of a wide flange steel frame and rests on a 12" thick monolithic concrete slab base. The building measures approximately 48' by 22', and stands approximately 58' at its peak. The temporary crusher / screen building has been constructed to meet MSHA regulations. Once the long-term coal handling facilities have been constructed, the temporary crusher / screen building will be razed.

33) Shop / Warehouse Building

The shop / warehouse building is shown on Plate 5-2 and 8-1. This building will be a long-term structure used to repair machinery and vehicles associated with mine operations, and shall store various wares associated with mine operations. The building will be 120 feet long by 60 feet deep. The roof will be sloped for drainage. The facility will be approximately 36 feet high at the peak of the roof. The building will be constructed of a poured concrete footing and foundation system and floor. The walls and roof will be of pre-fabricated steel. Several roll-up type overhead doors will allow vehicles to enter the building for repair and maintenance. One bay will have overhead doors on the front and rear of the building to allow trucks to enter the building on one side, load or off load wares or equipment, then exit the building through the opposite side of the structure. The building will also house a large capacity overhead crane that will be used to lift heavy objects and equipment. This structure will remain throughout the life of the mine, and will be removed at the time of final reclamation.

UTILITIES

Mine Substation

The mine substation is shown on Plate 5-2, and provides power to surface and underground areas of the mine property. The substation includes approximately four transformers setting on a concrete pad approximately 20' by 20' by 12" and fully fenced. The total fenced area of the substation is approximately 215' by 112'. Power is fed into the transformers at 138 KVA and will be transformed down to usable voltages for both the surface and underground facilities. It is anticipated that voltages of 110V, 220V, 440V will be used on the surface, and 12,470 volts will be utilized underground. The mine substation is constructed to fulfill all appropriate MSHA regulations. The Mine Substation will remain throughout the life of the mine, and will be removed during final reclamation.

8) Potable Water Tanks

The potable water tanks are shown on Plate 5-2. Potable water is purchased off-site and is transported to the mine site via tanker truck, which in turn fills the tanks. The potable water is stored in one 15' diameter by 20' high metal tank and two (2) 20' by 8' by 8' high conex-type cubic tanks . Water from these tanks are used for toilets and showering in the temporary bath house (see #1 above). The round tank is set on a 15' by 15' concrete pad designed for adequate support of the tank. The cubic tanks are self-contained and rest on native soil. The location of the potable water tanks can be found on Plate 5-2. The potable water tanks will remain throughout the life of the mine, and will be removed during final reclamation.

10) Power Poles

Multiple wooden power poles are utilized throughout the disturbed area. Locations of power poles are shown on Plate 5-2. The power poles are large, upright wooden poles used to support overhead power transmission lines and other wires as needed. The power poles will remain throughout the life of the mine and will be removed during final reclamation.

11) Electrical Transformer

An electrical transformer is used to adjust and transfer electrical energy in electric power applications. Each transformer rests on a 4" thick concrete slab of suitable size to support the weight of the transformer. The transformer feeds various mine facilities. Multiple transformers are currently utilized. Their locations are shown on Plate 5-2. Transformers will be removed as their respective temporary facilities are removed and replaced upon the completion of long-term facilities (see Plate 8-1).

12) Overhead Power Transmission Lines

Within the disturbed area, both overhead and underground power lines will be utilized. Overhead power lines will be run where underground power lines are not feasible. Vertical power poles (see #10 above) support the overhead lines to provide adequate and safe clearances below the power transmission lines. The overhead power transmission lines have been spaced to protect raptors. As-built drawings will be provided upon completion of the long-term surface facilities. Overhead power lines will be remain through the life of the mine, and will be removed upon final reclamation.

13) Buried Power Transmission Lines

Within the disturbed area both overhead and buried power lines will be utilized.

Buried power transmission lines will be run where feasible. All buried power transmission lines will be run in conduits. As-built drawings will be provided upon completion of the long-term surface facilities. Long-term underground power lines will remain throughout the life of the mine. Upon final reclamation, the long-term underground power transmission lines will be abandoned and left in place.

28) Electrical Grounding Field

The electrical grounding field is composed of a grounding grid and rods buried below the soil. The electrical grounding field has been designed and constructed to meet MSHA requirements and regulations. It is used to ground the Mine Substation (see above). The location of the electrical grounding field is shown on Plate 5-2. The electrical grounding field will remain throughout the life of the mine, and will be removed during final

reclamation.

37) Non-Potable Water Storage Tanks

Three non-potable water storage tanks are used to store water for mine-related purposes including dust suppression on roadways and other points as required by the approved Air Quality Order. The location of the non-potable water storage tanks is shown on Plate 5-2. The non-potable water storage tanks will remain throughout the life of the mine, and will be removed upon final reclamation.

40) Concrete Electrical Junction Box

The location of the concrete electrical junction box is shown on Plate 5-2. The concrete electrical junction box is a buried 6' by 6' by 6' concrete box with 6" thick walls, top and floor. A steel manhole allows access to the interior of the box. Within the junction box, high-voltage connections are made that allow power to be transferred from the Mine Substation to the overhead power lines. The concrete electrical junction box will remain throughout the life of the mine, and will be removed upon final reclamation.

41) Temporary Concrete Septic Tank

The temporary concrete septic tank facilitates the existing employees working on rotating shifts. The tanks are used in conjunction with the tanks that are a part of the bath house trailer (see #1 above) and other temporary office trailers (see #2 above). The tanks will be pumped out regularly. Multiple tanks are currently used. The locations of these tanks are shown on Plate 5-2. The temporary concrete septic tanks will be removed upon the completion of the long-term office areas and long-term bath house facilities.

MINE FACILITIES

14) Rock Dust Silo

The Rock Dust Silo is a tower silo used to store bulk rock dust for use within the mine. Rock dust is used to reduce the combustible fraction of coal dust in the air within the mine. The silo is constructed of a steel container supported by a steel frame on a concrete foundation with a 6" thick concrete pad and apron. The rock dust silo will remain throughout the life of the mine, and will be removed during final reclamation.

16) Temporary Underground Reclaim Room

The temporary underground reclaim rooms form a portion of the temporary coal handling facilities for the mine. The reclaim rooms are buried concrete and steel structures, measuring approximately 20' by 17' by 17' high. The floor, roof, and all walls, except one (1) wall, are constructed of steel reinforced concrete. The remaining wall is constructed of plate steel and steel angles, with an opening for a tubed conveyor structure. The roof of the structure has an opening and gate that allows coal to fall from the bottom of the stockpile above onto a conveyor belt for transportation to either the Crusher Building or Loadout Structure. Two (2) temporary underground reclaim rooms are currently in use. These structures are shown on Plate 5-2. At the completion of the long-term coal handline facilities' construction, the rooms will be filled with rocks and other backfill material, then left in-place after final reclamation.

17) Temporary Concrete Retaining Walls

The temporary concrete retaining walls form a portion of the temporary coal handling facilities for the mine. The walls are constructed of steel reinforced concrete, and provide support for conveyor assemblies emanating from the temporary underground reclaim rooms (see #16 above), and prevent coal stockpiles from encroaching into unwanted areas. Two (2) temporary concrete retaining walls are currently in use. Steel wide-flange posts will be embedded into the concrete wall, extending up from the retaining walls adjoining the concrete dozer trap (see #25 below) in the event that more coal storage capacity is required above the dozer trap. In this event, steel plates will be welded to the steel posts to extend the height of the retaining wall in this area. These structures are shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary concrete retaining walls will be razed.

18) Temporary Loadout Conveyors (48")

The temporary loadout conveyors are a portion of the temporary coal handling facilities for the mine. The temporary loadout conveyors move crushed coal from the temporary underground reclaim room (see #16 above) and concrete dozer trap (see #25 below) below the crushed coal storage pile to the top of the temporary loadout structures (see #20 below) in order to fill coal haulage trucks. Two (2) loadout conveyors (#1 and #2) will be utilized. The conveyors will transport coal to the Temporary Loadout #1 and #2 respectively. The conveyor structures are steel frameworks running 48" conveyor belts. A large portion of conveyor #1 is contained within a 9' diameter steel plate tube that extends underground to the temporary underground reclaim room (see #16 above). Conveyor #2 extends from the temporary concrete dozer trap (see #25 below). The temporary loadout conveyors are shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary loadout conveyors will be removed.

<u>19) Temporary Loadout MCC Building</u>

The temporary loadout MCC building is a portion of the temporary coal handling facilities for the mine. The building is the Motor Control Center (MCC) for the temporary loadout conveyor #1 (see #18 above). The structure is a steel plate building measuring approximately 6' by 16' by 8' tall. The electrical control for the conveyor motor and other electrical components for the temporary loadout assembly #1 are housed within the MCC building. The temporary loadout MCC building is shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary loadout MCC building will be removed.

<u>20) Temporary Loadout Structure</u>s

The temporary loadout structures are a portion of the temporary coal handling facilities for the mine. Two (2) temporary loadout structures will be utilized (#1 and #2). The loadout structures are wide flange steel-framed structures on concrete foundation systems, with 6" thick concrete pads and aprons. The MCC (similar to #19 above) for conveyor #2 (see #18 above) is located atop temporary loadout #2. The tops of the structures also support the motors that drive the respective temporary loadout conveyors #1 and #2 (see #18 above). Coal is transferred, via the temporary loadout conveyors, from the crushed coal stockpile to the top of the loadout structures, where it falls through a spreader assembly into coal haulage trucks below for delivery off-site. The temporary loadout structures are shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary loadout structures will be removed.

<u>21) Temporary Crusher Conveyor</u>

The temporary crusher conveyor is a portion of the temporary coal handling facilities for the mine. The temporary crusher conveyor conveys coal from the temporary underground reclaim room (see #16 above) below the ROM coal stockpile to the temporary crusher / screen building (see #22 above) for sorting and crushing. The conveyor structure is a steel framework running a 48" conveyor belt. A portion of the conveyor is contained within a 9' diameter steel plate tube that extends underground to the temporary underground reclaim room (see #16 above). The temporary crusher conveyor is shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary crusher conveyor will be removed.

<u>23) Temporary Crushed Coal Conveyor (48")</u>

The temporary crushed coal conveyor is a portion of the temporary coal handling facilities for the mine. The temporary crushed coal conveyor conveys coal from the temporary crusher / screen building (see #22 above) that has been sorted and crushed on the Upper Pad to the crushed coal stockpile on the Middle Pad. The conveyor structure is a steel framework, supported by steel bents on concrete foundations, running a 48" conveyor belt. The temporary crushed coal conveyor is shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary crushed coal conveyor will be removed.

<u>24) Temporary Crusher MCC Building</u>

The temporary crusher MCC building is a portion of the temporary coal handling facilities for the mine. The building is the Motor Control Center (MCC) for the temporary crusher / screen building (see #22 above). The structure is a steel plate building measuring approximately 6' by 16' by 8' tall. The electrical control for the conveyor motors and other electrical components for the temporary crusher / screen building are housed within the MCC building. The temporary crusher MCC building is shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary crusher MCC building will be removed.

<u>25) Temporary Concrete Dozer Trap</u>

The temporary concrete dozer trap is a portion of the temporary coal handling facilities for the mine. The structure will be composed of concrete walls with a steel roof structure. The wall facing the loadouts (north wall) will be open for the Loadout Conveyor #2 and for access to the equipment housed in the dozer trap. The roof of the structure has an opening and gate that allows coal to fall from the bottom of the stockpile above onto the temporary loadout conveyor #2 for transport Temporary Loadout #2. These structures are shown on Plate 5-2. At the completion of the long-term coal handling facilities' construction, the temporary concrete dozer trap will be removed.

27) Temporary Concrete Equipment Pad

The temporary concrete equipment pad is a portion of the temporary coal handling facilities for the mine. The pad is a 12" thick, steel reinforced concrete slab. The drive motor and take-up equipment for the temporary crushed coal conveyor (see #21 above) rest upon this concrete pad. The concrete equipment pad is shown on Plate 5-2. The concrete equipment pad will remain until final reclamation, at which point it will be buried with other concrete materials as described in the Reclamation Plan.

30) Existing ROM Coal Conveyor from Underground (60")

The ROM (Run of Mine) coal conveyor from underground is a part of the temporary AND long-term coal handling facilities for the mine. The ROM coal conveyor from underground ties into the coal conveyor system within the underground mine workings to convey mined coal from the working face to the surface. The surface portion of the ROM coal conveyor measures approximately 300' long. The assembly is a steel framework, supported by steel bents on concrete foundations, running a 60" conveyor belt. The ROM coal conveyor from underground is shown on Plate 5-2. The existing ROM coal conveyor from underground will remain through the life of the mine. The alignment and elevation of the conveyor structure are such that when the long-term coal handling system is constructed, the existing ROM coal conveyor structure will be extended to the future ROM coal stacking tube as shown on Plate 8-1. The entire assembly (existing and future) will be removed upon final reclamation.

31) Steel Portal Canopy Structure

A steel portal canopy structure is constructed at each portal of the mine. The canopy consists of steel wide flange posts and beams, and sheathed with steel plate. The canopy structure protects the portals (openings) to the underground workings. The canopies are constructed to meet MSHA regulations. Multiple steel portal canopy structures are utilized for the mine. The locations of the steel portal canopies are shown on Plates 5-2 and 5-2a, and in Appendix 5-9. The steel portal canopy structures will each remain throughout the life of the mine, or until its respective portal is no longer necessary and is sealed and reclaimed; whichever comes first. All remaining steel portal canopy structures will be removed during final reclamation.

32) Concrete Conveyor Bay at Belt Portal

The concrete conveyor bay at the belt portal is a portion of the temporary AND long-term coal handling facilities for the mine. The bay was originally used to house the belt drive for the original ROM conveyor structure, which has since been removed. The concrete conveyor bay now cradles and supports the westernmost end of the ROM coal conveyor from underground (see #30 above) at the surface. The concrete conveyor bay is shown on Plate 5-2. The concrete conveyor bay will remain in place for the life of the mine, and will be removed upon final reclamation.

34) Mine MCC Building / Electrical Tower

The Mine MCC (Motor Control Center) building is the main hub for electrical power running from the surface to the underground mine workings. Nearly all power to the underground mine equipment runs through this 21' by 12' by 11.5' tall, steel plate building. The Mine MCC building shares a concrete foundation with an electrical tower that is approximately 45.5' tall, and constructed of 10"x10" tube steel. The electrical tower receives overhead power lines extending from the Mine Substation (see above). Some power lines extend to the Main Mine Ventilation Fan (see #36 below), but most power runs to a transformer at the base of the tower, then into the Mine MCC Building for distribution to the underground mine workings. The Mine MCC Building, Electrical Tower and transformer all share a common poured concrete foundation. The Mine MCC Building / Electrical Tower assembly is shown on Plate 5-2. The Mine MCC Building / Electrical Tower will remain through the life of the mine, and the entire assembly and foundation will be removed upon final reclamation.

35) Backup Ventilation Fans

The original ventilation fans for the mine remain in-place on a concrete foundation. These fans are attached to Portal #0. When the main mine ventilation fan (see #36 below) came online, the original ventilation fans became the backup ventilation fans. The backup ventilation fans are 250 horsepower fans that will blow fresh air into the mine's underground workings in the event that the main mine ventilation fan (see #36 below) fails. The backup ventilation fans are shown on Plate 5-2. The backup ventilation fans and their respective concrete foundation will remain in-place through the life of the mine, and will be removed at final reclamation.

36) Main Mine Ventilation Fan / Electrical Tower

The main mine ventilation fan is a 1,500 horsepower blowing fan, located on the ledge that is the exposed top of the Sunnyside Sandstone, at the North Breakout of the underground workings. The fan's purpose is to blow fresh air into the underground mine workings for mine personnel throughout the mine, and to ventilate all open areas within the mine. The fan blows into Portal #2 of the North Breakout. The main mine ventilation fan rests on a poured concrete foundation that it shares with a 35' tall electrical tower, similar to the electrical tower at the Mine MCC Building (see #34 above).

Overhead power transmission lines (see #12 above) extend from the Mine MCC Building/Electrical tower (see #34 above) to provide power for the main mine ventilation fan. The main mine ventilation fan and associated concrete pad and electrical tower have been constructed to meet MSHA regulations and requirements. The location of the Main Mine Ventilation Fan is shown on Plate 5-2. The fan, electrical tower and concrete foundation will remain throughout the life of the mine, and will be removed upon final reclamation.

39) Chain Link Fencing

Six foot high chain-link fencing has been, and will be installed as shown on Plate 5-2. The fencing will be constructed to protect the public and wildlife from the Mine Substation (see above) and along sections of County Road RS-2477, along the western edge of the permit boundary. The fencing will remain throughout the life of the mine, and will be removed upon final reclamation.

43) Temporary Conveyor Counterweight Structures

The temporary conveyor counterweight structures add weight to conveyor belts to keep them taut during operation. The Temporary Loadout Conveyors (see #18 above) and the Temporary Crusher Conveyor (see #21 above) each have a temporary conveyor counterweight structure. The structure is constructed of a steel framework that guides the counterweight for the respective conveyor. The structure rests on a 12" thick, steel reinforced concrete slab. The locations of the temporary conveyor counterweight structures are shown on Plate 5-2. Upon the completion of the long-term coal handling facilities' construction, the temporary conveyor counterweight structures will be removed.

44) Jersey Barrier Guard Rails

A Jersey Barrier is a prefabricated, modular concrete barrier used to guide vehicular traffic and minimize damage in cases of incidental contact. When placed end-to-end, these barriers prevent vehicles from running off designated roadways. Jersey barrier guard rails are installed according to MSHA requirements. The locations of the jersey barrier guard rails are shown on Plate 5-2. The jersey barrier guard rails will be utilized throughout the life of the mine and will be removed upon final reclamation.

45) Concrete Trash Chute

The concrete trash chute is used for deposition and storage of trash until the refuse can be hauled to a nearby State-approved solid waste disposal area (landfill). The trash chute is constructed of concrete walls and floor; open at one end to allow for vehicles to dump and remove trash as necessary.

Chain link fencing will be stretched horizontally across a portion of the top of the chute to prevent the wind from blowing lighter pieces of trash out of the enclosure. The location of the Concrete Trash Chute is shown on Plate 5-2. The concrete trash chute will remain through the life of the mine, and will be removed upon final reclamation.

46) Gantry Lift Assembly

The Gantry Lift Assembly is a stationary assembly consisting of two (2) lifting crane structures, working together to lift heavy equipment and machinery from a trailer that cannot be lifted by other equipment (i.e. a forklift or other mobile machinery). Each of the lifting crane structures is rated for forty (40) tons. A set of two poured, steel reinforced concrete footing and foundations will support the legs of both crane structures. Each footing and foundation assembly will extend approximately forty (40) feet in length. The location of the Gantry Lift Assembly is shown on Plate 5-2. The Gantry Lift Assembly will remain through the life of the mine, and will be removed upon final reclamation.

SUPPORT FACILITIES

Mine Facilities Access Road / Truck Loadout Road

The mine facility road, shown on Plate 5-2, begins at the edge of County Road 164 (Lila Canyon Road), and allows for access to the Lower Pad and the temporary loadout structure (see #20 above). The road has been located in the most practical location taking into consideration grade, stability, and alignment. Employees will use this road to access the office & bathhouse facilities on the Lower Pad. Coal haul trucks use this road to access the temporary truck loadout (see #20 above) on the Middle Pad. All supplies will be hauled on a short portion of this road from the Lower Pad and Storage Area Pad to the slope access road. The road is paved with crushed granite and is regularly watered with a sprinkler system in order to minimize dust and provide a good surface for heavy truck traffic, as well as facility access. The facility access road is approximately 30' wide to provide for two-lane traffic, and has the appropriate drainage controls to insure long term life and low maintenance. The road has been constructed according to the appropriate R645-534 and R645-527 regulations. The road will remain throughout the life of the mine, and will be removed upon final reclamation.

Rock Slopes

Access to the underground workings of the Lila Canyon Mine is provided through two rock slopes driven from the top of the Mancos shale, sloping up to the intersection of the coal seam. One portal provides access for men, equipment and material to the mine. The second access slope contains the

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underground portion of run-of-mine belt line that attaches to the existing ROM Coal Conveyor from Underground at the surface (see #30 above) that transports mined coal to the run of mine stock pile at the Upper Pad. The two rock slopes incline upward at approximately 12%, from a starting elevation of approximately 6150'. The intersection of the coal seam and the rock slope takes place at approximately the 6,300 feet elevation. The lengths of the slopes were minimized by taking advantage of the coal seam dip which is approximately 12% to the east. The rock material removed from the slopes has been used as fill material for the pads of the surface facilities. The rock slope material / underground development waste contains mostly shale, sandstone and mudstone. Small traces of coal may be found, but the amount is insignificant. There are no known coal seams or significant rider seams found below the Sunnyside Seam in the Lila Canyon Portal Area. The rock slope and rock slope material fill locations are shown on Plate 5-2. The rock slopes will be sealed at the portals according to MSHA regulations at the completion of mining operations, and reclaimed per the Reclamation Plan.

Sediment Ponds

The sediment ponds have been designed to provide for adequate sediment protection for the project area. Surface water running off disturbed areas will be routed into the sediment ponds. The sediment ponds have been designed according to the appropriate R645 regulations, and the designs can be found in Appendix 7-4, and Plates 7-6a and 7-6b. Because the sediment ponds do not meet the requirement of 30 CFR 77.216(a), an MSHA number for the sediment ponds is not required. Sediment Pond #1 is located on the southwest corner of the property. Sediment Pond #2 is located on the northwest corner of the property. Both ponds are shown on Plate 5-2. Please refer to Chapter 7 for detailed information on drainage reporting to both ponds. Both sediment ponds will remain through the life of the mine, and will be removed during final reclamation according to the approved reclamation plan.

Slope Access Road / Portal Access Road

The slope access road connects to the facility access road near the northeast corner of the Middle Pad, and follows an alignment that takes into consideration grade and direct access. The slope access road is used to provide access to the rock slopes (see above), which in-turn provides access to the underground workings. The slope access road is used as access for all men, material and equipment needed within the mine. Since the slope access road provides for frequent access for men, equipment and materials for a period of six months or longer, the slope access road is classified as a primary road and will be paved. The slope access road has been designed, constructed, and maintained according to appropriate R645 regulations. The slope access road is shown on Plate 5-2. The slope access road will remain throughout the life of the mine, and will be removed during final reclamation.

New Storage Pad

A new supply and materials storage pad will be constructed directly south of the Mine Substation (see above), but within the existing disturbed boundary line as shown on Plate 5-2. The new pad will be constructed similarly to the existing Lower, Middle and Upper Pads (see Chapter 2, Section 232.500), with a gravel covering. The new storage pad is needed so large trucks delivering and/or collecting materials and supplies will not congest the parking and supply areas already in-place on the Lower Pad, or interfere with the Mine Facilities Access Road / Truck Loadout Road (see above) and trucks preparing to load coal or loaded trucks hauling coal from the mine site. Moving the delivery trucks to the new storage pad will reduce vehicular congestion, and decrease the possibility of accidents resulting from said congestion. The new storage pad will be utilized throughout the life of the mine, and will be reclaimed per the Reclamation Plan.

New Storage Pad Access Road

The new storage pad access road will extend from the Middle Pad to the New Storage Pad (see above), which lies just south the Mine Substation (see above). The new storage pad access road will be used to provide access between the two pads for mine personnel, equipment and supplies. Since the new storage pad access road will provide access for men, equipment and materials for a period of six months or longer, the new storage pad access road is classified as a primary road, and will be paved. The new storage pad access road has been designed and will be constructed and maintained according to appropriate R645 regulations. The new storage pad access road is shown on Plate 5-2. The new storage pad access road will remain throughout the life of the mine, and will be removed upon final reclamation.

New Storage Pad Service Road

The new storage pad service road, shown on Plate 5-2, will begin at the edge of County Road 164 (Lila Canyon Road), and will allow for access to the new storage pad (see above) directly south of the Mine Substation (see above). The first approximately 350 feet of the new storage pad service road from County Road 164 (Lila Canyon Road) will be a reworking of the existing County Road RS-2477. The new storage pad service road will then continue to the new storage pad (see above). The new storage pad service road will be approximately 30 feet wide and provide access for trucks to deliver and/or collect supplies, materials or equipment related to mine activities, without increasing congestion on the mine facilities access road / truck loadout road (see above). Since the new storage pad service road will provide access for men, equipment and materials for a period of six months or longer, the new storage pad service road is classified as a primary road, and will be paved. The new storage pad service road has been designed and will be constructed and maintained according to appropriate R645 regulations. The new storage pad service road is shown on Plate 5-2. The new storage pad service road will be removed during the course of construction of the long-term coal handling facilities. The portion of the new storage pad road that lies along the existing County Road RS-2477 may remain or be reclaimed. The BLM and Emery County will be consulted when appropriate, and the Division will be advised as to the course of action for the roadway (remain or be reclaimed). Access to the new storage pad (see above) will be rerouted through the new truck loadout road when the long-term truck loadout road is completed. When this happens, the existing truck loop will become the new truck loading/unloading area per Plate 8-1 for the future warehouse on the Upper Pad.

Topsoil Pile

The topsoil pile has been located on the southwest end of the surface facilities. The pile has been designed to contain adequate topsoil for redistribution according to the reclamation plan found in Chapter 5. The proposed location provides for good protection from wind contamination, as well as protection from mine related activities. The location of the topsoil pile is shown on Plate 5-2. The topsoil will be redistributed across the disturbed area according to the mine reclamation plan.

6) Temporary Concrete Walkway

Temporary concrete walkways have been constructed at temporary buildings, the temporary bath house (see #1 above) and temporary office trailers (see #2 above). The walkways are generally 6' wide by 4" thick. The locations of the temporary concrete walkways are shown on Plate 5-2. The temporary concrete walkways will be removed as their respective temporary buildings are removed.

15) Temporary Fuel Storage Tanks

The temporary locations of the fuel storage tanks are on the Middle Pad as shown on Plate 5-2. The tanks are bulk fuel storage tanks containing gasoline or diesel fuel for mine vehicles. The tanks are supported by steel legs above integral steel secondary containment basins. Upon completion of the long-term surface facilities' construction, the fuel tanks will be relocated to their long-term location on the Upper Pad, as shown on Plate 8-1. The fuel tanks will remain in their long-term locations for the life of the

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mine, and will be removed upon final reclamation.

29) Sediment Pond Spillway Structure

As shown on Plate 5-2, and in Chapter 7, Sediment Ponds #1 and #2 each have a spillway structure constructed of corrugated metal pipe to allow for surplus water to exit the respective pond. Each spillway is equipped with an oil skimmer structure. See Plates 7-6a and 7-6b for detailed drawings. The sediment pond spillway structures will remain throughout the life of the mine and will be removed during final reclamation.

38) Powder and Cap Magazines

Powder and cap magazines will be mobile, temporary, and supplied by the explosive distributer. Upon reclamation, the powder and cap magazines will be returned to the distributer.

42) Temporary Loadout Light Board

The temporary loadout light board consists of a free standing metal post pedestal with traffic control lights for the temporary loadout structure (see #20 above). The pedestal is mounted upon a steel reinforced concrete pad. The lights provide information to coal haul truck drivers as coal is loaded into their trucks at the temporary loadout structure. The temporary loadout light board location is shown on Plate 5-2. Upon the completion of the long-term coal handling facilities' construction, the temporary light board and concrete support pad will be removed.

Long-Term Underground Pipes

The locations of the long-term underground pipes have yet to be determined. Once detailed engineering design is completed, the underground pipes will be added to Plate 5-2, or other appropriate plates as required. Long-term underground pipes will be abandoned and left in place upon final reclamation.

Culverts

A complete list and design for the culverts can be found in Appendix 7-4, Tables 9 and 10; and are shown on Plate 7-5. A summary of the culverts follows:

Culvert	Length	Size
DC-1	72'	24"
DC-2	60'	18"
DC-3	65'	18"
DC-4	400'	24"
DC-5	350'	24"
DC-6	107'	24"

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DC-7	155'	24"
DC-8	167'	24"
DC-9	186'	24"
DC-10	60'	24"
DC-11	101'	24"
DC-12a	140'	24"
DC-12b	79'	24"
DC-12c	357'	24"
DC-12d	9'	24"
DC-13	60'	24"
DC-14	40'	24"
DC-15	45'	18"
DC-16	25'	18"
DC-17	120'	18"
DC-18	27'	18"
SP2-1	165'	18"
UC-1	480'	60"

As per the approved Air Quality Order and R645-201-534.300, all primary roads will be paved or surfaced with rock, crushed gravel, asphalt or other approved material. Roads and pad areas used by mobile equipment will be treated with water or other dust suppressant. Open stockpiles will be watered as conditions warrant.

521. Included in this section are maps, cross sections, narratives, descriptions and calculations used to satisfy the relevant requirements. This section describes and identifies the lands subject to coal mining and reclamation operations covering the estimated life of the project.

521.100 This application includes the cross sections, maps and plans needed to present the relevant information required by the Division. This information includes the following:

521.110. Plate 5-1 Shows area previously mined and approximate dates of mining.

521.111 Plates 5-1 and 2-2 show the location and extent of known workings of inactive, or abandoned underground mines. The surface portals or mine openings to the surface are shown. Plates 5-1 and 2-2 have been prepared and certified by or under the direction of a registered professional

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engineer.

Doelling lists several coal mines and mining activity within or adjacent to the permit area. Doelling lists the Calkins prospect, the Lila Canyon prospect, and the Prentiss prospect. In addition, Doelling lists several coal mines: Prentiss, Utah Blue Diamond, Blue Diamond and Heiner Mines. The research has shown that the Prentiss, Utah Blue Diamond, Blue Diamond and Heiner Mines were engulfed by the Book Cliffs mine. The Lila Canyon prospect refers to the old Lila Canyon mine fan portals used to ventilate the Geneva (Horse Canyon) mine. The Calkins prospect is believed to have been engulfed by the Geneva mine.

An outcrop fire has been detected in an area north of the exiting permit area "A." The fire is off the permit area and located in an area that has been sealed from the old horse canyon works. The outcrop fire is not anticipated to cause any problems with mining at the Lila Canyon Mine.

521.112 No surface mined areas are found within the permit area. Therefore, this section does not apply.

521.120 Three existing structures, a 48" and a 60" CMP culvert located near the new proposed sediment pond, and the Little Park Road can be found at the Lila Canyon Mine. The existing culverts are shown on plate 5-1A and the road on Plate 5-1. Existing Horse Canyon facilities are discussed in part "A" of this plan, and used for historical purposes only.

521.121 There are no buildings within 1000 feet of the proposed permit area, except those used as a part of the Lila Canyon mining operation.

521.122 There are no subsurface man-made features, other than the culverts discussed in 521.200, within, passing through, or passing over the proposed permit area.

521.123 Plate 4-1, as well as others, shows the existing County Road 126 which is located partly within 100 feet of the proposed permit area. In addition, the Little Park road is located above the surface facilities within the permit area. The Little Park Road is also shown on plate 4-1

521.124 There are no known existing areas of spoil, waste, coal development waste, or non-coal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities, except those used as part of the mining operation.

521.125 There are no existing sedimentation ponds, permanent water impoundment, coal processing waste banks or coal processing waste dams near or within the permit area.

521.130 Landowner and right of entry maps are included in the permit application. These maps and cross sections show the following:

521.131 Plate 4-1 shows the surface ownership and Plate 5-4 shows the coal ownership of land included in or contiguous to the permit area.

521.132 The applicant has the legal right to enter and begin coal mining and reclamation operations on all areas shown within the permit area. The permit area is shown on Plates 5-3 and 5-4 as well as others.

521.133 Coal mining or reclamation operations are planned within 100 feet of a public road. There are no plans to relocate public roads.

521.133.1 Emery County has given permission to conduct coal mining or reclamation operations within 100 feet of the county road. (See Appendix 1-4)

521.133.2 The current permit does not propose any relocation of public roads. Therefore, this section is not applicable.

521.140 Mine maps and permit area maps and/or cross-sections will clearly indicate the following:

521.141 Plate 5-1 shows the permit boundary and Plate 5-2 shows the disturbed area boundary. Additional subareas that might require additional permits are addressed in Section 112.800 and 4-1B.

521.142 The underground workings are shown on Plate 5-5.

521.143 The proposed disposal site for placing the slope rock is shown on Plate 5-2 as well as other appropriate plates.

521.150 Plates 6-2, 6-3, and 6-4, show surface contours that represent the existing land surface configuration of the proposed permit area.

521.151 The Plates show the surface contours for all areas to be disturbed as well as over the total permit area. The Plates showing the surface contours have been prepared by or under the supervision of a registered engineer.

521.152 No previously mined areas are included within Part "B." Therefore, this section does not apply.

521.160 The maps, plates, and cross sections associated with this chapter clearly show:

521.161 Proposed buildings, utility corridors, and facilities are shown on Plates 5-2 and 8-1, as well as others.

521.162 The area of land affected according to the sequence of mining and reclamation is shown on the appropriate plates.

521.163 Land for which a performance bond will be posted is shown on the appropriate plate. Plates 5-2 and 8-1, as well as others, show the area for which the performance bond will be posted. All disturbed areas within the permit boundary have been bonded.

521.164 Existing coal storage and loading areas are shown on Plates 5-2 and certified as required. Future coal storage and loading areas are shown on Plate 8-1 and certified as required. Additional information can be found in Appendix 5-4.

521.165 Topsoil and waste piles are shown on Plate 5-2, as well as others.

521.166 The waste disposal areas are shown for non-coal waste and underground mine waste on Plate 5-2.

521.167 No explosives are expected to be stored on-site. However, if explosives are stored, they will be stored as discussed in Section 520. on Plate 5-2.

521.168 Since Lila Canyon mine is an underground operation, this paragraph is not applicable.

521.169 The refuse pile is shown on Plate 5-2 and discussed in Appendix 5-7.

521.170 Transportation facility maps describing roads and conveyors maintained within the permit are shown with descriptions of roads, embankments, culverts, and drainage structures are presented in section 520 and are shown on Plates 5-2, 7-2, and 7-5.

521.180 Support facilities are described in section 520 and are shown on Plate 5-2. Plate 5-2 is the official disturbed area boundary map.

521.190 Other relevant information required by the Division will be addressed.

521.200 Signs and markers will:

521.210 Signs and markers will be posted maintained, and removed by the person who conducts the coal mining and reclamation operations.

521.220 Signs and markers will be of uniform design that can be easily seen and read and be made of durable material and conform to local laws and regulations.

521.230 Signs and marker will be maintained during all activities to which they pertain.

521.240 Mine and Permit Identification Signs.

521.241 Mine and permit identification signs will be displayed at each point of access from public roads to areas of surface operations and facilities on permit areas.

521.242 Since Lila Canyon Mine is an underground operation, this section is not applicable.

521.243 Mine and permit identification signs, where required, will show the name, business address, and telephone number of the permittee and the identification number of the permanent program permit authorizing coal mining and reclamation operations.

521.244 Mine and permit identification signs will be retained and maintained until after the release of all bonds for the permit area.

521.250 Perimeter Markers

521.251 The perimeter of all areas affected by surface operations or facilities before beginning mining activities will be clearly marked with perimeter markers.

521.252 Since Lila Canyon Mine is an underground operation, this section is not applicable.

521.260 Buffer Zone Markers

521.261 Signs will be erected to mark buffer zones as required and will be clearly marked to prevent disturbance by surface operations and facilities.

521.262 Since Lila Canyon Mine is an underground operation, this section is not applicable.

521.270 Topsoil Markers will be erected to mark where topsoil or other vegetation-supporting material is physically segregated and stockpiled.

522. Coal Recovery

Additional Details can be found in the R2P2 on file at the BLM Office.

Effective barrier and pillar designs are essential for safe and productive underground mining. Barrier pillars will be sized according to accepted engineering practices. One or more of the following methods may be used to properly size barrier pillars: Dunn's Rule, the Old English Barrier Pillar Law, Pennsylvania Mine Inspector's Formula, Ash and Eaton Impoundment Formula, Pressure Arch Method, British Coal Rule of Thumb, North American Method, Holland Rule of Thumb, or Holland Convergent Method.

Regardless of the methods or care taken to properly size barrier pillars, the true effectiveness on any design can only be determined by conducting full-scale in-mine performance evaluations. Mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

Barrier pillars will be utilized to isolate the abandoned Horse Canyon Mine from the new Lila Canyon Mine. Barrier pillars will also be used to simplify ventilation, to provide independent escape routes, and to possibly retain large quantities of mine water. Barrier pillars will be employed along the outcrop in order to maintain ventilation courses.

A barrier pillar, where no second mining will be allowed within the barrier, will be used to protect the escarpments. The width of the escarpment barrier will be determined by implementing a 21.5° angle of draw projected, downward from the surface to the coal seam. Development mining, or first mining, will be allowed within the escarpment barrier.

For longwall mining applications, the abutment loading is of prime importance. Initial longwall pillars will be designed using the ALPS method. Again, mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

Mine pillars will be sized taking into consideration the coal strength, depth of cover, width and height of pillars, using one or more of the following methodologies: Obert-Duvall, Holand-Graddy, Holland, Salamon-Munro, or Bieniawski. Again, mine experience and history in the local area will have as much influence on pillar sizes as does the engineering formulas.

523. Mining Methods:

Mining will begin in Section 15, T16S, R14E, in the Sunnyside seam. Development of the Sunnyside seam will be in a down dip direction toward the east. The seam will be accessed by two 1,200 foot slopes driven up at 12% from the base of the cliffs.

Production during the first year is estimated to be 200,000 tons. The second through the fifth year production should be between 1,000,000 and 1,500,000 using continuous mining methods. If and when tonnage demand increases to justify longwall mining, production could peak as high as 4,500,000 tons a year and continue at that level for the life of the mine.

Mine production will begin with the slope construction. Once the coal is encountered, development will continue using continuous miners and various haulage types. Battery, cable, or continuous haulage may be used in conjunction with continuous miners in development. Continuous miners will account for all the production during the first two to five years. Mining will consist of driving mains, developing room and pillar panels and gate entries for future longwall mining.

The majority of the second mining will be performed using longwall equipment. However, in isolated areas room and pillar type of mining may be used in areas not suitable for longwall mining. Longwall panels are sited approximately parallel lengthwise to the strike with a slight up dip orientation to provide drainage for the development faces. This practice will be applied to the continuous miner panels wherever possible. (See plate 5-5)

Roof control and ventilation plans will be submitted to MSHA and approved prior to any underground mining activities.

An air quality permit from the State Division of Air Quality has been obtained and will be modified as needed.

Ventilation of the mine will be by an exhaust and/or blowing type system. It has been estimated that 900,000 cfm will be required at full production. Intake air will be supplied by slopes and entries from the surface.

A water supply system will be installed. Potable water from an approved source will be hauled by truck and stored in a mine site storage tank located near the man and coal slope portals. Alternative sources for potable water are being considered. A treatment plant may be indicated. Process water will be hauled from the Price River or other approved source by truck and stored in another mine site storage tank. It is anticipated that once the old two entry development panel is encountered, adequate process water may be obtained from the old works. This process water will provide for dust control, water to the mine and fire suppression. Mine water will be used with the process water. See Appendix 7-3 (PHC) for water usage calculations.

Dust suppression will be accomplished by the use of sprays on all underground equipment as required. Sprays will also be used along sections of the conveyors and at transfer points.

No major de-watering concerns are anticipated at this property. The workings are expected to produce some water with more water being produced as the depth of mining increases. Part of this water will be used for dust suppression. The remainder will be collected in sumps and pumped to mined out sections of the mine or to the surface and treated when necessary.

Underground mining equipment to be used at Lila Canyon is typical of most room-and-pillar and longwall mines. A list of major equipment which may be used underground is listed below. Additional equipment not on the list may be used as needed.

Continuous Miners
Roof Bolters
Battery Shuttle Cars
Electric Shuttle Cars
Diesel Ram Cars
Feeder Breakers
Continuous Haulage Units
Battery Scoops
Diesel Scoops
Diesel Service Vehicles
Diesel Material Haulers
Diesel
Belts and Terminal Groups
Battery and Diesel Man Trips
Longwall Shields
Longwall Pan-lines
Longwall Shears
Longwall Stage-loaders
Longwall Pumps
Various Water Pumps
Various Transformers and Switches
Rock Drills
Loaders

523.100 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine. Therefore, this section is not applicable.

523.200 No Surface Coal Mining and Reclamation Activities are proposed with 500 feet of an underground mine. Therefore, this section is not applicable.

523.210 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine. Therefore, this section is not applicable.

523.220 No Surface Coal Mining and Reclamation Activities are proposed to be conducted within the permit area within 500 feet of an underground mine. Therefore, this section is not applicable.

524. Blasting and Explosives: Surface blasting activities incident to underground coal mining are planned for the Lila Canyon mine during construction of the access slopes only.

524.100 Steps have been taken to achieve compliance with the blaster certification program and are described in this permit application.

524.110 Surface blasting involving 5 lbs. of explosives or more will be done under the direction of a certified blaster.

524.120 Blasting certificates will be carried by the blasters or will be on file at the permit area during blasting operations.

524.130 The blaster and at least one other person will be present at the firing of a blast.

524.140 Persons responsible for blasting operations at a blasting site will be familiar with the blasting plan, if required, and site-specific performance standards and give on-the-job training to persons who are not certified and who are assigned to the blasting crew or assist in the use of explosives.

524.200 Since the planned blasting does not meet the requirements of 524.211 or 524.212, a blast design is not included in the permit application. If, in the future, blasting falls under section 524.200, then a plan will be submitted to Division for approval.

524.210 Since the planned blasting does not meet the requirements of 524.211 or 524.212, anticipated blast designs are not required.

524.300 Since planned blasting requires more than 5 lbs. of explosives, the preblasting survey is addressed where applicable in this permit application.

524.310 There are no dwellings or other structures located within one-half mile of the permit area owned by anyone but the operator. The operator will prepare the preblast survey if required. Notification procedures implied in this section are not applicable.

524.320 Since the operator is the only owner of structures and no dwelling exists within one-half mile of any part of the permit area, this section is not applicable.

524.330 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.340 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.350 Because the operator is the only owner of structures or dwellings within one-half mile of any part of the permit area, this section is not applicable.

524.400 The blast schedule is as follows:

524.410 Since there are no residents within one-half mile of the projected blasting site, this section does not apply.

524.420 All surface blasting will be conducted between sunrise and sunset, unless nighttime blasting is approved by the Division.

524.430 Since there are no residents within one-half mile of the projected blasting site, this section does not apply.

524.440 Since there are no residents within one-half mile of the projected blasting site, a flexible blasting schedule is allowable. Surface blasting may take place anytime during daylight hours, unless approved differently by the Division.

524.450 Because of the remote location of the Lila Canyon Mine, over six miles from the nearest locality (Columbia), this section does not apply.

524.460 Since the town of Columbia is the nearest locality and is over six miles distance from the permit area, this section does not apply.

524.500 The blasting signs, warnings and access control are described below.

524.510 Blasting signs will meet the specifications of R645-301-521.200. The following will apply.

524.511 Signs reading "Blasting Area" will be conspicuously place at the point where any road provides access to the blasting area.

524.512 The signs posted at all entrances to the permit area from public, roads, or highways will be placed in a conspicuous location and will state "Warning! Explosives in Use," and will clearly list and describe the meaning of the audible blast warning and all clear signals that are in use.

524.520 Audible warning and all-clear signals of different character or pattern will be given. Each person within the permit area will be trained in the meaning of the signals.

524.530 Access within the blasting area will be controlled until the operator has reasonably determined the following:

524.531 No unusual hazards, such as imminent slides or undetonated charges, exist; and

524.532 Access to and travel within the blasting area can be safely resumed.

524.600 Adverse blasting effects are described as follows:

524.610 Blasting will be conducted to prevent injury to persons, damage to public or private property outside the permit area, adverse impacts on any underground mine, and change in the course, channel, or availably of surface or ground water outside the permit area.

524.620 Airblast Limits

524.621 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.622 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.630 Monitoring: Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.640 Ground Vibration: Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance form the permit area, this section does not apply.

524.650 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

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524.660 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.670 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.680 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.690 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, sections 524.620 through 524.632 and 524.640 through 524.680 do not apply.

524.700 Records of blasting operations will be maintained at the mine site for at least three years, and will be available for inspection by the Division or the public.

524.710 Blasting records will include:

524.711 The name of the operator will be on the blasting record.

524.712 The location, date, and time of the blast will be recorded on the blasting record.

524.713 The name, signature, and certification number of the blaster will be recorded on the blasting record.

524.720 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, this section does not apply.

524.730 Weather conditions will be recorded on the blasting record.

524.740 A record of the blast will include the following:

524.741 The type of material blasted will be recorded on the blasting records.

524.742 Sketches of the blast pattern including number of holes, spacing, burden, decks, and delay pattern will be recorded on the blasting record.

524.743 The diameter and depth of holes will be recorded on the blasting record.

524.744 The type of explosives used will be recorded on the blasting record.

524.745 The total weight of the explosives used per hole will be recorded on the blasting record.

524.746 The maximum weight of explosives detonated in an eight-millisecond period will be recorded on the blasting record.

524.747 Information on the initiation system will be recorded on the blasting record.

524.748 The type and length of the stemming will be recorded on the blasting record.

524.749 Mats or other protections used will be recorded on the blasting record.

524.750 Since all structures are either owned by the permittee and not leased to another person, or are located over six miles distance from the permit area, a record of seismographic and airblast information is not required.

524.760 Since a blasting schedule is not required, this section does not apply.

524.800 The operator will comply with the various appropriate State and Federal laws and regulations in the use of explosives.

525. Subsidence: The permittee will comply with the appropriate R645-301-525 requirements.

525.100 Subsidence Control Plan

525.110 Plate 5-3 shows the location of State appropriated water and Plate 5-3 (Confidential) shows the eagle nests that potentially could be diminished or interrupted by subsidence.

525.120 SUBSIDENCE POTENTIAL

A review of renewable resources in and adjacent to the permit area found resources consisting of ground water, grazing, timber, and recharge areas. Subsidence from underground coal mines has been believed to affect overlying forest and grazing resource lands in the following ways:

o Formation of surface fissures which intercept near surface soil moisture thus draining the water away from the root zone with deleterious effects.

o Alterations in ground slope and destabilization of critical slopes and cliffs.

o Modification of surface hydrology due to the general downward migration of surface water through vertical fractures.

o Modification of groundwater hydrology including connection of previously separated aquifers, reduction in flows of seeps and springs which rely upon tight aquitards for their flow, and changes in recharge mechanisms.

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o Emissions of methane originating from the coal seam through open fissures to the surface or at least the base of the surficial soil which has been known to have deleterious effects on woody plants.

Because these renewable resources exist with and adjacent to the permit area, a subsidence control plan is required. This plan is presented in Section 525.400.

A great deal of baseline data is available from many mining settings to develop subsidence damage criteria for surface structures (Bhattacharya et al. 1984). The formation of cracks and fissures are the general effects of subsidence and can have minor deleterious effects on groundwater resources without any fissuring to the surface. In the arid areas of Utah, impacts to and modification of the groundwater regime can be disruption of flow from natural seeps and springs which rely on the permeability contrast of interbedded sandstones and shale for their flows. These water resources are generally near surface occurrences and are essentially surface waters and subject to the same limiting damage criteria as surface water bodies. Subsidence damage to surface water bodies has been studied by a number of workers including Dunrud (1976), Wardell and Partners (1976), and U.S. Bureau of Mines (1977). The result of the Wardell and Partners studies of subsidence effects in a number of countries indicates that the limiting strain for the onset of minor impacts to surface waters is approximately 5×10^{-3}. The SME Mining Engineering Handbook also suggests a limiting extension strain value of 5×10^{-3} for pasture, woodland, range or wildlife food and cover.

Table 10.6.19 in the Mining Engineers Handbook suggests that the minimum safe cover required for total extraction of the coal resources under surface waters is approximately 60 times the seam thickness for coal beds at least 6 feet thick or approximately 450 feet. In their review of the foregoing, Singh and Bhattacharya (1984) recommended that the same limiting safe strain values and cover thickness ratios be used for protecting groundwater resources and recharge areas over coal mines. Where extension strain is greater than this limiting value, it is likely that surface fissures and cracks may develop. As the strain value decreases below the limiting value, the potential for surface damage decreases.

Figure 1 in Appendix 7-3 shows a typical subsidence profile. As shown in Figure 1, the zones are: a caved zone that occurs in the six to 10 times the thickness of the coal seam, a fractured zone which occurs 10 to 30 times the thickness of the coal seam, and deformation zone which occurs 30 to 60 times the thickness of the coal seam, and finally, a soil zone which occurs on the ground surface. The cover thickness of 1,000 to over 2,000 feet, over most of the mine area is also much greater than the limiting thickness of 630 feet recommended by International Engineers Inc. (1979) (10.5' x 60).

The Lila Canyon mine will be a longwall operation. As projected, 15 longwall panels at various depths will be mined. The longwall panels are laid out with the gate roads running along the strike roughly north-south, which will result in the longwall shear cutting up and down the dip. The depth of cover over the longwall panels approaches but never gets less than 500 feet toward the southwest and increases to over 2500 feet in the northeast. Only three of the 13 planned longwall panels are under less than 1,000 feet of cover. The remaining 10 panels are under 1,000 plus feet of cover. Maximum subsidence is expected to be approximately 9.5 feet in the areas approaching 500 feet of cover and less than 3' in the deeper cover areas. Extension strain varies from 12.4 $\times 10^{-3}$ in the 500 foot cover areas to .9 $\times 10^{-3}$ in the 2,500 foot cover areas. Extension strain values of 5.0 $\times 10^{-3}$ and above occurs in areas of approximately 1000' of cover and less.

A typical longwall panel at the Lila Canyon Mine will have dimensions of approximately 950 feet wide and up to 7,000 feet long and 2,000 feet deep. Using the methods described in the National Coal Board's *Subsidence Engineers' Handbook,* the S/m ratio for this geometry would be 0.38 where "S" is the maximum subsidence and "m" is the seam extraction thickness. For an average seam extraction thickness of 10.5 feet, the total subsidence would be 4.0 feet. However, as described above, the major impacts of this subsidence are due to extension strains and not total vertical subsidence. The prediction of average extension strain is accomplished with the use of the formula:

$+E = 0.75\ S/h$ where S=subsidence, and h=depth of cover

NOTE: The .75 factor is only an average. The factor changes with various w/h ratios. Figure 15

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found in NCB's Subsidence Engineers Handbook takes into account the w/h ratio.

The solution of this equation for the Lila Canyon Mine configuration discussed above produces a predicted, average extension strain of 1.5×10^{-3} which is less than the limiting strain of 5×10^{-3} for protecting surface waters, groundwater sources, pasture, woodland, range or wildlife food and cover. Thus, it is unlikely that the gradual compression expected over much of the subsidence area will have any deleterious effects on the overlying renewable surface resources.

The table below shows the expected subsidence amounts and expected extension strain for longwall panels at various mining depths. These calculations were done for a flat multiple seam mining. There are adjustments for single seam mining and for dipping seams. However, these adjustments are minor and are not expected to result in significant changes in values.

Maximum Subsidence & Expected Extensive Strain (NCB 1975)

	Feet	Meters
Panel Width =	900	274
Seam Height =	10.5	3

Depth of Cover		Width to Depth (a)	Maximum Subsidence (S)		NCB Fig. 15 Factor	Extension Strain (E)
Feet	Meters	Ratio	Feet	Meters	Factor	x 10^{-3}
500	152	0.9	9.5	2.9	.65	12.4
1000	305	0.75	7.9	2.4	.66	5.2
1100	335	0.71	7.5	2.3	.68	4.6
1200	366	0.68	7.1	2.2	.70	4.1
1300	396	0.65	6.8	2.1	.70	3.7
1400	427	0.59	6.2	1.9	.75	3.3
1500	457	0.54	5.7	1.7	.78	3.0
2000	610	0.38	4.0	1.2	.82	1.6
2500	762	0.28	2.9	0.9	.80	0.9

The most favored technique until recently has been the use of the empirical charts developed by the National Coal Board (NCB). The above calculations were obtained using the empirical charts developed by the National Coal Board (NCB). Comparisons, as stated in the SME handbook, of US subsidence data with NCB predictions highlight the following differences between coalfields in the US and UK: Most of the studies in the US are limited to the Eastern US coalfields with a very limited data base applicable to western conditions.

With the exception of Illinois, maximum subsidence factors observed in US coalfields are less than predicted by NCB.

The limit (draw angles in the US coalfields tend to be less then the 35 degree value generally accepted by NCB.

The points of inflection of the subsidence profiles over US coal mines are generally closer to the panel centerline compared to the NCB profile. This effect is dependent not only on the percentage of competent strata in the overburden but also on their locations relative to the ground surface and their thickness.

Surface strains and curvatures observed over US longwall panels have been shown to be significantly higher then NCB predictions, almost four times larger in many cases.

The pace at which subsidence occurs depends on many controls including the type and speed of coal extraction, the width, length and thickness of the coal removed, and the strength and thickness of the overburden. Observations of subsidence by Dunrud over the Geneva and Somerset Mines indicate that subsidence effects on the surface occurred within months after mining was completed, and the maximum subsidence was essentially completed within 2 years of the completion of retreat mining.

Dr. Roy Sidle found in his study of Burnout Creek that subsidence impacts to streams are temporary and self healing.

The Sidle Study is representative of the conditions found in the Lila area because:

- the lithology is very similar between the Book Cliffs and the Wasatch Plateau
- the cover thickness ranges from 600 - 800 feet which falls within the rage expected at Lila, and
- the seam thickness of 8-10 feet is in the same range expect at Lila.

An Executive Summary of his study and published findings follows:

Title : Stream response to subsidence from underground coal mining in central Utah

5. Authors: Sidle-RC Kamil-I Sharma-A Yamashita-S

Short-term geomorphic and hydrologic effects of subsidence induced by longwall mining under Burnout Creek, Utah were evaluated. During the year after longwall mining, 0.3-1.5 m of subsidence was measured near impacted reaches of the mountain stream channel. The major channel changes that occurred in a 700-m reach of Burnout Creek that was subsided from 1992 to 1993 were: extent glides; (2) increases in pool length, numbers and volumes; (3) increases in median particle diameter of bed sediment in pools; and (4) some constriction in channel geometry. Most of the changes appeared short-lived, with channel recovery approaching pre-mining conditions by 1994. In a 300-m reach of the South Fork drainage that was subsided from 1993 to 1994, only channel constriction was observed, although any impacts on pool morphology may have been confounded by heavy grazing in the riparian reaches during the dry summer of 1994. Similar near-channel sedimentation and loss of pool volume between 1993 and 1994 were noted throughout Burnout Creek and in adjacent, unmined James Creek. Subsidence during the 3-year period had no effect on baseflows or near- channel landslides.

No major impacts of subsidence to the surface, caused by the underground mining methods proposed during the permit term are anticipated.

The coal seam is approximately 12.5 feet thick with only about 10.5 feet being extracted, and the depth of cover ranges from 0' to approximately 2,500'. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden, and depth of workings, even with full seam extraction, only minimal subsidence, if any, is anticipated.

Some surface expressions of tension cracks, fissures, or sink holes may be experienced, but should be insignificant. The chances of subsidence-related damage to any perceived renewable resource is minimal.

All dirt roads above the mine are in areas in excess of 1,000 feet of cover or in areas where mining will not take place. The chance of subsidence negatively effecting these dirt roads is minimal. However, in the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence, the road will remain accessible by regrading and filling in the cracks, fissures or sinkholes.

The unnamed ephemeral channel in the southwest corner of the permit area is located in an area where no mining is planned or over the top of a bleeder system that will not be second mined. The chance of subsidence negatively effecting this ephemeral channel is minimal. However, in the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence the channel will be regraded and the cracks, fissures or sinkholes will be filled in by hand methods due to its inaccessibility.

A small portion of Little Park Wash, which is ephemeral, has less than 1,000 feet of cover in the southwest corner of the permit area. The portion with less than 1,000 feet of cover runs diagonally across one longwall panel and then parallel to the bleeder system in the second longwall panel. In the unlikely event that cracks, fissures or sink holes are observed as a result of subsidence the channel will be regraded and cracks, fissures or sinkholes will be filled in. Since this stream channel is accessible and is traversable by 4 wheel drive, access for repairs would not be a problem. If any subsidence repairs cannot be fixed using hand methods, small earth moving equipment could be used.

DWR and BLM Wildlife Biologists, in consultation with the Division, have determined that any loss of snake dens to subsidence would be random and a minor impact to the population of snakes.

525.130 A survey was conducted within the proposed permit area and adjacent area and it was determined that limited renewable resource lands exist within the area surveyed. Limited areas were found which contribute to the long-range productivity of water supply or fiber products. No structures exist within the permit area in which subsidence, if it occurred, could cause material damage or diminution for reasonably foreseeable use. See Plates 5-5 and 5-3 for areas of potential subsidence. Identification and data for the State appropriated water supplies can be found in chapter 7 section 727.

All State Appropriated water rights within the maximum limit of subsidence that could be affected, are either owned by the Operator or by the BLM. The BLM has been notified of the water rights survey by means of the submittal of the permit application.

According to Mark Page (State Water Rights), there is not a water conversation district associated with Lila Canyon Mine.

525.200. Protected Areas

525.210. Since there are no public buildings or other facilities such as churches, school or hospitals, and since there are no impoundments with a storage capacity of more than 20 acre-feet, this section does not apply.

525.220. Since R645-301-525.210 does not apply, this section
does not apply.

525.230. Since there are no planned operations under urbanized areas, cities, towns, and communities, or adjacent to industrial or commercial buildings, major impoundments, or perennial streams this section does not apply.

525.240. A detailed plan of the underground workings, including maps and descriptions of significant features of the underground mine, including the size, configuration, and approximate location of pillars and entries, extraction ratios, measures taken to prevent or minimize subsidence and related damage, and areas of full extraction can be found in the R^2P^2 on file with the BLM local and state offices.

525.300. Subsidence control.

525.310. Measures to prevent or minimize damage.

525.311 No attempt will be made to prevent subsidence in any area except where the escarpment near the outcrop is to be protected and to insure that subsidence remains within the permit area. The use of continuous miners in a pillar section as well as longwall technology provides for planning subsidence in a predictable and controlled manner. Some surface expressions of tension cracks, fissures, or sink holes may be experienced but should be insignificant. The chances of subsidence related damage to any perceived renewable resource is minimal. The value and foreseeable use of the surface lands will not be affected by potential subsidence.

525.312 Since there are no buildings or occupied residential dwellings or structures within the Lila Canyon project area this section does not apply.

525.313 Room-and-pillar mining in addition to longwall methods will be used at the Lila Canyon Mine.

525.400. Since state-appropriated water supplies exist on the surface, 525.400 has been addressed.

525.410 Coal will be removed using a combination of continuous miner and long wall methods as described in sections 522 and 523. Sequence and timing for the development of underground workings are also discussed in sections 522 and 523.

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525.420 Plate 5-5 shows the underground workings, and depicts areas where first mining or partial mining will be utilized to protect the escarpment and raptor nests that may exist on the escarpment, and to insure that subsidence remains within the permit area. State-appropriated water rights are shown on Plates 5-3, 5-5 as well as Plate 7-1.

525.430 No major impacts of subsidence to the surface caused by the underground mining methods proposed during the permit term are anticipated.

The coal seam is approximately 12.5 feet thick with only about 10.5 feet being extracted, and the depth of cover ranges from 0' to approximately 2,300'. The rocks overlaying the coal seam are sandstones and mudstones with some thin bands of coal. Due to the strength of the overburden and depth of workings, even with full seam extraction, only minimal subsidence, if any, is anticipated.

525.440 Aerial subsidence monitoring will be done annually while the significant subsidence is taking place. The subsidence monitoring will be initiated in an area prior to any 2nd mining being done within that area. Initially a 200 foot grid along with baseline photograph will be established prior to any 2nd mining. Approximately 12-16 control points will be needed to cover the total mining area. Six of these points will be located outside of the subsidence zone. The accuracy of this survey will be plus or minus 6" horizontally and vertically. From this data a map will be created that will show subsided areas. Once per year a follow up aerial will be performed to determine the extent and degree of active subsidence. Subsidence monitoring will continue for a minimum of 5 years after the mining ceases. If at the end of the 5 year period the annual subsidence in any of the 3 prior years measures more than 10 percent of the highest annual subsidence amount, subsidence monitoring will continue until there are 3 consecutive years where the annual subsidence amount is less than 10 percent of the highest annual subsidence amount. If for three years in a row the subsidence is measured to be less than 10% of the highest subsidence year, subsidence will be determined to be complete, and no additional monitoring for that area will be required.

"A ground survey of the mine permit area 'where secondary extraction has occurred over the last year' will be conducted in conjunction with the quarterly water monitoring program." Identified features will be monitored until they are repaired or self-healed. The survey will be conducted on roads, adjacent to stock watering ponds, and in drainage channels where they cross tension areas relative to the underground extraction areas."

"The results of this survey will be documented quarterly in a written report which provides global positioning co-ordinates as well as the following information;

A) a description of the identified subsidence related feature,
B) length, and width measurements, and compass bearing,
C) dated photographic documentation,
D) located on a topographic overlay map of the underground disturbed area.
E) if the feature is determined as significant, the Division will be notified within a 48 hour period.
F) A written report, <u>compiling the four quarterly reports for the monitoring year</u>, will be submitted as part of the Annual Report required by the Division.
G) The commitment "to restore the land where subsidence damage has affected the use of the surface" must be revised to read "to restore the land where subsidence damage has been determined as significant enough to require repair, as determined by the Division".

Two areas of the permit have stream reaches with less than 1,000 feet of cover over the coal seam. As discussed in Section 525.120, it is not envisioned that subsidence will negatively impact these areas. During periods of 2nd mining under areas of intermittent or perennial streams, a ground survey will be conducted of the stream channels every two weeks. These ground surveys will be continued for a period of 3 months following the 2nd mining.

The ground survey will consist of walking and photographing the various areas of the surface over the mine where subsidence might occur. If evidence of subsidence is identified, the area of subsidence will be surveyed and the extent of the disruption identified. Depending on the extent and location of the damage, mitigation measures will be reviewed and implemented. Due to the fact that mitigation options change with time as new technology and measures are developed, better options may be implemented in the future. However, UEI provides a commitment that where subsidence damage affects uses of the surface, the land will be restored to a condition capable of maintaining the value and reasonable foreseeable uses which it was capable of supporting before the subsidence. The surface effects will be repairs as described in Section 525.500.

525.450 Subsidence control measures.

525.451. No backstowing or backfilling of voids used as a subsidence control measure is planned at this time. Therefore, this section is not applicable.

525.452. Support pillars as a subsidence control measure is not anticipated at this time. However, an area of partial mining where an unmined coal block will be left for subsidence control is shown on Plate 5-5. First mining indicates an area where a block of coal is roomed leaving pillars for support with no mining of the remaining pillars. Partial mining as shown on Plate 5-5 indicates an area where a block of coal has been isolated without the rooms being developed. Both first mining and partial mining will leave support that can be used to control subsidence. If the partially mined area shown on Plate 5-5 is ever roomed out, the area now defined as partially mined would become an area defined as being first mined.

525.453. An outcrop barrier of coal will be left to protect the escarpments at the outcrop. As per the R2P2, only first mining will be allowed within 200' of the outcrop. Mains, submains, and ventilation portals will be allowed within the outcrop.

525.454 No measures will be taken on the surface to prevent material damage or lessening of the value or reasonable foreseeable use of the surface.

525.460. Anticipated effects of planned subsidence may include tension cracks, fissures, or sink holes. Areas of minimal ground lowering may be anticipated. The chances of subsidence-related damage to any perceived renewable resource is minimal.

525.470. Since no urbanized areas, cities, towns, public buildings, facilities, churches, schools, or hospitals exist within the permit area this section does not apply.

525.480. There are no plans to change or modify the mining plan to protect any springs or seeps. Springs with water rights will be monitored for flow and quality as described in Chapter 7 Section 731.211. UEI has committed to provide for mitigation of any lost water rights as per Chapter 7 Section 727.

525.490. Other information specified by the Division as necessary to demonstrate that the operation will be conducted in accordance with R645-301-525.300 will be provided.

525.500. Repair of damage.

525.510. If effects of subsidence are confirmed, any material damage to the surface lands will be restored to the extent technologically and economically feasible. The land will be restored to a condition capable of maintaining the value and reasonable foreseeable uses which it was capable of supporting before the subsidence.

525.520. Since no structures exist within or adjacent to the permit area which could be damaged by subsidence, should it occur, this section does not apply.

525.530. The Little Park Road exists in the subsidence zone. In the unlikely event the road is damaged by subsidence, UEI will repair the damage as per Section 525.120.

525.600. Public Notice.

At least six months prior to mining, or within that period if approved by the Division, the underground mine operator will mail a notification to all owners and occupants of surface property and structures above the underground workings. The notification oil include, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined.

526. A narrative explaining the construction, modification, use, maintenance and removal of the mine facilities follows. Additional information can be found in Appendix 5-4 and Chapter 8.

526.100 Mine Structures and Facilities.

526.110 The only existing structures are found in Horse Canyon (Part "A" of this permit) and are the remains of the United States Steel operation. Horse

Canyon has received phase II bond release, and the remaining structures have been left in place for future use. Only three existing structures, a 60" and a 48" CMP culverts located near the new proposed surface facilities, and the County road on top of Little Park, can be found within the Lila Canyon Permit. The existing culvert is shown on plate 5-1A. The existing road on Little Park can be found on Plate 5-1 as well as most other plates showing the surface area of the Lila Canyon Permit. Several vehicle ways will be used for water and subsidence monitoring. These ways branch off the Little Park Road and generally follow the ephemeral drainages. The ways are shown on Plate 5-1 as well as most other plates showing the surface area of the Lila Canyon Permit. More detail of the existing Little Park Road can be found in Appendix 5-4.

526.111 The location of the existing culverts is shown on Plate 5-1A.

526.112 Most of the existing 48" culvert is outside the permit boundary and is Emery County's responsibility. UEI will grade the site so that during reclamation and operations surface flows will be directed away from the 48" culvert. The 60" culvert is in poor condition and will be replaced by the County. UEI will add on to the culvert during the operation and reclamation phase. The bottom 30' is the responsibility of the County, the upper portion is the responsibility of UEI.

526.113 It is believed that the existing culverts were installed with the road construction around 1940.

526.114 Since the existing culvert is going to be removed upon construction of the sediment pond, this section does not apply.

526.115 Since the existing culvert is going to be removed upon construction of the sediment pond, this section does not apply. The County road and the culvert within the disturbed area boundary will be modified or reconstructed by the County.

526.115.1. Since the existing culvert is going to be removed upon construction of the sediment pond, this section does not apply. See Appendix 5-4 for existing road details.

526.115.2. Since the existing culvert is going to be removed upon construction of the sediment pond, this section does not apply. See Appendix 5-4 for existing road details.

526.115.3. Since the existing culvert is going to be removed upon construction of the sediment pond, this section does not apply. See Appendix 5-4 for existing road details.

526.115.4. Since the existing culvert is going to be removed upon construction of the sediment pond, this section does not apply. See Appendix 5-4 for existing road details.

526.116 The only coal mining and reclamation operations that are planned within 100 feet of the County Road are an office complex, sediment ponds, topsoil pile, and security shack. The permit area adjacent to the county road will be fenced to protect the public from the sediment pond and other mine associated buildings. Other than fencing, no additional measures are planned after the construction phase. During construction, measures to control traffic on the County Road will be taken to protect the public from construction related hazzards.

526.116.1. A cooperative agreement with Emery County ,as stated in Appendix 1-4, requires a six foot chain link fence to be constructed adjacent to the Lila Canyon Road to provide safety to the general public in the proximity to the mine site and mine related structures and activities.

526.116.2. At the current time, there are no plans to relocate any public road.

526.200 Utility Installation and Support Facilities.

526.210 All coal mining and reclamation operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by oil, gas, and water wells, oil, gas, and coal-slurry pipelines, railroads, electric and telephone lines, and water and sewage lines which may pass over, under, or through the permit area, unless otherwise approved by the owner of those facilities and the Division. Since no existing services are found within the projected disturbed area, no negative impact to any service is anticipated.

526.220 The new support facilities are described in section 520 and in Appendix 5-4 and shown on plate 5-2 and will be operated in accordance with the mine reclamation plan. Plans and drawings for each support facility to be constructed, used or maintained within the permit area are found in Appendix 5-4, Plates 5-7A, 5-7B, and 5-8.

526.221 The new facilities designs shown in Appendix 5-4 prevent or control erosion and siltation, water pollution, and damage to public or private property, and:

526.222 The new facilities designs shown in Appendix 5-4 minimize damage to fish, wildlife, and

related environmental values; and minimize additional contributions of suspended solids to stream flow or runoff outside the permit area to the extent possible by using the best technology currently available.
Islands of undisturbed areas within the permit area will be visually monitored for coal fines deposition. If monitoring reveals coal fine deposition, then water sprays on the area from which the fines are originating will be warranted as per the August 27, 1999 Approval Order.

526.300 Water pollution control facilities consist of sedimentation control and properly designed sewage systems.

The sedimentation control is accomplished by containing all disturbed area runoff in a properly sized sedimentation pond. Complete designs are presented in Appendix 7-4 and on Plate 7-6.

The sewage system will consist of a septic tank and drainfield. Complete designs are presented in Appendix 5-4.

The drain field design and layout are shown on plate 5-2, and details are shown in Appendix 5-4.

526.400 Since Lila Canyon Mine is an underground operation, this section does not apply.

527. Transportation Facilities.

527.100 All new roads within the disturbed area have been classified as primary.

527.110 See Sections 527.120 and 527.130.

527.120 The Slope Access Road / Portal Access Road and the Mine Facilities Road / Truck Loadout Road will be used frequently for access for a period in excess of six months, and or will transport coal. They are classified as primary roads.

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527.121 See 527.120 above.

527.122 See 527.120 above.

527.123 Since none of the new roads planned within the disturbed area will be retained for an approved postmining land use, this section does not apply.

527.130 There are no ancillary roads within the disturbed area.

527.200 A detailed design and description for each road, and conveyor to be constructed used, and maintained within the proposed permit area is included in Appendix 5-4. The roads are show on Plate 5-2.

527.210 The specifications for each road width, road gradient, road surface, road cut, fills, embankments culverts, drainage ditches and drainage structures are shown on Plate 5-2 and in Appendixes 5-4 and 7-4.

527.220 Since no alteration or relocation of natural drainage ways is anticipated, this section is not applicable.

527.230 Roads shall be maintained in manner that allows them to meet their design standards throughout their use.

527.240 If any of the roads on the disturbed area is damaged by a catastrophic event, the road will be repaired as soon as practical after the damage has occurred.

527.250 Steep cut slopes or requests for alternative specifications are not anticipated at this time therefore this section does not apply.

528. Handling and Disposal of Coal, Overburden, etc:
A narrative explaining the construction modifications, use, maintenance and removal of coal, overburden, excess spoil and coal mine waste.

528.100 Coal will be mined using continuous miners and longwall equipment. The coal will be transported from the face and deposited on the underground mine belts using shuttle cars or continuous haulage equipment. The coal will be transported by a series of conveyor belts from the section to the run of mine stockpile. The coal will be removed from the run of mine stockpile by a reclaim belt to an enclosed crusher/screen. Once crushed the coal will be conveyed to a storage bin from which it will loaded in to coal haul trucks for transportation to a unit train loadout.

528.200 Overburden: Lila Canyon is an underground operation, and it is not anticipated that any material that overlays the coal seam, consolidated, or unconsolidated, other than topsoil, will be disturbed. Therefore, this section does not apply.

528.300 Spoil, coal processing waste, mine development waste, and noncoal waste removal, handling, storage, transportation, and disposal areas and structures are discussed below.

528.310 Excess Spoil: Since Lila Canyon is an underground operation, it is not anticipated that any spoil will be generated. Therefore, this section does not apply.

528.320 Coal Mine Waste: All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized coal chunks from the screens will be crushed and put back into the ROM stream. The temporary mine development waste pile and slope rock disposal area are shown on Plate 5-2 and in Appendix 5-7.

528.321 Coal processing waste produced from the screen will not be returned to any abandoned underground workings. Any and all of the coal processing waste from the screen will be crushed and reintroduced into the ROM stream for sale.

528.322 Refuse Piles. Each pile will meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215, meet the design criteria of R645-301-210, R645-301-512.230, R645-301-513.400, R645-301-514.200, R645-301-515.200, R645-301-528.320, R645-301-536 through R645-301-536.200, R645-301-536.500, R645-301-536.900, R645-301-542.730, R645-301-553.250, R645-301-746.100, R645-301-746.200, and any other applicable requirements.

528.323 Burning and Burned Waste Utilization.

528.323.1. Coal mine waste fires will be extinguished by the person who conducts coal mining

and reclamation operations, in accordance with a plan approved by the Division and MSHA. The plan will contain, at a minimum, provisions to ensure that only those persons authorized by the operator, and who have an understanding of the procedures to be used, will be involved in the extinguishing operations. The coal mine waste fire plan can be found in Appendix 5-3. MSHA approval is not required unless you have an actively burning fire. (Phone conversation with Billy Owens MSHA Denver 5/31/05)

528.323.2. No burning or burned coal mine waste will be removed from the permitted disposal area.

528.330 Noncoal Mine Waste.

528.331 Noncoal mine wastes including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustible materials generated during mining activities will be placed and stored in a controlled manner in a designated portion of the permit area. The noncoal mine waste will be placed in dumpsters and emptied on a as needed basis. The designated noncoal waste area (concrete trash chute) is shown on Plate 5-2. Circumstances may arise where equipment must be abandoned underground. If this circumstance arises, the operator must get approval from the BLM and the Division prior to abandoning equipment in place.

UtahAmerican Energy, Inc. is abandoning the current set of 106 DBT longwall shields upon completion of Panel #6. From Panel #7 going forward in the mine plan, a new set of longwall equipment will be installed and utilized for coal extraction. Every component from our current longwall installation including the shearer, pan line, conveyor chain, stage loader, crusher, current belt installation, and associated belting in Panel #6 will be recovered except for the 106 longwall shields. In order to avoid any adverse environmental impacts from the shields, the mine will run water through the shields as opposed to emulsion in the last few passes of production to remove any oils before the recovery process proceeds. These shields would be abandoned in the mine under 1000 feet of cover, with no foreseen environmental impacts to ground water due to the depth of cover and grade of the coal seam. Although a longwall move is routine, completed safely, and occurs several times a year at Lila Canyon, there is inherent exposure that is associated with a longwall move. By not extracting these shields and leaving them in the mine, this removes any opportunity for an accident as a result of the longwall move. Upon completion of mining in District #2 the shields will be behind seals for the remainder of the mine life. See plate 5-5a.

528.332 It is anticipated that final disposal of noncoal mine wastes will be at the

ECDC facility near East Carbon City. Concrete will be disposed of in a specified area, refer to Plate 5-6 for this location. The disposal site will be located under the reclaimed coal stockpile. This area will receive the maximum fill during reclamation. Placement of this fill around the concrete will help to eliminate runoff. This will ensure that leachate and drainage does not degrade surface or underground water. The noncoal mine waste will be placed in dumpsters and emptied on an as-needed basis.

528.333 The noncoal mine waste will be disposed of at the ECDC facility near East Carbon City.

528.334 Notwithstanding any other provision to the R645 Rules, any noncoal mine waste defined as "hazardous" under 3001 of the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-580, as amended) and 40 CFR Part 261 will be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

528.340 A description of the disposal methods for placing underground waste and excess spoil generated at surface areas according to R645-301-211, R645-301-212, R645-301-412.300, R645-301-512.210, R645-301-512.220, R645-301-514.100, R645-301-528.310, R645-301-535.100 through R645-301-535.130, R645-301-535.300 through R645-301-535.500, R645-536.300, R645-301-536.600, R645-301-542.720, R645-301-553.240, R645-301-745.100, R645-301-745.300, and R645-301-745.400 is covered in sections 535, and 536.

528.350 A description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of in accordance with R645-301-528.330, R645-301-537.200, R645-301-542.740, R645-301-553.100 through R645-301-553.600, R645-301-553.900, and R645-301-747 is included.

528.400 Dams, embankments and other impoundments. See Section 700 and Appendix 7-4.

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529. Management of Mine Openings:

The permit application includes a description of the measures to be used to seal or manage the openings within the proposed permit area. New slope or drift openings required to be sealed shall be sealed with solid, substantial, noncombustible material for a distance of at least 25 feet into such openings. The closure design for portals, slopes, and drifts, can be found in Appendix 5-6.

529.100 Shafts or other exposed underground opening when no longer in use will be cased, lined, or otherwise managed as approved by the Division. All openings exposed by mining operations within the permit area will be permanently closed unless approved for water monitoring.

529.200 For the purposes of Underground Coal Mining and Reclamation Activities:

529.210 Mine entries which are temporarily inactive, but have a further projected useful service under the approved permit application, will be protected by barricades or other covering devices, fenced, and posted with signs, to prevent access into the entry and to identify the hazardous nature of the opening. These devices will be periodically inspected and maintained in good operating condition by the person who conducts the activity.

529.220 Since no portals are projected to return underground development waste, coal processing waste or water to the mine, this section does not apply. There is no current need to return any waste to the underground workings.

529.300 Section 529 does not apply to holes drilled and used for blasting.

529.400 No openings have been identified for use to return coal processing waste to underground workings. Therefore, this section is not applicable.

530. Operational Design Criteria and Plans.

531. General plans for the sediment pond and refuse pile are found within this section.

532. Sediment control measures can be found in Chapter 7.

532.100 The smallest practicable area will be disturbed during the life of the project. Progressive backfilling, grading, and prompt revegetation of applicable will be completed as per R645-301-353.200.

532.200 Backfilled material will be stabilized to promote a reduction of the rate and volume of runoff in accordance with R645-301-537.200, R645-301-552 through R645-301-553.230, R645-301-553.260 through R645-301-553.420, R645-301-553.600, and R645-301-553.900.

533. Impoundments.

533.100 Since no impoundments meeting the criteria of 30 CFR 77.216(a), this section does not apply.

533.200 Two impoundments are planned for this site: Pond #1 and Pond #2. The sediment ponds are temporary structures. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1; and on Plates 7-6a and 7-6b.

533.210 The sediment ponds will be incised, except for the dam/road embankment. This embankment will be reconstructed and compacted to at least 95%. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1; and on Plates 7-6a and 7-6b.

533.220 Where fill is to be placed, natural ground shall be removed 12" below the structure. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1; and

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on Plates 7-6a and 7-6b.

533.300 Rip-rap or other protection (culverts, concrete) will be placed at all inlets and outlets to prevent scouring. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1. Also see Plates 7-6a and 7-6b.

533.400 External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability. A detailed design for the Sediment ponds can be found in Appendix 7-4, Section 3.1; and on Plates 7-6a and 7-6b.

533.500 This section does not apply. There are no vertical highwalls associated with this impoundment.

533.600 Since no impoundments are planned that meet the criteria of MSHA, 30 CFR 77.216(a), this section does not apply.

533.700 Design and construction requirements, as well as operation and maintenance requirements, are detailed in Appendix 7-4, Section 3.1.

534. Roads. The designs for surface roads can be found in Appendix 5-4.

534.100 The roads have been designed, located, constructed and will be maintained to:

534.110 The roads have been designed, located, constructed and will be maintained to prevent or control damage to public or private property.

534.120 Non-acid or nontoxic-forming substances will be used in road surfacing.

534.130 The designs for the roads can be found in Appendix 5-4.

534.140 The reclamation plan for the roads can be found in section 542.600.

534.150 The roads have been designed to prevent or control erosion, siltation and air pollution.

534.200 Appropriate limits for grade, width, and surface materials have been used in the design of the roads.

534.300 Primary Roads. Primary roads will meet the requirements of R645-301-358, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-542.600, R645-301-542.600, and R645-301-762, and any necessary design criteria established by the Division, and the following requirements.
Primary roads will:

534.310 The roads will be located insofar as practical, on the most stable available surfaces.

534.320 The roads will be surfaced with rock, crushed gravel, asphalt, or other material approved by the Division as being sufficiently durable for the anticipated volume of traffic and the weight and speed of vehicles using the road;

534.330 The roads will be routinely maintained to include repairs to the road surface, blading, filling potholes and adding replacement gravel or asphalt. It will also include revegetating, brush removal, and minor reconstruction of road segments as necessary.

534.340 Culverts, if required, will be designed, installed, and maintained to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the road.

535. Spoil: It is anticipated that no spoil will be produced at the Lila Canyon Mine. Therefore, this section is not applicable.

536. Coal Mine Waste: The proposed Lila Canyon Mine could produce 2 separate types of coal mine waste:

1. Normal coal processing waste or refuse and;
2. Underground development waste (rock slope

material).

All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. The rock slope material / underground development waste will be examined and tested as necessary to determine acid- or toxic-forming potential.

536.100 All underground development waste, other than the rock slope material, will be brought to the surface and will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface.

536.110 The refuse pile will be designed to attain a minimum long-term slope stability safety factor of 1.5. See Appendix 5-7.

536.200 Underground development waste brought to the surface will be deposited according to the plan described in Appendix 5-7.

536.300 Since no spoil fills will be generated this section does not apply.

536.400 Since there will not be any impounding structures constructed of coal mine waste this section does not apply.

536.500 As discussed in Section 536 and 536.300, it is proposed to dispose of the rock slope material / underground development waste within the rock disposal area and be used as structural fill as shown on Plate 5-2.

536.510 It is not anticipated that coal mine waste materials from activities located outside the permit area be disposed of in the permit area. Therefore this section does not apply.

536.520 It is not anticipated that coal mine waste will be brought to the surface then taken back underground for disposal therefore this section does not apply.

536.600 In areas where slope rock or coal processing waste is deposited, the topsoil will be removed and stored in the topsoil stockpile area until reclamation.

536.700 It is not anticipated that coal processing waste will be returned to abandoned underground workings therefore this section does not apply

536.800 Since no coal processing waste banks, dams, or embankments are planned for the Lila Canyon Mine therefore, this section does not apply.

536.900 Refuse Piles. (See Appendix 5-7) The refuse pile is designed to meet the requirements of R645-301-210, R645-301-512.230, R645-301-513.400, R645-301-514.200, R645-301-515.200, R645-301-528.322, R645-301-528.320, R645-301-536 through R645-301-536.200, R645-301-536.500, R645-301-536.900, R645-301-542.730, R645-301-553.250, R645-301-746.100 through R645-301-746.200, and the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215.

537. Regraded Slopes.

537.100 Each application will contain a report of appropriate geotechnical analysis, where approval of the Division is required for alternative specifications or for steep cut slopes under R645-301-358, R645-301-512.250, R645-301-527.100, R645-301-527.230, R645-301-534.100, R645-301-534.200, R645-301-534.300, R645-301-542.600, R645-301-742.410, R645-301-742.420, R645-301-752.200, and R645-301-762.

540. Reclamation Plan. (See Appendix 5-8 for reclamation plan.)

541. General.

541.100. The operator is committed to performing all reclamation as in accordance with R645 rules.

541.200. N/A. The operator is not involved in surface mining activities.

541.300. The operator is committed to the removal of all equipment facilities and structures upon cessation of mining activities.

541.400. The operator will address all reclamation activities as referenced in Chapter 5 of this document.

542 Narratives, Maps and Plans.

542.100. See Table 3-3 time table based on project reserves markets and life of mine.

542.200. The perimeter of the disturbed area contains approximately 40.12 surface acres within the disturbed area but only 33.99 acres will be disturbed, leaving 6.13 acres of undisturbed islands within the disturbed area.
The following R645 regulations will give detailed description and reclamation procedures to address these areas of disturbance. The reclamation plan for the sediment pond and drainage control structures can be found in Appendix 7-4.

Topsoil amounts can be found in Section 232.100 and are calculated from Plate 2-3. Concrete amounts can be calculated from the text in Section 520. Coal Mine Waste volumes can be found in Appendix 5-7. Volumes were calculated using a Cad system.

542.300. Included.

542.310. Included. (See Plates 5-6 & 7-7)

542.320. There will not be any surface facilities left post mining.

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542.400. Not applicable. No surface facilities will remain post bond liability period.

542.500. A reclamation time table is included as Table 3-3.

542.600. All roads within the disturbed area will be reclaimed immediately after they are no longer needed for mining and reclamation operations, except for the upgraded portion of County Road #R.S. 2477. At the time of reclamation, the Bureau of Land Management (BLM) and Emery County will be given the option of keeping the upgrades to this portion of the roadway, reclaim the roadway to its original condition. The Division will be notified of the final decision.

542.610. The time table of reclamation activities will enable the roads to be removed concurrently with reclamation activities. So, no closures specific to traffic would be anticipated except for the upgraded portion of the Emery County Road #R.S. 2477. Minimal closures may be required for the upgraded portion, if it is reclaimed.

542.620. All bridges and culverts will be removed concurrent with reclamation.

542.630. All disturbed areas will be ripped and top soiled prior to revegetation activities in compliance with all applicable R645 regulations. (See Appendix 5-8)

542.640. Road surfacing materials such as sand and gravel, which are not suitable for revegetation establishment, will be buried on site and covered with a minimum of two feet of material that would support vegetation. Concrete will be disposed of in the designated area and covered with four feet of cover. Asphalt will be disposed of off site, either in a landfill or sent to a recycling facility.

542.700. Final Abandonment of Mine Openings and Disposal Areas.

542.710. Appendix 5-6 depicts a typical seal that will be constructed at all mine openings.

542.720. No excess spoil is anticipated at this time.

542.730. All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface.

542.740. Disposal of Noncoal Mine Wastes.

542.741. All non coal waste will be temporarily stored on site in approved waste bins and commercially picked up and transported to an approved disposal site. Non Coal waste generated during reclamation (such as concrete structure, buried culverts, utility lines, septic systems etc.) will be buried in the refuse disposal area and covered with a minimum of four feet of fill.

542.742. No noncoal waste will be stored on site or disposed of on site during the life of the mine.

542.800. A detailed cost break down is included in Chapter 8, Appendix 8-1 relative to bonding.

550 Reclamation Design Criteria and Plans. Each permit application will include site specific plans that incorporate the following design criteria for reclamation activities.

551. All underground openings will be sealed as detailed in Appendix 5-6.

552. Permanent Features.

552.100. In the course of reclamation, areas that have been recontoured and top soiled will be "pock-marked," creating small basins that will facilitate vegetation establishment as well as minimizing erosion.

552.200. No permanent impoundments will be left post reclamation.

553. The operator will comply with all regulations applicable to underground mining activities relative to backfilling and grading as required by R645 regulations.

Some minor cut slopes along the reclaimed road may be left after reclamation due to the difficulty and inability to reclaim all material pushed over the side while making the road cut. See plate 5-7B-2, cross section 16+00 for details. UEI will make reasonable efforts to minimize the cut slopes being left.

553.100. Disturbed Areas. Disturbed areas will be backfilled and graded to:

553.110 The operator will obtain a post mining topography similar in form as what existed premining.

553.120 Since Lila Canyon is an underground operation, no spoil piles will be created. Minor highwalls may be created with the development of the rock slope portals. Upon completion of mining these entries will be sealed as per Closure for Mine Openings Appendix 5-6 and all highwalls will be eliminated during the reclamation phase of the operation. Plate 5-9 shows the proposed portal plan. During reclamation, suitable material will be placed against the portals. This material will be shaped to eliminate the highwall and to bring the slope back to the approximate original contour.

553.130 All fill slope will have a static safety factor of 1.3 as shown in Appendix 5-5.

553.140 Erosion and water pollution will be minimized on site by the use of drainage control structures (berms, channels and silt fence) and the use of small depressions, soil tackifiers, mulch and sediment pond design. No water is anticipated leaving the reclaimed site prior to adequate treatment in the form of retention and/or filtration that does not meet and/or exceed UPDES standards.

553.150 The post mining land use of wildlife and domestic grazing should be enhanced to some degree with the revegetation of a more desirable seed mix and a vegetative cover in excess of what was present premining.

553.200 Spoil and Waste.

553.210 All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream.

553.220 Since no spoil will be produced this section does not apply.

553.221 All vegetation and /or organic material will be removed prior to any coal mine waste being stored.

553.222 All useable topsoil or topsoil substitute will be removed from the structural fill and refuse areas prior to use. Table 2-1 shows estimates of salvageable soil by soil type based on current NRCS soil inventories. The location of the soil storage is shown on Plate 5-2. This material will be spread over the recontoured structural fill and refuse areas prior to seeding and mulching.

553.223 Since no spoil will be produced this section does not apply.

553.230 All recontoured areas will be compacted to minimize slippage. The area will then be over laid with topsoil and ripped. In addition the area will be "pock-marked" to minimize the potential for erosion, as well as enhance revegetation establishment. It is not anticipated that soil will be disturbed in areas too steep for equipment to operate.

553.240 The structural fill area will have slopes of less than 8% upon final recontouring, and revegetated to enhance the post mining land use of grazing and wildlife habitat.

553.250 A need for a refuse pile at Lila Canyon is not anticipated.

553.260 The operator will commit to all applicable R645 regulations relative to disposal of coal processing waste.

553.300 All underground development waste brought to the surface will be placed in the temporary rock pile and then blended back into the ROM product for sale. There will be no coal processing waste generated on the surface. Any oversized from the screens will be crushed and put back into the ROM stream.

553.400 Cut-and-fill terraces may be allowed by the Division

553.410 No cut and fill terraces will be required.

553.420 No terraces will be required for post mining land use.

553.500-540 and 553.600-553.650.500
The only area that falls under these provisions are the reclaimed Horse Canyon mine which lies in the north west portion of the lease area and is addressed under approved MRP Act #0013.

553.700-553.900
This operation will only involve underground mining, and as such the above referenced regulations do not apply.

560. Performance Standards. Coal mining and reclamation operations will be conducted in accordance with the approved permit and requirements of R645-301-510 through R645-301-553.

APPENDIX 5-7

LILA CANYON MINE

ROCK SLOPE MATERIAL

(Mine Development Waste)

General

The proposed Lila Canyon Mine includes a site and plan for permanent disposal of the rock slope material which by definition is considered "Underground Development Waste". The underground development waste (rock slope material), will be generated by the construction of the rock slopes. The rock slope material differs from typical underground development waste in that the rock slope material does not contain any coal and consists of siltstone, mudstone, and sandstone. Coal and carbonaceous shale are not found in the rock slope material. Under no circumstances will the material removed from the rock slopes contain enough combustibles to induce or continue combustion.

The rock slope work will generated approximately 25,000 bank cubic yards of underground development waste (rock slope material). Using a 1.5 bulking or swell factor, the total amount of loose yard of rock slope material disposed of in the refuse area is approximately 37,500 yd^3 (based upon an as-built survey of the rock slopes).

The rock slope material is used to construct the Upper Pad of the mine surface facilities (see Plate 5-2). The remaining pads (Middle Pad, Lower Pad, Temporary Storage Pad, Shop Pad, and New Storage Pad) are constructed using native subsoil.

Plate 5-2 shows the location of the ROM (run of mine) coal stockpile and the location where the rock slope material will be buried. Plate 5-7a shows a longitudinal profile of the reclaimed site. Plates 5-7b-1 to 5-7b-6 show cross sections along the profile shown in Plate 5-7a. The material shown on Plate 5-2 at the Upper Pad (ROM coal stockpile) contains the mine waste pile (sub-contract coal) that is regularly blended back into the ROM coal stream and conveyed to the crushed coal stockpile (Middle Pad) to be sold and shipped according to sales contracts.

The following sections will describe the ground preparation, placement, and reclamation procedures for the rock slope material. All the rock slope material will be placed in an incised area.

Ground Preparation

Vegetation and topsoil will be removed from the proposed rock slope storage area and stored in the topsoil pile as shown on plate 5-2.

Placement of Underground Development Waste (rock Slope Material)

Rock slope material will be dumped and compacted on the material supply pad. The material will be placed on the pad compacted in 24" lifts using a front end loader. Once all the rock slope material is placed and compacted.

The dumping (placing) of material on the pad is NOT the same as "end dumping". End Dumping is defined by the Bureau of Mines as "Process in which earth is pushed over the edge of a deep fill and allowed to roll down the slope".

Testing of the Rock Slope Material

Material from the rock slope portals will be tested five times that will take place as follows: during the initial startup, at the ¼ mark, the ½ mark, the ¾ mark and near completion of the rock slopes. Analysis of the four samples tested are included at the end of Appendix 6-2 with other acid and toxic analyses.

Testing parameters for the rock slope material will be as per Table 1.

Spreading and compaction

Compaction will take place using a wheeled loader during the filling operation. Upon final reclamation the topsoil will be redistributed over the rock slope storage area and reclaimed as per Chapter 3. The total cover over the rock slope material area, when considering the subsoil and topsoil, will be a minimum of 4' if the material is found to be acidic or toxic forming.

Pad Configuration and Drainage

Runoff from the rock slope material storage area will be directed into the Sediment Pond shown on Plate 7-5.

Site Inspection

The rock slope material storage area will be inspected under the supervision of a qualified registered professional engineer on a quarterly basis during construction.

If such inspection discloses a potential hazard, the inspector will immediately notify the regulatory authority of the hazard and the emergency procedures to be implemented.

Reclamation

Upon completion of the active mining operation, the rock slope material disposal area will be covered with topsoil and seeded according to the approved plan. Runoff from the reclaimed disposal area will continue to flow to the sediment pond until Phase II Bond Release requirements for the reclaimed site are met.

TABLE 1

Rock Slope Material

List of Test Parameters for Acidic and Toxic Material
(As per personal conversation with Priscilla Burton 12/29/2004)

pH
EC
SAR
Available Boron
Soluble Selenium
Acidic Base Potential
Texture
Water Holding Capacity
Total Nitrogen
Nitrate as Nitrogen
% Organic Carbon

APPENDIX 5-8

LILA CANYON MINE

RECLAMATION AND ENHANCEMENT PLAN

Some of the information for Appendix 5-8 is hard copies. Electronic copies do not exist for all information contained within the Appendix.

Reclamation and Enhancement Plan Associated with the Lila Canyon Mine Site

I. Description of Existing Area

The Lila Canyon Mine constitutes approximately 40.12 acres within the disturbed area boundary. For the purpose of reclamation, the total area is divided into two units. The upper unit consists of the water treatment area and the portal pad. The lower unit consists of the majority of the facilities, bath house, parking, shop, and coal handling structures (see plate 5-2 Surface Facilities). In addition to the above, there is a spoil/refuse disposal area and sediment pond. The actual disturbance, pads, silos, coal processing structures, parking constitute a total of 33.99 acres. The pond is the only structure that will remain throughout phase 2 bond liability.

This new disturbance constitutes a loss of approximately 40 acres of critical high value big game winter range. In addition, it distracts from the general aesthetics of the upper reaches of Lila Canyon.

The following reclamation plan is designed to rehabilitate this area to such a degree that the appearance would be aesthetically compatible with the adjacent undisturbed area and reestablish a desirable and diverse vegetative cover that will enhance wildlife habitat and domestic grazing.

II. Demolition and Clean-Up

After abandonment the area will be cleared of all mine related material and structures. The majority of the coal handling equipment; belt lines, conveyors, and some of the metal fab buildings, will be sold as used equipment and removed prior to demolition. The balance of the structures will be demolished utilizing heavy equipment such as; dozers, loaders track hoes, various shears for steal dismantling etc. The trash (non-metal, non-concrete material) will be removed from the site and hauled to an approved land fill. Any contaminated soil or debris, such as coal refuse that has petroleum additives, would be hauled to an approved disposal site. The balance of the non-combustible, non-ferrous debris such as concrete would be buried on site

All material with salvage value would be removed by a licensed salvage company.

III. Reclamation Plan

Following the cessation of mining, the portal cuts can be brought back to approximate original contours.

Earthwork

Topsoil amounts can be found in Section 232.100 and is calculated from Plate 2-3
Concrete amounts can be found in Section 520.
Coal Mine Waste amounts can be found Page 2 in Appendix 5-7.
General back fill can be found in Table 1 of Appendix 5-4.

Pad and Facility Site

This area would be re-contoured utilizing equipment such as dozers, scrapers, backhoes, track hoes, trucks, etc. The level nature of the topography would allow the equipment to work in unison.

To create a natural slope similar to the pre-mining topography (see Plate7-7 Post Mining Hydrology), the natural channels would be reconstructed and rip rap to minimize the potential for erosion as detailed in Chapter 7, Appendix 7-4. Fill will be placed in a manner as to prevent water channelization.

Sediment Pond

Plate 7-7 shows the surface configuration for the area at the Phase I bond release. At Phase I bond release, the area will be backfilled and graded to the final configuration except for the sediment pond. The sediment pond will be removed after the Operator demonstrates that vegetation adequately controls erosion.

Erosion

Following the ripping the stored topsoil (growth media) would be spread to a uniform depth over the entire lower area.

It is imperative that as the area is re-contoured that the surface is pock-marked (see Figure 1). Pock-marking creates a very uneven surface which to a large degree diminishes the likelihood of erosion (gullies and rills) and enhances the success of revegetation.

In conjunction with the pock-marking, the track hoe can cast any vegetation: dead trees, large rocks, back onto the re-contoured surface. The pockmarking creates a more mesic site by trapping precipitation, both rain and snow, in the depressions.

The debris (dead trees, rocks etc.) on the surface accomplish the same function to a lesser degree by providing solar protection. In addition, the combination of the above makes the site more aesthetically compatible with the adjacent undisturbed areas and to a large degree discourages both domestic stock as well as the big game from adversely impacting the site until the vegetation can become established.

Revegetation

In conjunction with the earth moving, the site will be hydro-seeded, mulched, tackified and fertilized. The following methodologies have been incorporated on numerous sites on both private and federal lands, and have proven very successful frequently allowing Phase 2 Bond release in as little as three growing seasons.

A. Methodology-Seeding and Mulching

A hydro-seeder is positioned directly behind the track hoe as the hoe re-contours and implements the site seed bed preparation, the hydro-seeder can spray over the hoe or utilized a hose line to apply the seed in combination with 500#/acre wood fiber-mulch and 100#/acre of tack agent. Following the seeding, the entire area is then overs-prayed with 1500 to 2000 pounds of wood fiber mulch per acre.

An additional 100#/acre of tack and fertilizer, choice and application rate to be determined by the testing in section 243, would be added to this mulch slurry. Fertilizer and seed will not be mixed during hydroseeding operations. The lower area would be hydro-seeded and mulched utilizing the same procedures, with the exception that the operation can occur as each area is ready and would not interfere with adjacent earthmoving activities

Depending on weather conditions, the hydro-mulched areas should be allowed to harden off (dry on the surface) from 24 to 72 hours before the area is walked on.

B. Methodology- Seedling Planting

Woody plants (shrubs) are a component in the final reclamation seed mix. Two years following reclamation, an ocular estimate of the reclaimed site will be conducted. If it appears that the woody plant density is lacking, containerized or bare rooted stock may be planted to supplement stocking. The species and numbers will be determined from the evaluation of the ocular estimates and with consultation with the Division and DWR. The operator will follow R645-301-357.311.

The planting procedures, as outlined, must be strictly adhered to in order to insure a reasonable degree of success. The following is a list of key points:

1. Live Seedlings – ideally dormant planting stock

2. Stock – primarily root mass kept moist at all times

3. Position of seedlings to maximize survival potential

4. Proper Planting Procedure (Figure 4)

    A. Straight and natural root alignment (no "J" roots)

    B. Firm soil placement length of root mass (no air pockets)

    C. The root collar needs to be ½ to 1" below grade (soil depth)

The actual planting of seedlings can follow the seeding mulching anywhere from 24 hours up to two years with little or no adverse results. Ideally, planting should occur as late as possible in the fall prior to the first snow, or as early in the spring as the site is accessible. Fall planting normally produces better results and is not as vulnerable to weather conditions. In both cases, survival will increase if the planting stock is dormant when planted.

The root mass should be kept moist at all times during transport, handling and planting. This is somewhat easier with containerized stock, but can be accomplished with bare root stock if a few simple procedures are followed.

A good procedure is to insure moist roots on bare root stock is to mix a slurry of vermiculite and/or potting soil in a 30 gallon water filled barrel. Cut up pieces of burlap approximately 18x24 inches and soak overnight in the slurry. Wrap the root mass of the bare root stock loosely in a roll of saturated burlap prior to planting. Each roll should contain 50 to 100 seedlings loosely rolled within the burlap and placed in a planting bucket or bag or field use. Periodically during the day, the rolls can be wet down in the event they start to dry.

It is imperative to have the holes dug and ready to plant, prior to removing the seedlings from the container or burlap roll. In warm or windy conditions, a seedling's root hairs can dry out in as little as seven seconds, effectively killing the plant.

When selecting the location for the seedling, always keep in mind to maximize the potential for moisture and shade, select "depressions" over "humps" and areas adjacent to rocks, dead trees, etc. to provide solar protection. In pock marks, the seedling should be placed approximately one third the way up from the bottom. This area allows the roots to extend into the moist soil and avoids having the seedling covered by sluffing or siltation (See Figure2).

The last area of concern is to utilize correct planting procedures. There are a variety of planting tools on the market. They range from a 16 inch tile spade to a region 6 "hoedad". Any tool capable of digging a hole at least 2 inches deeper than that of the root mass is adequate.

It is imperative that the root mass is placed in the hole in a straight near natural configuration. The soil should be firmly pressed around the roots utilizing your hand, not a foot or stick. The planter must make sure there are no air pockets left in the hole, and insure the seedling is planted to the correct depth.

This is accomplished by showing each planter the location of the root crown. It is advantageous for the root crown to be covered by ½ to 1 inch of soil at time of planting. This allows the soil to settle without exposing the root crown (See Figure 3).

Following the planting, all trash (containers, etc.) will be removed from the site. A four-strand barbed wire fence will be constructed around the lower area to preclude domestic stock from entering the site.

A sign reading "This Area is Temporarily Closed for Reclamation" shall be posted on the fence and maintained until the site is re-vegetated. After the vegetation is well established (Phase 2 Bond Release), the sediment pond can be removed by simply re-contouring back over the pond area.

The same seeding and planting methodologies will be utilized to revegetate this small area.

Figure 1
Pock Mark Configuration

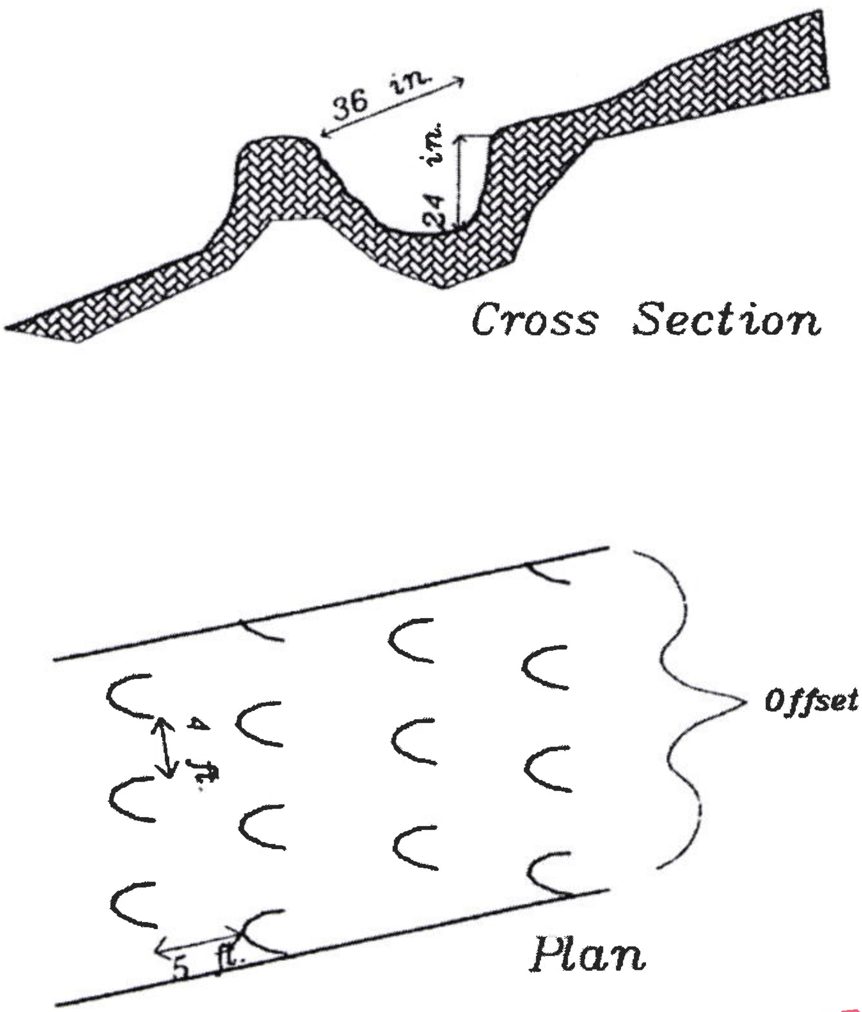


Figure 2
Seedling Locations

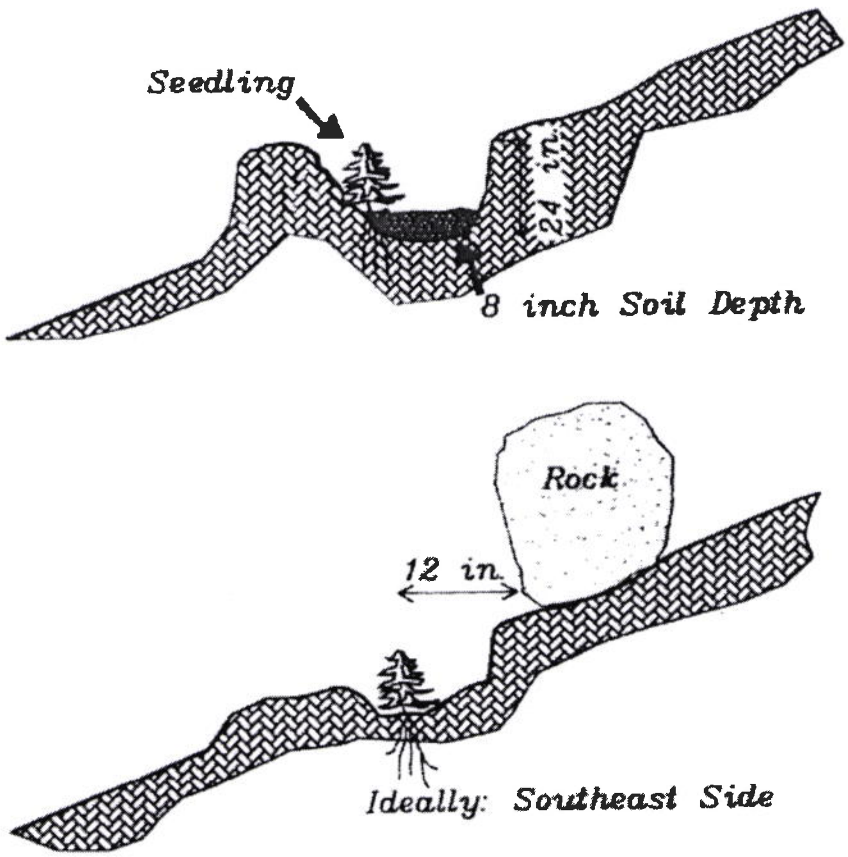
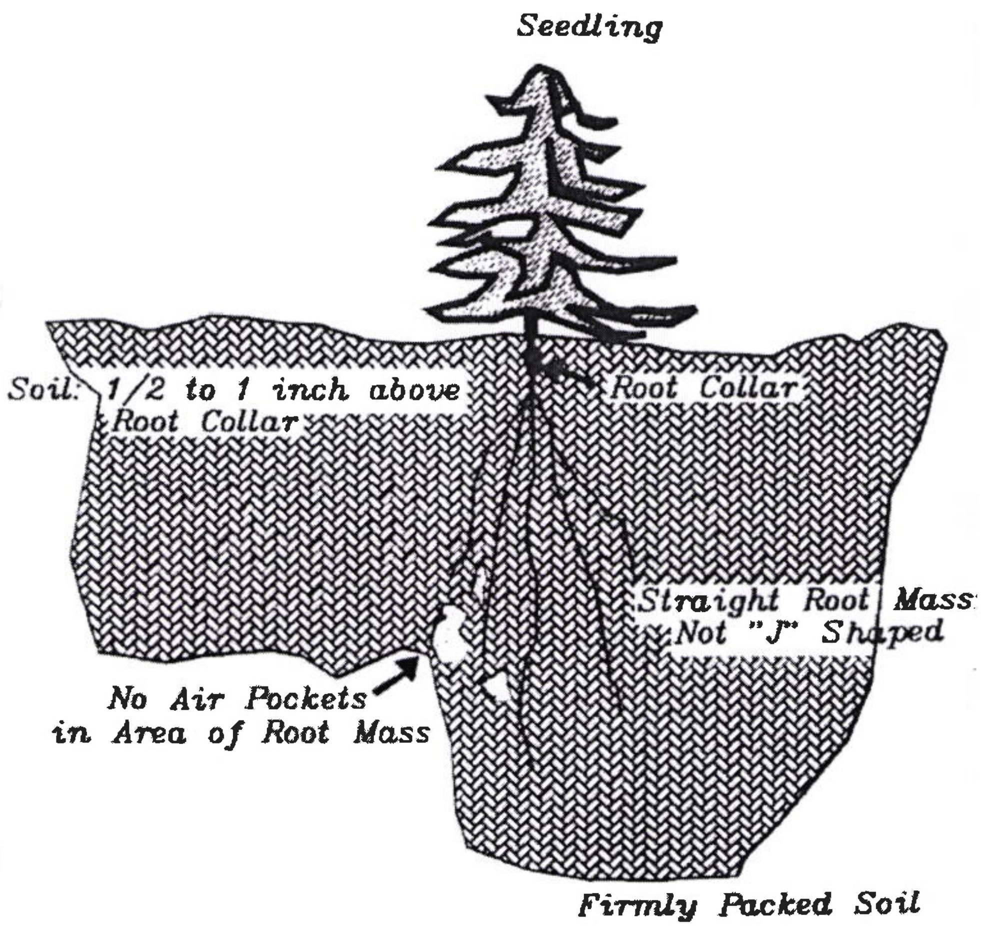


Figure 3
Seedling Planting Procedure



Appendix 7-4
Lila Canyon Mine
Sedimentation and Drainage Control Plan

Revised

January 2001
October 2002 RJM
February 2007 TJS
April 2008 TJS
July 2008 TJS
June 2009 TJS
January 2010 TJS
January 2012 TJS
October 2014 TJS
December 2015 KM-PJ
November 2016 PJ/KM
June 2017 PJ
December 2018 PJ/KM

SEDIMENTATION AND DRAINAGE CONTROL PLAN

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5- Alternate Sediment Control for Fan, Water Treatment, and Topsoil Sites . . . . . Page -59-

SEDIMENTATION AND DRAINAGE CONTROL PLAN

1- Introduction

The Sedimentation and Drainage Control Plan for the Lila Canyon Mine has been designed according to the State of Utah R645- Coal Mining Rules, November 1, 1996. All design criteria and construction will be certified by a Utah Registered Professional Engineer.

This plan has been divided into the following three sections:

1) Design of Drainage Control Structures for the Proposed Construction

2) Design of Sediment Control Structures

3) Design of Drainage Control Structures for Reclamation

The general surface water control plan for this project will consist of the following:

(a) This is a new site construction. All areas proposed for disturbance will be sloped to drain to surface ditches and/or culverts where runoff will be carried to two sediment ponds. All minesite drainage controls and watersheds are shown on Plate 7-5 "Proposed Sediment Control Map" and Plate 7-2 "Disturbed Area Hydrology and Watershed Map," respectively.

(b) The majority of undisturbed runoff will be diverted around the minesite and/or beneath the Sediment Pond #1 by properly sized culverts. Undisturbed diversion culvert UC-1, is located on the southwest end of the site. This diversion will allow the majority of undisturbed runoff from the Right Fork of Lila Canyon to bypass the mine area beneath Sediment Pond #1. All undisturbed diversions are designed to carry runoff from a 100 year - 6 hour precipitation event. UC-1 is oversized at 60" diameter.

 (a) NOTE: In the fall of 2016, a massive storm event caused a large portion of culvert UC-1 to become plugged. Blockage in the culvert is so extensive that removing the debris blocking the culvert would be an enormous undertaking. The Operator has determined that replacing a large portion of the UC-1 culvert will be a safer and more cost-effective solution than clearing the debris from the existing culvert. Therefore, a new 60" culvert (UC-1a) will be constructed from the inlet location of UC-1 and extending below Sediment Pond #1, then attaching to UC-1 near the spillway structures. The plugged portion of UC-1 will be cut and removed as required for the installation of the new section of culvert. The remaining section of existing culvert will be abandoned and sealed in place. All sections of the culvert will remain until final reclamation. During final reclamation, all sections (including the abandoned portions) of UC-1 and UC-1a will be removed in accordance with the approved reclamation plan.

(c) Two adequately sized sediment ponds will be constructed at the lower end of the site. These ponds are sized to contain and treat the runoff from all of the disturbed area and any contributing undisturbed areas for a 10 year - 24 hour precipitation event. The ponds will be equipped with C.M.P. culvert principle spillway and decant and CMP culvert emergency spillway sized to safely pass runoff from a 25 year - 6 hour precipitation event. The spillways from Sediment Pond #1 will discharge into the UC-1 CMP culvert running beneath the pond. This culvert will discharge onto an engineered discharge structure and into the Right Fork of Lila Canyon channel below the minesite. The spillways from Sediment Pond #2 will discharge onto an engineered discharge structure and into the Middle Fork of Lila Canyon channel, below the minesite.

DESIGN OF DRAINAGE CONTROL STRUCTURES

Design Parameters:

2.1	Precipitation
2.2	Flow
2.3	Velocity
2.4	Drainage Areas
2.5	Slope Lengths
2.6	Runoff
2.7	Runoff Curve Numbers
2.8	Culvert Sizing
2.9	Culverts
2.10	Main Canyon Culvert - Outlet Structure
2.11	Ditches

Tables:

Table 1	Undisturbed Watershed Summary
Table 2	Disturbed Watershed Summary
Table 3	Watershed Parameters
Table 4	Runoff Summary - Undisturbed Watershed (Not Draining to Pond)
Table 5	Runoff Summary - Watersheds Draining to Sediment Pond
Table 6	Runoff Control Structure - Watershed Summary
Table 7	Runoff Control Structure - Flow Summary
Table 8	Disturbed Ditch Design Summary
Table 9	Disturbed Culvert Design Summary
Table 10	Undisturbed Culvert Design Summary

Figures:

Figure 1	Culvert Nomograph
Figure 2	Rip-Rap Chart
Figure 3	Disturbed Ditch Typical Section
Figure 4	Trash Rack - Culvert Inlet - Typical Section
Figure 4A	UC-1 Culvert Outlet
Figure 7.26	Design of Outlet Protection - Barfield et al.

Design Parameters

2.1 Precipitation

The precipitation-frequency values for the area were taken from the approved Mining and Reclamation Plan, Horse Canyon Mine, Emery County, Utah, Volume III, submitted by I.P.A.

Frequency - Duration	Precipitation
10 year - 6 hour	1.30"
10 year - 24 hour	1.90"
25 year - 6 hour	1.50"
100 year - 6 hour	1.90"

2.2 Flow

Peak flows were determined from rainfall depths, drainage areas, and curve numbers and were calculated using the computer program "Triangular Hydrograph Calculations", based on SCSHYDRO Program developed by Hawkins and Marshall (1979) prepared for the Division of Oil, Gas, and Mining.. All flows are based on the SCS Curve Number Method for both SCS 6-hour and NOAA Type II, 24-hour storms.

Time of concentration of storm events were calculated for each drainage area using SCS Lane's Formula. (U.S. Soil Conservation Service, 1972):

$$L = \frac{l^{0.8} * (S+1)^{0.7}}{1900 * Y^{0.5}}$$

and

$$Tc = 1.67 * L$$

where L = watershed lag (hours)
l = hydraulic length of the watershed, or distance along the main channel to the watershed divide (feet)
S = watershed storage factor defined in Equation (2-2)
Y = average watershed slope (percent)
Tc = time of concentration (hours)

2.3 Velocity

Flow velocities for each ditch structure were also calculated using the Storm computer program with Manning's Formula:

$$V = \frac{1.49}{n} * R^{2/3} * S^{1/3}$$

where:

V	=	Velocity (fps)
R	=	Hydraulic Radius (ft.)
S	=	Slope (ft. per ft.)
n	=	Manning's n; Table 3.1, p. 159,

"Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner & Haan, 1983.

Note: The following Manning's n were used in the calculations:

Structure	Manning's n
Culverts (cmp)	0.024
Culverts (HDPE)	0.013
Unlined Disturbed Area Ditches	0.030
Lined Disturbed Area Ditches	0.032 - 0.040

2.4 Drainage Areas

All drainage areas were determined directly from Plate 7-1, "Permit Area Hydrology Map", Plate 7-2, "Disturbed Area Hydrology/Watershed", or Plate 7-5 "Proposed Sediment Control".

2.5 Slopes, Lengths

All slopes and lengths were measured directly from the topography on Plates 7-1, 7-2, and/or 7-5.

2.6 Runoff Volume

Runoff was calculated using the SCS Curve Number formula for both NOAA Type II, 24-hour and SCS 6-hour storms; using the SCSHYDRO computer program:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

where:

Q = Runoff in inches
P = Precipitation in inches

$$S = \frac{1000}{CN} - 10$$

CN = Runoff Curve Number

2.7 Runoff Curve Numbers

Two curve numbers were utilized for the undisturbed areas. Areas with milder slopes (less than 30%) were given a runoff curve number of 75. All other undisturbed areas (30% slope or greater) were given a runoff curve number of 83. These numbers were taken directly from the approved "Mining and Reclamation Plan, Horse Canyon Mine, Emery County, Utah, Volume III", submitted by I.P.A. The numbers in that plan were based on vegetation and soils data from on-site.

A runoff CN of 90 is used for all disturbed areas. This value is based on commonly used and approved values and from Table 2.20, (p. 82, Barfield, et al, 1983).

The following is a summary of runoff curve numbers used in these calculations:

Watershed	Runoff CN
Undisturbed (<30% slopes):	75
Undisturbed (>30% slopes):	83
Disturbed:	90

2.8 Culvert Sizing

Minimum culvert sizing is based on the either the inlet control nomograph or Manning's Equation. Culverts were evaluated for inlet control conditions to determine the minimum pipe size using the Culvert Nomograph included as Figure 1 of this Appendix. If the pipe had a HW/D ratio equal to or greater than 1.0 or the slope were less than 2% the Hydraulic Toolbox, Version 4.0 or later version computer program was used to determine the pipe flow diameter using:

$$D = \left(\frac{2.16\ Q\ n}{\sqrt{s}}\right)^{0.35}$$

where:	D	=	Required Diameter (feet)
	Q	=	QP = Peak Discharge (cfs)
	n	=	Roughness Factor (0.025 for CMP)
	S	=	Slope (ft. per ft.)

2.9 Culverts

Culverts have been sized according to the calculations previously described, and are shown on Plate 7-5, "Proposed Sediment Control". Culverts carrying undisturbed drainages are designated with UC- Letters (i.e. UC-1). All undisturbed area drainage culverts will be fitted with trash racks to minimize plugging by rocks or other debris.

Trash racks will be provided at the inlet for all undisturbed drainage culverts. These will consist of 3/4" steel bars welded on 6" centers across the flared inlet structures of each culvert. Bars will be sloped from the front of the inlet structure up to the top of the culvert. This ramp configuration will allow trash, branches and other potential obstructions to be swept up and away from the inlet rather than being impinged against the grates during a flow event. Rip rap will be placed around the flared inlet structure and above it to a height of at least 6" above the required headwall for each culvert. (See Figure 4 for details). Trash racks will be checked on a routine schedule and following precipitation events and all trash, branches and other obstructions will be removed.

It should be noted that all undisturbed area culverts are adequately sized to handle the expected runoff from a <u>100 year - 6 hour event</u> for maximum protection of the mine area, sediment pond and undisturbed drainage. This is well in excess of the 10 year - 6 hour event required by the regulations and is proposed as an extra measure of safety.

Disturbed area culverts and ditches are shown on the "Proposed Sediment Control", Plate 7-5. Culverts carrying disturbed drainage are designated with a DC-number (i.e. DC-1). Calculations for all disturbed area culverts and ditches are also included with this report, along with design criteria. Disturbed drainage areas draining to culverts and ditches are marked with a DA-number (i.e. DA-1).

Culverts will be inspected regularly, and cleaned as necessary to provide for passage of drainage flows. Inlets and outlets shall also be maintained so as to prevent plugging or undue restriction of water flow.

All disturbed area culverts are temporary, and will be removed upon final reclamation.

2.10 Main Canyon Culvert - Outlet Structure

The outlet of culvert UC-1 has been designed to flow onto a rip-rap apron to protect against scouring and to allow for energy dissipation. The rip-rap apron is designed to fit the natural channel configuration as closely as possible, and will allow runoff to re-enter the natural channel at a reduced velocity which is no greater than natural flow conditions. Runoff from the 100 year - 6 hour precipitation event in the canyon below the minesite has been calculated at 55.60 cfs, including sediment pond overflow.

The rip-rap apron design is based on Figure 7-26, Design of Outlet Protection - Maximum Tailwater Condition, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983. Based on the figure, the apron should be a minimum of 15' in length, widening from 5' to 9', with a 0.1% slope. The proposed length has been increased to 20', to ensure adequate time for velocity reduction. The apron slope is kept at 0.1%. Rip-rap size is conservatively placed at 12" D_{50}. Rip-rap will be placed to a depth of 1.5 D_{50} and will be placed on a 6" layer of 2" drain rock filter. Rip-rap will also be placed on the 2H:1V side slopes to the height of the culvert (5') at the culvert outlet tapering to 3' at the outlet of the apron. This rip-rap apron has been sized and designed to adequately dissipate energy from flow velocities of a 100 year - 6 hour precipitation event and resist dislodgement. The drain rock filter bed will also serve to secure the rip-rap boulders firmly in place, to add an additional element of stability, and prevent scouring underneath the armored apron. (See Figure 4A for construction details). The natural channel below the culvert has a gradient of approximately 7.76%. When the flow is routed from the culvert across the apron to the natural channel, the velocity is reduced from 6.31 fps at the culvert outlet to 1.54 fps at the outlet of the apron. (See Culvert Outlet Rip-Rap Apron Flow Velocity Calculations in Appendix 1.)

It should be noted that these calculations are based on a 100 year - 6 hour event.

Please see Part (a) of Section (b) on Page 1 regarding changes to UC-1 due to a massive storm event in 2016.

2.11 Ditches

All ditches will carry disturbed area drainage to the ponds. Ditches are shown on the "Proposed Sediment Control", Plate 7-5, and are designated with a DD-number (i.e. DD-1 for Disturbed Area Ditches) or UD-number (i.e. UD-1 for Undisturbed Area Ditches).

All ditches are designed to carry the expected runoff from a 10 year - 6 hour event with a minimum freeboard of 0.5' (See Table 8 and Figure 3).

Ditches which exhibit expected flow velocities of 5 fps or greater will be lined with rip-rap. A typical cross-section is shown on Figure 3 and flow depths and areas for all lined and unlined ditches are presented in Table 8 of this report.

Ditch slopes have been determined from Plates 7-2 and 7-5.

All ditches will be inspected regularly, and maintained to the minimum dimensions to provide adequate capacity for the design flow. All ditches are temporary and will be removed as described under the reclamation hydrology section. (Section 4)

TABLE 1

Undisturbed Watershed Summary		
Watershed	Drains To	Final
UA-1	UC-1/UC-1a	Right Fork Lila Canyon
UA-2	DD-1	Sediment Pond
UA-3	DD-1	Sediment Pond
UA-4	Sediment Pond	Sediment Pond
UA-5a	Removed	
UA-5b	Removed	
UA-6a	DD-2	Sediment Pond
UA-6b	DD-2	Sediment Pond
UA-7	ASCA Area	Left Fork Lila Canyon
UA-8	County Road Culvert	Right Fork Lila Canyon

TABLE 2

Disturbed Watershed Summary		
Watershed	Drains To	Final
DA-1	DD-1	Sediment Pond
DA-2	DD-2	Sediment Pond
DA-3	DD-3	Sediment Pond
DA-4	DD-4	Sediment Pond
DA-5	DD-5a	Sediment Pond
DA-6a	DC-6a	Sediment Pond
DA-6b	DC-6b	Sediment Pond
DA-7	DC-7	Sediment Pond
DA-8	DC-8	Sediment Pond
DA-9	DC-9	Sediment Pond
DA-10	DD-7	Sediment Pond
DA-11	DD-7	Sediment Pond
DA-12	DD-8	Sediment Pond
DA-13	DD-9 Reworked	Sediment Pond
DA-14a	DD-10	Sediment Pond
DA-14b	DD-15	Sediment Pond
DA-15	DD-11a	Sediment Pond
DA-15b	DD-11b	Sediment Pond
DA-16a	DD-12b	Sediment Pond
DA-16b	DD-12c	Sediment Pond
DA-16c	DD-12a	Sediment Pond
DA-16d	DD-12d	Sediment Pond
DA-17	Pond 2	Sediment Pond
DA-18	DD-17	Sediment Pond
DA-19	DD-18	Sediment Pond
DA-20	DD-13	Sediment Pond
DA-21	DD-12d	Sediment Pond
DA-22	DD-22	Sediment Pond
DA-23	DC-12a	Sediment Pond
Fan Portals	ASCA Areas	Right Fork Lila Canyon
TS-01	Topsoil Berm	Sediment Pond
POND 1	Sediment Pond	Sediment Pond
POND 2	Sediment Pond	Sediment Pond

TABLE 3

Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Undisturbed Watersheds					
UA-1	258.29	9475	2020	21.32	75
UA-2	1.63	1360	1000	74.26	83
UA-3	2.40	660	410	62.12	83
UA-4	14.08	1950	595	30.51	83
UA-5a	Removed				
UA-5b	Removed				
UA-6a	0.54	230	80	34.78	83
UA-6b	0.46	90	30	33.33	83
UA-7	0.90	100	30	30.00	75
UA-8	0.17	160	16	10.00	75
Disturbed Watersheds					
DA-1	1.25	650	79	12.15	90
DA-2	0.30	380	47	12.37	90
DA-3	0.25	240	10	4.17	90
DA-4	0.38	275	51	14.55	90
DA-5	2.87	580	103	17.93	90
DA-6a	0.12	155	26	16.77	90
DA-6b	0.74	220	28	25.91	90
DA-6c	0.81	410	61	14.88	90
DA-7	0.22	170	33	19.41	90
DA-8	0.41	400	50	12.50	90
DA-9	0.30	290	32	11.03	90
DA-10	0.13	250	35	14.00	90
DA-11	0.25	230	20	8.70	90
DA-12	4.38	875	85	9.71	90
DA-13a	Removed				
DA-13	1.85	490	45	9.18	90
DA-14a	0.59	630	43	6.83	90
DA-14b	0.51	490	43	8.57	90
DA-15a	1.15	497	77	15.49	90
DA-15b	3.50	885	72	8.14	90
DA-16	Removed				
DA-16a	0.12	160	30	18.7[illegible]	90
DA-16b	0.67	256	25	9.77	90
DA-16c	0.34	190	27	1[illegible]	90

TABLE 3 (Continued)

Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
DA-16d	1.12	520	60	11.54	90
DA-20	0.84	550	60	10.91	90
DA-21a	1.12	385	55	14.29	90
DA-21b	0.18	120	61	50.83	90
DA-21c	1.91	758	61	8.05	90
DA-23	0.34	360	29	8.06	80
TS-01	1.87	310	53	17.10	75
POND 1	1.92	815	30	3.68	100
Disturbed Watersheds					
DA-17	1.12	240	11	4.58	90
DA-18	0.48	490	37	7.55	90
DA-19	0.55	764	63	8.25	90
DA-22	0.38	320	19	5.94	90
Fan Portal	0.60	195	25	12.82	90
POND 2	0.47				100

TABLE 4

Runoff Summary
Undisturbed Watersheds (Not Draining to Ponds)

Watershed	10 yr. / 6 hr. Peak Flow - cfs	25 yr. / 6 hr. Peak Flow - cfs	100 yr. / 6 hr. Peak Flow - cfs	10 yr. / 24 hr. Peak Flow - cfs	10 yr. / 24 hr. Volume - ac.ft.
UA-1	7.99	13.69	30.52	35.07	7.17
UA-7	0.05	0.12	0.29	0.36	0.03
UA-8	0.01	0.02	0.05	0.07	0.01

TABLE 5

Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Runoff Summary Watershed Drainage to Sediment Pond				
Undisturbed Watersheds draining to Pond #1				
UA-2	0.40	0.58	1.12	0.09
UA-3	0.62	0.89	1.70	0.13
UA-4	3.00	4.48	9.00	0.74
UA-5a	Removed			
UA-5b	Removed			
UA-6a	0.14	0.20	0.39	0.03
UA-6b	0.12	0.18	0.33	0.02
Disturbed Watersheds				
DA-1	0.64	0.82	1.29	0.11
DA-2	0.16	0.20	0.32	0.03
DA-3	0.13	0.17	0.26	0.02
DA-4	0.20	0.26	0.40	0.03
DA-5	1.48	1.90	3.00	0.24
DA-6a	0.06	0.08	0.13	0.01
DA-6b	0.39	0.50	0.78	0.06
DA-6c	0.42	0.54	0.85	0.07
DA-7	0.12	0.15	0.23	0.02
DA-8	0.21	0.27	0.43	0.03
DA-9	0.16	0.20	0.32	0.03
DA-10	0.07	0.09	0.14	0.01
DA-11	0.13	0.17	0.26	0.02
DA-12	2.16	2.79	4.46	0.37
DA-13a	Removed			
DA-13b	Removed			
DA-13	0.95	1.22	1.92	0.16
DA-14a	0.29	0.38	0.60	0.05
DA-14b	0.26	0.34	0.53	0.04
DA-15a	0.79	1.02	1.60	0.10
DA-15b	1.56	2.01	3.20	0.29
DA-16	Removed			
DA-16a	0.06	0.08	0.13	0.01
DA-16b	0.35	0.45	0.71	0.06
DA-16c	0.18	0.23	0.36	0.03
DA-16d	0.57	0.73	1.16	0.09
DA-20	0.42	0.54	0.87	0.07
DA-21a	0.58	0.75	1.17	0.09
DA-21b	0.10	0.12	0.19	0.02
DA-21c	0.94	1.22	1.95	0.16

Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
DA-23	0.31	0.41	0.70	0.03
TS-1	0.96	1.24	1.95	0.05
POND 1				0.30
TOTAL				**3.60**

TABLE 5 (Continued)

Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Disturbed Watersheds				
Fan Portal	0.21	0.27	0.40	0.03
DA-17	0.58	0.74	1.17	0.09
DA-18	0.25	0.32	0.50	0.04
DA-19	0.27	0.35	0.56	0.05
DA-22	0.39	0.50	0.80	0.07
POND 2				0.07
TOTAL				**0.32**

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
UC-1	Culvert	UA-1, Fan Portal, Sediment Pond Overflow (Partially abandoned in Fall of 2016 due to plugging from massive storm event)
UC-1a	Culvert	UA-1, Fan Portal, Sediment Pond Overflow (Replaces abandoned portions of UC-1)
DD-1	Ditch	DA-1, UA-2, UA-3
DC-1	Culvert	DD-1
DD-2	Ditch	DC-1, DA-2, UA-6a, UA-6b
DC-2	Culvert	DD-2
DD-3	Ditch	DA-3
DC-3	Culvert	DD-3
DD-4	Ditch	DA-4, DC-2
DC-4	Culvert	DD-4, DC-3
DD-5a	Ditch	DA-5
DD-5b	Ditch	DD-5a
DD-6a	Ditch	DA-6a
DD-6b	Ditch	DD-6a, DA-6b
DC-5	Culvert	DD-5b, DD-6b
DC-6	Culvert	DC-4, DC-5, DA-6c
DC-7	Culvert	DC-6, DA-7
DC-8	Culvert	DC-7, DA-8
DC-9	Culvert	DC-8, DA-9
DD-7	Ditch	DC-9, DA-10, DA-11
DC-10	Culvert	DD-7
DD-8	Ditch	DC-10, DA-12
DD-21	Ditch	DA-20

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-11	Culvert	DD-8, DD-21
DD-9 Rework	Ditch	DC-11, DA-13
DC-12a	Culvert	DD-9 Rework
DC-12b	Culvert	DC-12a, DA-23
DC-12c	Culvert	DC-12b
DC-12d	Culvert	DC-12c
DD-10	Ditch	DA-14a
DD-11a	Ditch	DA-15a, DA-23a, Mine Water
DD-11b	Ditch	DA-15b
DC-13	Culvert	DD-12c
DD-12a	Ditch	DA-16c, DD-11a
DD-12b	Ditch	DD-12, DA-16a
DD-12c	Ditch	DD-12b, DA-16b
DD-12d	Ditch	DC13, DA-21, DD-12a
DD-13	Ditch	DA-20
DC-14	Culvert	DD-12d, DA-16d
DD-14	Ditch	DC-14, DD-13
DD-15	Ditch	DA-14b
DD-16	Ditch	DC-12d, DD-10, DD-15
DD-17	Ditch	DA-18
DD-18	Ditch	DA-19
DD-22	Ditch	DA-22
DC-15	Culvert	DD-18
DC-16	Culvert	DC-15, DD-17
DC-17	Culvert	DA-17

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-18	Culvert	DD-22

TABLE 7

Runoff Control Structure Flow Summary				
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
UC-1*	Culvert	33.07	60.15	55.60
UC-1a*	Culvert	33.07	60.15	55.60
DD-1	Ditch	1.66	4.11	- -
DC-1	Culvert	1.66	4.11	- -
DD-2	Ditch	2.08	5.15	- -
DC-2	Culvert	2.08	5.15	- -
DD-3	Ditch	0.13	0.26	- -
DC-3	Culvert	0.13	0.26	- -
DD-4	Ditch	2.28	5.55	- -
DC-4	Culvert	2.41	5.81	- -
DD-5a	Ditch	1.48	3.00	- -
DD-5b	Ditch	1.48	3.00	- -
DD-6a	Ditch	0.06	0.13	- -
DD-6b	Ditch	0.45	0.91	- -
DC-5	Culvert	1.93	3.91	- -
DC-6	Culvert	4.76	10.57	- -
DC-7	Culvert	4.88	10.80	- -
DC-8	Culvert	5.09	11.23	- -
DC-9	Culvert	5.25	11.55	- -
DD-7	Ditch	5.45	11.95	- -
DC-10	Culvert	5.45	11.95	- -
DD-8	Ditch	7.61	16.41	- -
DC-11	Culvert	7.61	16.41	- -
DD-9 Reworked	Ditch	8.56	20.87	- -

TABLE 7

Runoff Control Structure Flow Summary				
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
DC-12a	Culvert	8.56	20.87	- -
DC-12b	Culvert	8.87	22.82	- -
DC-12c	Culvert	8.87	22.82	- -
DC-12d	Culvert	8.87	22.82	- -
DD-10	Ditch	0.26	0.60	- -
DD-11a	Ditch	0.79	1.60	- -
DD-12a	Ditch	1.36	1.96	- -
DD-11b	Ditch	1.56	3.20	- -
DD-12	Ditch	1.56	3.20	- -
DD-12b	Ditch	1.91	3.33	- -
DD-12c	Ditch	2.26	3.46	- -
DC-13	Culvert	2.26	3.46	
DD-12d	Ditch	4.20	6.29	
DC-14	Culvert	4.20	6.29	- -
DD-13	Ditch	0.42	1.16	- -
DD-14	Ditch	4.62	7.45	- -
DD-15	Ditch	0.26	0.53	- -
DD-16	Ditch	9.42	23.95	- -
DD-17	Ditch	0.25	0.50	- -
DD-18	Ditch	0.27	0.56	- -
DA-22	Ditch	0.39	0.80	- -
DC-15	Culvert	0.27	0.56	- -
DC-16	Culvert	0.52	1.06	- -
DC-17	Culvert	0.58	1.17	- -
DC-18	Culvert	0.39	0.80	- -

* UC-1 and UC-1a flow values includes sum of 25yr-6hr peak flows for UA-1 13.69 cfs from Table 4 and 25yr-6hr Sediment Pond 1 peak flow of 26.33 cfs & Fan Portal flow from Table 5- 0.27cfs.

TABLE 8

Disturbed Ditch Design Summary

Ditch	DD-1	DD-2	DD-3	DD-4	DD-5a	DD-5b
Slope (%)	13.01	11.98	1.11	11.76	3.33	55.45
Length (ft.)	607	334	180	170	390	110
Manning's No.	0.035	0.035	0.03	0.035	0.03	0.04
Side Slope (H:V)	3:1	3:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	2.00	2.00	0.00	2.00	2.00	2.00
Peak Flow 10/6 (cfs)	1.66	2.08	0.13	2.28	1.48	1.48
Peak Flow 10/24 (cfs)	4.11	5.15	0.26	5.55	3.00	3.00
Flow Depth (ft.) 10/6	0.17	0.19	0.24	0.21	0.21	0.11
Flow Depth (ft.) 10/24	0.27	0.31	0.31	0.35	0.32	0.17
Flow Area ($ft.^2$) 10/6	0.41	0.49	0.11	0.51	0.52	0.25
Flow Area ($ft.^2$) 10/24	0.77	0.93	0.19	0.93	0.84	0.40
Velocity (fps) 10/6	4.03	4.22	1.17	4.52	2.86	5.93
Velocity (fps) 10/24	5.35	5.55	1.39	5.96	3.55	7.58
Rip-Rap Req'd (Y/N)	N	N	N	N	N	Y
Rip-Rap D_{50}	-	-	-	-	-	3"

Note: Slope/Lengths from Plate 7-2.

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-6a	DD-6b	DD-7	DD-8	DD-9 Rework	DD-10	DD-11a
Slope (%)	11.76	5.38	8.11	2.22	2.31	7.46	7.31
Length (ft.)	170	130	148	142	190	630	260
Manning's No.	0.030	0.030	0.035	0.030	0.035	0.030	0.035
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	0.00	0.00	2.00	2.00	2.00	0.00	0.00
Peak Flow 10/6 (cfs)	0.06	0.45	5.45	7.61	8.56	0.26	0.79
Peak Flow 10/24 (cfs)	0.13	0.91	11.95	16.41	20.87	0.60	1.60
Flow Depth (ft.) 10/6	0.11	0.28	0.38	0.59	0.67	0.21	0.13
Flow Depth (ft.) 10/24	0.15	0.36	0.58	0.88	1.05	0.29	0.20
Flow Area (ft.^{2}) 10/6	0.03	0.16	1.05	1.88	2.27	0.09	0.24
Flow Area (ft.^{2}) 10/24	0.05	0.27	1.83	3.29	4.33	0.17	0.47
Velocity (fps) 10/6	2.33	2.87	5.21	4.04	3.79	2.88	2.70
Velocity (fps) 10/24	2.83	3.43	6.55	4.99	4.82	3.55	3.42
Rip-Rap Req'd (Y/N)	N	N	Y	N	N	N	N
Rip-Rap D_{50}	-	-	3"	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-11b	DD-12a	DD-12b	DD-12c	DD-13	DD-14	
Slope (%)	0.93	15.32	14.29	11.05	9.05	3.24	
Length (ft.)	540	235	70	190	475	340	
Manning's No.	0.030	0.035	0.030	0.035	0.030	0.035	
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	
*Bottom Width (ft.)	2.00	0.0	0.0	2.0	0.0	0.0	
Peak Flow 10/6 (cfs)	1.56	1.36	1.91	2.26	0.42	4.62	
Peak Flow 10/24 (cfs)	3.20	1.96	3.33	3.46	1.16	7.45	
Flow Depth (ft.) 10/6	0.32	0.37	0.40	0.21	0.25	0.78	
Flow Depth (ft.) 10/24	0.47	0.42	0.49	0.29	0.36	0.93	
Flow Area ($ft.^2$) 10/6	0.83	0.27	0.32	0.51	0.12	1.22	
Flow Area ($ft.^2$) 10/24	1.38	0.358	0.49	0.74	0.26	1.75	
Velocity (fps) 10/6	1.87	5.00	5.95	4.40	3.43	3.79	
Velocity (fps) 10/24	2.31	5.48	6.84	4.66	4.43	4.27	
Rip-Rap Req'd (Y/N)	N	Y	Y	N	N	N	
Rip-Rap D_{50}	-	3"	3"	-	-	-	
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	DD-15	DD-16	DD-17	DD-18	DD-21	DD-22	
Slope (%)	6.94	1.52	8.43	7.75	8.61	5.00	
Length (ft.)	490	260	415	710	360	480	
Manning's No.	0.030	0.030	0.030	0.030	0.030	0.030	
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	
*Bottom Width (ft.)	0.0	4.0	0.0	0.0	0.0	0.0	
Peak Flow 10/6 (cfs)	0.79	9.92	0.25	0.27	0.25	0.39	
Peak Flow 10/24 (cfs)	2.20	25.02	0.50	0.56	0.51	0.80	
Flow Depth (ft.) 10/6	0.32	0.53	0.21	0.22	0.21	0.27	
Flow Depth (ft.) 10/24	0.42	1.18	0.27	0.28	0.27	0.35	
Flow Area (ft.^{2}) 10/6	0.21	2.68	0.09	0.09	0.08	0.14	
Flow Area (ft.^{2}) 10/24	0.35	5.16	0.14	0.16	0.14	0.25	
Velocity (fps) 10/6	3.83	3.42	2.94	2.90	2.96	2.70	
Velocity (fps) 10/24	4.57	4.85	3.49	3.48	3.54	3.23	
Rip-Rap Req'd (Y/N)	N	N	N	N	N	N	
Rip-Rap D_{50}	-	-	-	-	-	-	
Note: Slope/Lengths from Plate 7-2.							

TABLE 9

Disturbed Culvert Design Summary						
Culvert	DC-1	DC-2	DC-3	DC-4	DC-5	DC-6
Slope (%)	11.67	10.00	53.85	9.81	4.71	28.04
Length (ft.)	60	60	65	400	350	107
Manning's No.	0.024	0.024	0.024	0.024	0.024	0.024
Peak Flow 10/6 (cfs)	1.66	2.08	0.13	2.41	1.93	4.76
Peak Flow 10/24 (cfs)	2.85	3.37	0.21	5.81	3.91	10.57
Diam. Proposed (ft.)	1.5	1.5	1.5	2.0	2.0	2.0
Velocity (fps) 10/6	6.72	6.79	5.32	6.20	4.93	12.06
Rip-Rap D_{50}	3"	3"	3"	3"	-*	-*
Note: Slope/Lengths from Plate 7-5. Velocity: (Hydraulic Toolbox Program)						

* Discharge is into manhole - no riprap needed

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-7	DC-8	DC-9	DC-10	DC-11	DC-12a
Slope (%)	7.74	5.99	5.91	2.27	4.95	0.48
Length (ft.)	155	167	186	60	101	140
Manning's No.	0.024	0.024	0.024	0.024	0.024	0.015
Peak Flow 10/6 (cfs)	4.88	5.09	5.25	5.45	7.86	8.87
Peak Flow 10/24 (cfs)	10.80	11.23	11.55	11.95	16.25	22.82
Diam. Proposed (ft.)	2.0	2.0	2.0	2.0	2.0	2.5
Velocity (fps) 10/6	7.70	7.11	7.14	5.11	7.5	4.68
Rip-Rap D_{50}	-*	-*	3"	3"	3"	-*
Note: Slope/Lengths from Plate 7-5. Velocity: (Hydraulic Toolbox Program)						

* Discharge is into manhole - no riprap needed

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-12b**	DC-12c**	DC-12d	DC-13	DC-14	DC-15
Slope (%)	1.55	2.46	-0.12	3.33	5.00	2.22
Length (ft.)	79	357	9	60	40	45
Manning's No.	0.015	0.015	0.015	0.024	0.024	0.024
Peak Flow 10/6 (cfs)	8.62	8.62	8.62	2.26	4.20	0.27
Peak Flow 10/24 (cfs)	22.82	22.82	22.82	3.46	6.29	0.56
Diam. Proposed (ft.)	2.0	2.0	2.75	2.0	2.0	1.50
Velocity (fps) 10/6	7.15	8.47	4.02	4.13	6.31	2.72
Rip-Rap D_{50}	-	-	-	-	3"	-
Note: Slope/Lengths from Plate 7-5. Velocity: (Hydraulic Toolbox Program)						

** Discharge is into a manhole - no riprap required

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	DC-16	DC-17	DC-18	SP2-1*		
Slope (%)	11.20	5.00	3.73	0.50		
Length (ft.)	25	120	27	165		
Manning's No.	0.024	0.024	0.024	0.024		
Peak Flow 10/6 (cfs)	0.52	0.58	0.39	-		
Peak Flow 10/24 (cfs)	1.06	1.17	0.80	2.72*		
Diam. Proposed (ft.)	1.50	1.50	1.50	1.50		
Velocity (fps) 10/6	5.80	2.93	2.93	2.45		
Rip-Rap D_{50}	3"	-	-	-		
Note: Slope/Lengths from Plate 7-5. Velocity: (Hydraulic Toolbox Program)						

* SP2-1 Peak Flow is a 25/6 event

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TABLE 10

Undisturbed Culvert Design Summary		
Culvert	UC-1	UC-1a
Min. Slope (%)**	0.50	0.50
Length (ft.)	120	360
Manning's No.	0.025	0.025
Peak Flow 10/6 (cfs)*	33.07	33.07
Peak Flow 100/6 (cfs)*	55.60	55.60
Diam. Proposed (ft.)	5.00	5.00
Velocity (fps) 100/6	5.22	5.22

* Note: Peak flow values include 25 year-6 hour flow from Sediment Pond 1 (see Tables 4 and 7).
** Pipe slope from Plate 7-6a.
***Note: A large portion of culvert UC-1 was abandoned and replaced with UC-1a in the fall of 2016. See Part (a) of Section (b) on Page 1 regarding changes to UC-1.

References:

Hawkins, R.H. and K.A. Marshall. 1979. Storm Hydrograph Program. Final Report to the Utah Division of Oil, Gas and Mining. Utah State University. Logan, Utah.

DESIGN OF SEDIMENT CONTROL STRUCTURES

Design Specifications:

3.1 Design and Construction Specifications for Sedimentation Pond
3.2 Sediment Yield
3.3 Sediment Pond Volume
3.4 Sediment Pond Summary

Tables:

Table 11 Sediment Pond Design
Table 12a Sediment Pond #1 - Stage Volume Data
Table 12b Sediment Pond #2 - Stage Volume Data
Table 13a Sediment Pond #1 - Stage Discharge Data
Table 13b Sediment Pond #2 - Stage Discharge Data

Figures:

Figure 5.4 Depth of 2-year, 6-hour rainfall - Barfield et al.
Figure 5.15 Slope-effect Chart - Barfield et al.

3.1 Design and Construction Specifications for Sedimentation Pond

- All construction of sedimentation ponds will be performed under the direction of a qualified, registered professional engineer.
- The Sediment Pond #1 will be located in an existing low area where the Right Fork of Lila Canyon passes beneath the existing road. The existing road fill and culvert will be removed, and the pond embankment (road fill) will be reconstructed and compacted. The existing culvert will be replaced with UC-1/UC-1a which will extend approximately 400' up the Right Fork of Lila Canyon. This culvert will be equipped with an inlet section and trash rack, and will allow undisturbed runoff and treated access road drainage to pass beneath the sediment pond. The majority of the pond will be in an existing channel area, and is therefore considered incised. The pond will be equipped with a culvert riser principal spillway with an oil skimmer, a decant, and a second culvert riser emergency spillway with an oil skimmer. Both spillways will discharge to the oversized (60") CMP culvert running beneath the pond.
- The area of pond constructed shall be examined for topsoil, and where present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.
- In areas where fill is to be placed for the pond impoundment structures, natural ground shall be removed to at least 12" below the base of the structure.
- Native materials shall be used where practical. Fill will be placed in lifts not to exceed 6" and compacted prior to placement of next lift. Compaction of all fill materials shall be at least 95%.
- Rip-rap or other protection (culverts, concrete, etc.) will be placed at all pond inlets to prevent scouring. Rip-rap will consist of substantial, angular (non-slaking) rock material of adequate size.
- Decanting of the pond, as required, will be accomplished by use of a decant pipe with an inverted inlet as shown on Plate 7-6a. Samples will be collected prior to decanting of the pond. If the quality of the water meets the requirements of the U.P.D.E.S. Permit, decanting will proceed. Discharge samples will be collected as per the approved U.P.D.E.S. Discharge Permit.
- Slopes of the embankments shall not be steeper than 2h:1v, inside or outside, with a total of the inslope and outslope not less than 5h:1v, except where areas of the pond are incised.
- External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability.
- Top width of the embankment shall be not less than (H+35)/5, where H = Height of Dam in feet from the upstream toe.

3.2 Sediment Yield

The Universal Soil Equation (USLE) was used to estimate sediment yield from disturbed areas. All soil loss from this area was assumed to be delivered to, and deposited in the sedimentation pond.

Erosion rate (A) in tons-per-acre-per-year is determined using the USLE as follows:

$$A = (R)\,(K)\,(LS)\,(CP)$$

Where the variables R, K, LS, and CP are defined as follows:

Variable "R" is the rainfall factor which can be estimated from $R = 27P^{2.2}$; where P is the 2-year, 6-hour precipitation value. P for the Lila Canyon area is 0.75" as shown in Figure 5.4, page 315, Barfield, et.al. 1983. Therefore, the estimated value of "R" for this area is 14.34.

Variable "K" is the soil erodibility factor. For disturbed areas, the "K" value is conservatively estimated to be 0.5. For disturbed runoff, but uncompacted and ungraded areas, "K" is estimated at 0.320. "K" is estimated to be 0.035 for undisturbed areas.

Variable "LS" is the length-slope factor. This figure was determined by applying the slope length and percentage for each sub-drainage area to the chart in Figure 5.15, p. 334, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983.

Variable "CP" is the control practice factor, which can be divided into a cover and practice factor. Values were determined from Appendix 5A, Barfield, et.al., 1983.

Site	CP Factor
Compacted Areas	1.20
Disturbed/Uncompacted Areas	0.20
Undisturbed Areas	0.15

The sediment volume is based on a density of 100 pounds per cubic foot of sediment.

SEDIMENT YIELD CALCULATIONS - USLE - Drainages to Sediment Ponds

Drainage	R	K	Area (ac)	Slope Length (Ft)	Slope (%)	LS	CP	A (T/ac)	Yield (ac-ft)
Draining to Sediment Pond 1									
DA-1	14.34	0.500	1.25	650	12.15	4.67	1.20	40.14	0.0230
DA-2	14.34	0.500	0.30	380	12.37	3.67	1.20	31.55	0.0043
DA-3	14.34	0.500	0.25	240	4.17	0.59	1.20	5.10	0.0006
DA-4	14.34	0.500	0.38	275	18.55	5.95	1.20	51.20	0.0089
DA-5	14.34	0.500	2.87	580	17.76	8.05	1.20	69.26	0.0913
DA-6a	14.34	0.500	0.12	155	16.77	3.79	1.20	32.63	0.0018
DA-6b	14.34	0.500	0.74	220	12.73	2.92	1.20	25.10	0.0085
DA-6c	14.34	0.500	0.81	410	14.88	5.09	1.20	43.81	0.0163
DA-7	14.34	0.500	0.22	170	19.41	5.04	1.20	43.35	0.0044
DA-8	14.34	0.500	0.41	400	12.50	3.82	1.20	32.90	0.0062
DA-9	14.34	0.500	0.30	290	11.03	2.69	1.20	23.14	0.0032
DA-10	14.34	0.500	0.13	250	14.00	3.61	1.20	31.06	0.0019
DA-11	14.34	0.500	0.25	230	8.70	1.68	1.20	14.50	0.0017
DA-12	14.34	0.500	4.38	875	9.71	3.86	1.20	33.22	0.0668
DA-13	14.34	0.500	1.85	490	8.16	2.25	1.20	19.33	0.0164
DA-14a	14.34	0.500	0.59	630	6.83	1.99	1.20	17.13	0.0046
DA-14b	14.34	0.500	0.51	490	8.78	2.49	1.20	21.46	0.0050
DA-15a	14.34	0.500	1.55	497	15.49	5.98	1.20	51.43	0.0272
DA-15b	14.34	0.500	3.50	885	8.02	2.95	1.20	25.35	0.0407
DA-16a	14.34	0.500	0.12	251	15.54	4.27	1.20	36.74	0.0020
DA-16b	14.34	0.500	0.67	275	14.18	3.86	1.20	33.24	0.0102
DA-16c	14.34	0.500	0.34	221	13.57	3.23	1.20	27.80	0.0043
DA-20	14.34	0.500	0.84	410	8.54	2.19	1.20	18.86	0.0073
DA-21a	14.34	0.500	1.12	385	14.03	4.49	1.20	38.67	0.0199
DA-21b	14.34	0.500	0.18	120	8.33	1.14	1.20	9.85	0.0008
DA-21c	14.34	0.500	1.91	758	5.54	1.66	1.20	14.33	0.0126
DA-23	14.34	0.500	0.34	270	14.81	4.10	1.20	35.29	0.0055
UA-2	14.34	0.500	1.63	1360	73.53	110.75	0.15	119.11	0.0891
UA-3	14.34	0.500	2.40	540	75.93	72.56	0.15	78.04	0.0860
UA-4	14.34	0.500	14.08	1540	38.64	46.77	0.15	50.30	0.3252
UA-6a	14.34	0.500	0.54	370	21.62	8.87	0.15	9.54	0.0024
UA-6b	14.34	0.500	0.46	130	23.08	5.86	0.15	6.3	0.0013
TS-01*	14.34	0.500	1.87	660	17.10	8.08	0.20	11.58	0.0099
POND 1	14.34	0.500	1.92	340	3.68	0.59	1.20	5.11	0.0045
TOTAL									0.9139

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Draining to Sediment Pond 2									
DA-17	14.34	0.500	1.12	240	4.58	0.66	1.20	5.68	0.0029
DA-18	14.34	0.500	0.48	490	7.55	2.02	1.20	17.34	0.0038
DA-19	14.34	0.500	0.55	764	8.25	2.85	1.20	24.51	0.0062
DA-22	14.34	0.500	0.79	610	4.59	0.96	1.20	8.26	0.0030
POND 2	14.34	0.500	0.47	45	12.82	1.33	1.20	11.48	0.0025
TOTAL									0.0184

* Disturbed Runoff / Uncompacted Area
** Paved Areas

3.3 Sediment Pond Volume

The volumes shown in Tables 11a and 11b are from the volumes calculated from the precipitation, runoff and sediment yield for a 10 year-24 hour precipitation event. The volumes were calculated based on the disturbed areas (and contributing undisturbed areas) runoff values, developed using the design parameters described in this section.

TABLE 11a

Sediment Pond #1 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (3.60 ac-ft, from Table 5, 10yr/24hr Vol) =	3.60 ac-ft
3. Sediment Storage Volume USLE 0.9139 ac-ft./yr. x 3.0 yrs. =	2.74 ac-ft
4. Total Required Pond Volume 3.38 + 2.74 =	6.34 ac-ft
5. Peak Flow (25 yr. - 6 hr. event) =	24.81 cfs
6. Pond Design Volume @ Principle Spillway = (See Table 12a)	13.01 ac-ft
7. Extra storage [1]	6.67 ac-ft

[1] difference in storage between the top of the require storm water storage and the spillway elevation

TABLE 12a

Sediment Pond #1 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (cu. ft.)	Acc. Volume (ac. ft.)	Remarks
5839	26870	0	0.00	Bottom of Pond
5840	28640	27755	0.64	
5841	30480	29560	1.32	Sediment Storage - 2.74 ac-ft
5842	32320	31400	2.04	
5843	34210	33265	2.80	Sediment Cleanout Level 5843.6
5844	36140	35175	3.61	Decant 5844.6 - 4.21 ac-ft
5845	38110	37125	4.46	Runoff Storage - 3.60 ac-ft
5846	40120	39115	5.36	
5847	42160	41140	6.30	Runoff + Sed Storage - 6.34 ac-ft
5848	44260	43210	7.29	
5849	46390	45325	8.33	
5850	48550	47470	9.42	Extra Storage - 6.67 ac-ft
5851	50970	49760	10.57	
5852	53490	52230	11.77	
5853	55010	54250	13.01	Principal Spillway - 5853
5854	56590	55800	14.29	Emergency Spillway - 5854
5855	58380	57485	15.61	Top of Embankment

TABLE 11b

Sediment Pond #2 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (from Table 5, 10yr/24hr) =	0.32 ac-ft.
3. Sediment Storage Volume USLE 0.0184 ac-ft./yr. x 3 yrs. =	0.06 ac-ft
4. Total Required Pond Volume 0.32 + 0.06 =	0.38 ac-ft
5. Peak Flow (25 yr. - 6 hr. event)* =	1.41 cfs
6. Pond Design Volume @ Principle Spillway = (See Table 12b)	1.36 ac-ft
* Peak Flow values from Table 5, sum of all contributing watersheds.	

TABLE 12b

Sediment Pond #2 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (cu. ft.)	Acc. Volume (ac. ft.)	Remarks
5845	0	0	0	Bottom of Pond 5845.0
5846	312	156	0.00	
5847	6935	3623.5	0.08	Sediment Cleanout Level 5847.0
5848	8045	7490	0.26	Decant 5847.9
5849	8650	8348	0.45	
5850	9270	8960	0.65	Principal Spillway 5849.61
5851	9910	9590	0.87	
5852	10560	10235	1.11	Emergency Spillway 5851.25
5853	11230	10895	1.36	
5854	11920	11575	1.62	
5855	12890	12406	1.91	
5855.5	14120	6753	2.06	Top of Embankment

TABLE 13a

Sediment Pond #1 Stage/Discharge Data			
Head above Spillway(ft.)	Q (cfs) Weir Controlled	Q (cfs) Orfice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	2.53	15.22	95.68
0.4	7.15	21.53	96.23
0.6	13.14	26.36	96.77
0.8	20.23	30.44	97.31
1.0	28.27	34.04	97.85
1.2	37.17	37.28	98.38
1.4	46.84	40.27	98.91
1.6	57.22	43.05	98.91
1.8	68.28	45.66	99.44
2.0	79.97	48.13	99.97

Note: 1- 25 year - 6 hour flow = 24.81 cfs.
2- Flow will be weir controlled at a head of 0.91' over riser inlet.

Weir Controlled

$Q = CLH^{1.5}$; where: C= 3.0, L= Circumference of Riser = 9.4248', R=1.5'

Orfice Controlled

$Q = C'a\,(2gH)^{0.5}$; where: C= 0.6, a= Area of Riser = 7.0686 ft², R=1.5', g= 32.2 ft/sec²

Pipe Flow Controlled

$$Q = \frac{a\,(2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$$; where

a = Area of Pipe = 7.07 ft², R = 1.5'
H' = Head = H + 14.5 (Riser) + 0.35 (Slope) + 0.6*4 (barrel height)
Ke = 1.0
Kb = 0.5
Kc = 0.043
L = 70'

TABLE 13b

Sediment Pond #2 Stage/Discharge Data			
Head above Spillway (ft.)	Q (cfs) Weir Controlled	Q (cfs) Orfice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	0.84	1.69	5.81
0.4	2.38	2.39	5.88
0.6	4.38	2.93	5.95
0.8	6.74	3.38	6.02
1.0	9.42	3.78	6.09
1.2	12.39	4.14	6.16
1.4	15.61	4.47	6.22
1.6	19.07	4.78	6.29
1.8	22.76	5.07	6.36
2.0	26.66	5.35	6.42

Note: 1- 25 year - 6 hour flow =1.41 cfs.
2- Flow will be Weir controlled at a head of 0.36' over riser inlet.

Weir Controlled

$Q = CLH^{1.5}$; where: C= 3.0, L= Circumference of Riser =3.14', R=0.5'

Orfice Controlled

$Q = C'a\,(2gH)^{0.5}$; where: C= 0.6, a= Area of Riser = 0.79 ft^2, R=0.5', g= 32.2 ft/sec^2

Pipe Flow Controlled

$Q = \dfrac{a\,(2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$; where

a = Area of Pipe = 0.79 ft^2, R = 0.5'
H' = Head = H + 6.0 (Riser) + 0.8 (Slope) + 0.6*2 (barrel height)
Ke = 1.0
Kb = 0.5
Kc = 0.043
L = 160'

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3.4 Sediment Pond Summary

a) The sedimentation ponds have been designed to contain the disturbed area (and contributing undisturbed area) runoff from a 10 year-24 hour precipitation event, along with multiple years of sediment storage capacity. Runoff to the ponds will be directed by various ditches and culverts as described in the plan.

b) The required volume for Sediment Pond #1 is calculated at 6.34 acre feet, including 3.0 years of sediment storage. The proposed sediment pond size will have a volume of approximately 13.01 acre feet (at the principal spillway), which is more than adequate. The extra storage 6.67 acre-foot in Pond 1 will be used for extra storage volume, if needed for future expansions. The required volume for Sediment Pond #2 is calculated at 0.38 acre feet, including 3 years of sediment storage. The proposed sediment pond size will have a volume of approximately 1.36 acre feet (at the principal spillway), which is more than adequate.

c) The ponds will meet a theoretical detention time of 24 hours. Both are equipped with a decant, a culvert principal spillway and a culvert emergency spillway. Any discharge from the ponds will be in accordance with the approved UPDES Permit.

d) The pond inlets will be protected from erosion, and the spillways will discharge into the natural drainages in a controlled manner.

e) The ponds are temporary, and will be removed upon final reclamation of the property.

f) The ponds will be constructed according to the regulations and under supervision of a Registered, Professional Engineer.

DESIGN OF DRAINAGE CONTROL STRUCTURES FOR RECLAMATION

Reclamation Hydrology:

4.1 General
4.2 Reclamation Area Drainage Control

Tables:

Table 14 Final Reclamation - Drainage Areas Contributing to Structures
Table 15 Final Reclamation - Drainage Structure Flow Summary
Table 16 Final Reclamation - Reclamation Structure Design Parameters
Table 17 Final Reclamation - Reclamation Structure Flow Calculations

Figures:

Figures 5 Filter Fence Construction

Reclamation Hydrology

4.1 General

Upon completion of operations at the Lila Canyon Minesite, the portals will be sealed and backfilled, and all structures will be removed except for the sediment ponds, bypass culvert UC-1/UC-1a, reclamation ditches and temporary sediment controls such as silt fences or straw bales.

Any refuse or mine development waste previously deposited under the approved plan will also be left in place. Concrete will be buried beneath at least 2' of non-toxic, non-acid material. Any potentially toxic or acid-forming material buried on site will be covered with a minimum of 4' of material.

The sediment ponds, and all remaining drainage controls will be removed upon completion of Phase II Bond Release.

4.2 Reclamation Area Drainage Control

During the initial phase of reclamation, all drainage controls will be removed with the exception of the two sediment ponds, bypass culvert UC-1/UC-1a, reclaimed ditches RD-1 and RD-2, and temporary sediment controls such as straw bales or silt fences installed in the undisturbed drainages.

As undisturbed drainage culverts are removed, a minimum of two straw bale or silt fence barriers will be installed downstream of each location for sediment control purposes.

Disturbed areas will be regraded and reclaimed ditches RD-1 and RD-2 will be installed to collect the runoff from the site area and direct it to the outlet structures (see Plate 7-7).

When the vegetation and sediment contribution levels meet requirements for Phase II Bond Release, a series of at least three straw bale or silt fence barriers will be placed downstream of the sediment pond outlets. All upstream sediment controls will be removed. Reclaimed ditches RD-1 and RD-2 will also be removed, regraded and reseeded. Culvert UC-1/UC-1a will be cut off at the location of the principal pond spillway.

The portion of culvert UC-1 remaining beneath the road will be left as a permanent drainage control. The culvert will be equipped with an inlet section and rip-rapped headwall. The culvert is adequately sized to safely pass runoff from a 100 year - 6 hour event, as shown in Table 10. To ensure that state of the art technology is incorporated, the final reclamation plans for the sedimentation pond areas will be submitted prior to commencement of final reclamation of this area.

The remainder of culvert UC-1/UC-1a will be removed, and the natural channel restored through the sediment pond #1 area. The sediment pond structures will also be removed, the pond areas regraded as necessary and reseeded. The Sediment Pond #1 embankment will remain as a permanent feature, since the existing (and proposed future) road through the area passes over the embankment.

Following the successful establishment of vegetation, and when effluent standards are met, the sediment ponds will be removed. The same methodologies relative to recontouring, top soil application and seeding will be utilized in grading and revegetating the pond areas as outlined in Chapters 2, 5, and Appendix 5-8.

The pond embankment will be narrowed to facilitate the even character of the Lila Canyon Road. The 60 inch bypass culvert (UC-1) will be removed to within six feet of the road embankment. A newly formed channel will be constructed at an approximate four percent grade to intercept the inlet of the culvert at its intersection of the road. The road embankment and associated new channel will be armored by the Operator with an underlayment of filter gravel, with D_{50}-30 inch rip-rap. The new area of disturbance including the newly formed channel will have top soil spread in and around the rip-rap. The Operator will use the same seeding and mulching methods described in Appendix 5-8 will be used on this area as well. See Figure 4 for a detailed design.

TABLE 14

Final Reclamation Drainage Areas Contributing to Structures	
Channel	Contributing Watershed/Structure
RD-1	RW-1
RD-2	RW-2
UC-1/UC-1a	UA-1, UA-4, RD-1

TABLE 15

Final Reclamation Drainage Structure Flow Summary	
Channel	*100/6 Flow (cfs)
RD-1	13.26
RD-2	10.89
UC-1/UC-1a	**72.62

* CN = 83.
** Combined flow for watersheds UA-1, UA-4, and RW-2.

TABLE 16

Final Reclamation Reclamation Structure Design Parameters					
Channel	Bottom Width (ft.)	Side Slope H:V	Slope %	Reclaimed Depth (ft.)	Manning's No.
RD-1	3	2:1	5.00	1.5	0.035
RD-2	3	2:1	10.00	1.5	0.035
UC-1/UC-1a	60" Diam.	-	0.90*	60" Diam.	0.025

* Pipe slope for Plate 7-6

TABLE 17

Final Reclamation Reclamation Structure Flow Calculations			
Channel	RD-1	RD-2	UC-1/UC-1a
100 year - 6 hour event (in.)	1.90	1.90	1.90
Peak Flow (cfs)	13.26	10.89	72.62
Velocity (fps)	5.44	6.52	6.74
Required Area ($ft.^2$)	2.44	1.67	10.80
Flow Depth (ft.)	0.58	0.43	2.69

Alternate Sediment Control for Fan Site and Topsoil Storage Area

5.1 ASCA Areas

Sediment Control at the slope below water treatment area, and topsoil storage area sites will be accomplished with a combination of one or more of the following: berms, silt fences, and straw bales.
The ventilation breakouts are just punch outs and will have insignificant disturbance associated with them. (Plate 5-2 and 5-2a) However, they are addressed as ASCA's and are addressed here even though there will be only insignificant surface disturbance. The ASCA's will be seeded upon final reclamation.

The topsoil collected from the topsoil storage area sites will be located downslope from the sites and will be used in the construction of the berm. The berm will be constructed a minimum of two feet high and have 2:1 side slopes. The berm will control the flow from a 10 year-24 hour precipitation event. Silt fence will be selectively placed to help control run-off. The berm will be stabilized with vegetation to prevent erosion. As much as practical, the vegetation techniques used on the main topsoil pile will be utilized on the fan topsoil berm.

The outside of the berm will be protected with a silt fence or gravel. The gravel, if used, would help augment the revegetation. Construction details of the silt fence/filter fence are shown if Figure 5.

The outslope of the portal access road, outslope of the water treatment pad, and ventilation break outs will have a silt fence located along the disturbed area boundary to treat the runoff from the slope. While some portions of this area will be disturbed as a result of the fill material placed for the pad and road construction, the major portion of this area is expected to remain undisturbed. As an added protection, the portions of the area that are disturbed by the fill placement will be covered with a erosion control mat to minimize the erosion from this slope and that area seeded to aid in the establishment of a vegetative cover.

Due to lack of final engineering details, the exact location of the berms, silt fences, and subsequent erosion techniques will be determined in field with the approval of UDOGM. The final determination will be made prior to the start of topsoil removal.

Run-off Calculations

5.2 Ventilation Break Outs

Insignificant surface disturbance.

5.3 Topsoil Storage Area

Acreage:	2.61 acres
Design Storm:10 year/24 hour:	1.90"
CN:	90
S:	1.111

$$Q = \frac{(P-0.25S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.22 acre feet

5.4 Water Treatment Area

Acreage:	0.37 acres
Design Storm:10 year/24 hour:	1.90"
CN:	90
S:	1.111

$$Q = \frac{(P-0.2S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.03 acre feet

Lila Canyon Mine Reclamation Bond Estimate

Bonding Calculations

Direct Costs

Subtotal Demolition and Removal	$827,920.00	
Subtotal Backfilling and Grading	$567,433.00	
Subtotal Revegetation	**$151,618.00**	
Direct Costs in 2017 Dollars	**$1,546,971.00**	

Indirect Costs

Mob/Demob	$154,697.00	**10.0%**
Contingency	$77,349.00	**5.0%**
Engineering Redesign	$38,674.00	**2.5%**
Main Office Expense	$105,194.00	**6.8%**
Project Management Fee	$38,674.00	**2.5%**
Subtotal Indirect Costs 2017 Dollars	**$414,588.00**	26.8%
Total Cost	**$1,961,559.00**	
Escalation factor		0.0232
Number of years		2
Escalation	$92,072.00	
Total Reclamation Cost 2021 Dollars	**$2,053,631.00**	
Bond Amount (rounded to nearest $1,000) 2021 dollars	$2,054,000.00	
Bond Posted	$1,817,000.00	
Difference Between Posted Bond and Cost Estimate	-$237,000.00	

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Lila Canyon Mine Reclamation Bond Estimate

Unit Costs

All unit costs were obtained from RS Means 2017 Site Work and Landscape Costs or
RS Means 2017 Heavy Construction Costs, except as noted.
All costs include overhead and profit.

Means Number	Item	Unit Cost	Units	
32 91 13.23 3100	75 HP Dozer with scarifier	5.85	MSF	
32 91 13.16 0390	Power mulcher, large, hay 1" deep	30.50	MSF	
32 01 90.13 0180	Fertilizer, hydro spread, 1.5 lb/MSF	5.00	MSF	
32 92 19.14 4600	Hydroseeder (equipment and labor only)	22.00	MSF	
05 05 05.10 0380	Fabricated steel demo, 121-500 lb	68.00	EA.	
05 05 05.10 0390	Fabricated steel demo, 501-1000 lb	91.00	EA.	
02 41 19.27 0020	Torch cutting, steel, 1" thick plate	3.21	LF	Unit cost re
02 41 16.13 0020	Building Demolition - Steel	0.27	CF	(see 02 4
02 41 16.13 0100	Building Demolition - Mixture of Types	0.40	CF	
13 05 05.50 0650	Pre-engineered steel bldg demo,>12,500 SF	1.68	SF Flr	
02 41 16.17 0280	Concrete Floor Demolition, 4" thick, reinforced	0.89	SF	
02 41 16.17 0420	Concrete Floor Demolition, 6" thick, reinforced	1.11	SF	Unit cost in
02 41 16.17 2500	Concrete Wall/Floor Demo, 12" thick, reinforced	1.57	SF	(see 02 4
03 05 05.10 0060	Concrete, Selective Demo, Reinf 1-2% of X Sec	167.00	CY	
31 23 16.42 1300	Front End Loader 3CY	2.21	CY	
31 23 23.20 1014	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	3.74	CY	
02 41 16.17 4200	On Site Disposal	11.40	CY	
Crew B-1	Portal seal, site preparation crew	1464.40	Day	See JennC
04 22 10.34 1500	Block wall, reinforced, 4" thick (2 each seal)	8.50	SF	
JennChem	Seal portals, materials	4320.00	EA.	
JennChem	Seal portals, labor	265.00	HR	
Classic Helicopters	Portal seal support, material haulage	11965.00	Job	
23 05 05.10 3600	Mechanical Equipment Demolition, Heavy	1225.00	Ton	
26 05 05.10 1570	Demo of elec transformer, 3 ph, 750kVA	1700.00	EA.	
Crew A-3H	Hydraulic crane, 12 ton, with operator	1518.58	Day	
G1030 1100	Cut and fill common earth, 8" lift, 2 passes	7.00	CY	
31 23 16.42 0260	Excavation Bulk Bank 2 CY (322BL)	1.81	CY	
31 23 16.13 3080	Backfill Trench, min haul, FE loader 2 1/4 CY	2.50	CY	
Crew B-10M	Dozer, 300 HP, 50' haul, sandy clay and loam	2978.00	Day	
Crew B-14A	Loader, 500 HP, wheel mounted, 5 CY cap	4306.40	Day	
Crew B-10G	Sheepsfoot roller, 315 HP, 8" lifts, 2 passes	2313.60	Day	
Crew B-33K	Self-propelled scraper, 34 CY, 500 HP	418.20	HR	
Crew B-34F	Off-highway rear dump truck, 40 ton, 10 MPH	2234.80	Day	
Crew B-9A	5000 gallon water truck	2041.01	Day	
02 41 13.60 1700	Chain link removal, 8'-10' high	4.44	LF	
02 41 13.17 5050	Pavement Removal, bituminous, 4" to 6" thick	9.80	SY	See Scamp
02 41 13.30 1600	Median barrier, precast conc, remove and store	14.00	LF	
Scamp	Demolition debris, off-site haul and disposal	6.00	Ton	
02 41 13.80 0200	Wood utility poles, 35'-45' high	370.00	EA.	
02 41 13.80 0300	Wood cross arms, 4'-6' long	136.00	EA.	
Crew B-6	Backhoe loader, 2 laborers, equip operator	1980.00	Day	
Crew B-7	Log chipper, crew, and assoc equipment	5025.34	Day	

Means Number	Item	Unit Cost	Units
26 05 05.10 1900	Electrical demolition, #2 wire, from conduit	30.50	CLF
02 65 10.30 0110	3000 to 5000 gal. undrgrnd steel tank removal	860.00	EA.
02 65 10.30 1023	3000 to 5000 gal. tank, disposal, 100 mi RT	830.00	EA.
02 65 10.30 0300	3000 to 5000 gal. tank, sludge removal	285.00	EA.
02 65 10.30 0390	Dispose of sludge off site	6.80	Gal
1305 05.75 0530	5000 to 12000 gal. abovegrnd steel tank removal	1625.00	EA.
02 41 13.40 0110	Demolition, CMP pipe, steel, 12"	2.60	LF
02 41 13.40 0160	Demolition, CMP pipe, steel, 18"	3.90	LF
02 41 13.40 0170	Demolition, CMP pipe, steel, 24"	14.70	LF
02 41 13.40 0180	Demolition, CMP pipe, steel, 30"-36"	17.65	LF
24 41 13.40 0190	Demolition, CMP pipe, steel, 48-60"	22.00	LF
13 05 05.60 0050	Silos, Selective Demolition, steel	2900.00	EA.
01 52 13.20 0800	Haul Conex units offsite	12.10	Mile

ɜduced 30% for no interior walls
1 16.13 5000)

ıcreased 10% for reinforcing
1 16.17 2600)

:hem bid

p bid

Lila Canyon Mine Reclamation Bond Estimate
Demolition and Removal Cost Summary

Structure/Item	Cost ($)
01 Office/Bathhouse	78,886
02 ROM Coal Stockpile	0
03 Shop/Warehouse	170,039
04 Storage Shed	348
05 Employee Parking	96,771
06 Truck Loading/Unloading Area	0
07 Equipment/Materials Storage Area	0
08 Potable Water Tank	3,741
09 Sewer Treatment Plant	887
10 Power Poles	11,603
11 Electrical Transformers	4,961
12 Overhead Power Lines	2,952
13 Buried Power Lines	816
14 Rock Dust Silo	3,147
15 Fuel & Oil Tanks	7,902
16 Reclaim Tunnel	23,160
17 Reclaim Conveyor	3,709
18 Conveyor to Loadout Bin	4,341
19 Crusher MCC Building	364
20 Truck Loadout	7,270
21 Refuse Conveyor	826
22 Crusher/Screen Plant	3,913
23 Reclaim Escape Tunnel	12,851
24 Reclaim Feeder Gate	137
26 Extended ROM Conveyor	3,258
27 Refuse/Non-Coal Waste Pile	0
28 Electrical Grounding Field	1,986
29 Sedimentation Pond Spillways	1,430
30 Existing ROM Conveyor	6,432
31 Portal Closure	63,312
32 Concrete Conveyor Bay	371
33 ROM Coal Staking Tube	8,858
34 Mine MCC Building and Electrical Tower	1,595
35 Backup Ventilation Fans	37,668
36 Main Ventilation Fan	37,599
37 Non-Potable Water Tanks	7,670
38 Powder and Cap Magazines	4,924
39 Chain Link Fence	6,676
40 Concrete Electrical Junction Box	73
41 Loadout MCC Building	289
42 Mine Parking	35,311
43 Abandoned Concrete Reclaim Room	5,364
44 Jersey Barrier	10,640
45 Concrete Trash Chute	1,280
46 Emergency Reclaim Feeder Gate	69
47 Gantry Lift Assembly	5,727
Mine Substation	8,476

Paved Mine Roads	63,224
Culvert Demolition	46,055
Lila Old Fan Portals	24,586
Visual Disconnect	6,279
Drop Box	145
TOTAL	827,920

Ref.	Description	Materials
	01 Office/Bathhouse	
	Structure's Demolition Cost	Pre-engineered steel bldg demo,>12,500 SF
	Structure's Vol. Demolition	
	Bathhouse New Addition Demo	Building Demolition - Mixture of Types
	Truck's Capacity	
	Haulage	
	Loading Cost Bathhouse New	Front End Loader 3CY
	Transportation Cost Bathhouse New	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Cost Bathhouse New	On Site Disposal
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Load Conex Units	Hydraulic crane, 12 ton, with operator
	Haul Connex Units to SLC, UT	Haul Conex units offsite
	Disposal Costs	
	Subtotal	
	Concrete Demolition	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Footings - Conex Units	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
13 05 05.50 0650	1.68	SF Flr	150	100	15		15000	
								225000
02 41 16.13 0100	0.40	CF			10		432	4320
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						
Scamp	6.00	Ton						
Crew A-3H	1518.58	Day						
01 52 13.20 0800	12.10	Mile						
02 41 16.17 2500	1.57	SF	150	100	1			
02 41 16.17 2500	1.57	SF	200	2	1			
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						15000	SF Flr	25200
					0.3	2500	CY	
					0.3	1296	CF	518
						48		106
						48		180
						48	CY	547
	480			lb/cy		600	Tons	3600
								0
								30151
		1		Day				1519
			140	Miles		6	EA	10164
								11683
			15000	SF		555.6	CY	23550
			400	SF	1.3	14.8		628
						742	CY	1640
						742	CY	2775
						742	CY	8459
								37052
								78886

Ref.	Description	Materials
	02 ROM Coal Stockpile	
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF TH**
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Slab	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume

IE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
								0
								0

Ref.	Description	Materials
	03 Shop/Warehouse	
	Structure's Demolition Cost (Shop 1)	Pre-engineered steel bldg demo,>12,500 SF
	Structure's Vol. Demolition (Shop 1)	
	Structure's Demolition Cost (Shop 2)	Pre-engineered steel bldg demo,>12,500 SF
	Structure's Vol. Demolition (Shop 2)	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Slab	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
13 05 05.50 0650	1.68	SF Flr	150	100	20		15000	
								300000
13 05 05.50 0650	1.68	SF Flr	160	60	30		9600	
								288000
Scamp	6.00	Ton						
			310	160	1			1837
02 41 16.17 2500	1.57	SF						
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						15000	SF Flr	25200
					0.3	3333	CY	
						9600	SF Flr	16128
					0.3	3200	CY	
	480			lb/cy		1568	Ton	9408
								0
								50736
			49600	SF				
						49600	SF	77872
					1.3	2388	CY	
						2388	CY	5277
						2388	CY	8931
						2388	CY	27223
								119303
								170039

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Ref.	Description	Materials
	04 Storage Shed	
	Structure's Demolition Cost	Building Demolition - Mixture of Types
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	On Site Disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Concrete Demolition	Concrete Floor Demolition, 4" thick, reinforced
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density
02 41 16.13 0100	0.40	CF	8	8	8					
02 41 16.17 4200	11.40	CY								
02 41 16.17 0280	0.89	SF	8	8	0.33					
31 23 16.42 1300	2.21	CY								
31 23 23.20 1014	3.74	CY								
02 41 16.17 4200	11.40	CY								

Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				512	CF	204.8
			0.3	6	CY	
				6	CY	68
						273
				64	SF	57
	0.8	CY	1.3	1	CY	2
				1	CY	4
				1	CY	12
						75
						348

Ref.	Description	Materials
	05 Employee Parking	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Pavement Removal	Pavement Removal, bituminous, 4" to 6" thick
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 13.17 5050	9.80	SY			0.33		76200	
02 41 16.17 4200	11.40	CY						931

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			SF		8467	SY	82977
			CY	1.3	1210	CY	13794
								96771
								96771

Ref.	Description	Materials
	06 Truck Loading/Unloading Area	
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF TH**
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Slab	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume

IE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
								0
								0

Ref.	Description	Materials
	07 Equipment/Materials Storage Area	
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF TH**
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Slab	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume

IE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
								0
								0

Ref.	Description	Materials
	08 Potable Water Tank	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Floor Demolition, 6" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area
02 41 16.13 0020	0.27	CF			20	15	
Scamp	6.00	Ton					
02 41 16.17 0420	1.11	SF	15	15	0.5		
31 23 16.42 1300	2.21	CY					
31 23 23.20 1014	3.74	CY					
02 41 16.17 4200	11.40	CY					

Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
							3534	CF	954
							1296	SF	
		1.00			LB/SF		0.65	Ton	4
									0
									958
							225	SF	250
						1.3			
							146		323
							146		546
							146		1664
									2783
									3741

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Ref.	Description	Materials
	09 Sewer Treatment Plant	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Floor Demolition, 6" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF						1800
Scamp	6.00	Ton						
02 41 16.17 0420	1.11	SF	15	15	0.5			
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			CF			1800	CF	486
					0.3	20	CY	
	480			lb/cy		5	Ton	30
								0
								516
			225	SF		225	SF	250
					1.3	5.4	CY	
						7		15
						7		26
						7		80
								371
								887

Ref.	Description	Materials
	10 Power Poles	
	Structure's Demolition Cost	Wood utility poles, 35'-45' high
	Structure's Demolition Cost	Wood cross arms, 4'-6' long
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation and Disposal Cost All	Log chipper, crew, and assoc equipment
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 13.80 0200	370.00	EA.						
02 41 13.80 0300	136.00	EA.						
Crew B-7	5025.34	Day						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			13	EA		13	EA	4810
			13	EA.		13	EA.	1768
						1.00	Day	5025
								11603
								11603

Ref.	Description	Materials
	11 Electrical Transformers	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Demolition Cost	Demo of elec transformer, 3 ph, 750kVA
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	Hydraulic crane, 12 ton, with operator
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
26 05 05.10 1570	1700.00	EA.						
Crew A-3H	1518.58	Day						
Scamp	6.00	Ton						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
			2			2	EA.	3400
						1	Day	1519
						7	Ton	42
								4961
								0
								4961

Ref.	Description	Materials
	12 Overhead Power Lines	
	Structure's Demolition Cost	Electrical demolition, #2 wire, from conduit
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
26 05 05.10 1900	30.50	CLF	3220					
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			3			9660	FT	2946
	201			lb/MF		0.97	Ton	6
								2952
								2952

Ref.	Description	Materials
	13 Buried Power Lines	
	Structure's Demolition Cost	Electrical demolition, #2 wire, from conduit
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
26 05 05.10 1900	30.50	CLF	890					
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			3			2670	FT	814
	201			lb/MF		0.27	Ton	2
								816
								816

Ref.	Description	Materials
	14 Rock Dust Silo	
	Structure's Demolition Cost	Silos, Selective Demolition, steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
13 05 05.60 0050	2900.00	EA						
Scamp	6.00	Ton						
02 41 16.17 2500	1.57	CY	16	16	1			256
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			1	EA		1	Ea	2900
4				Ton		4	Ton	24
								2924
				CF		9	CY	14
					1.3	12	CY	
						12	CY	27
						12	CY	45
						12	CY	137
								223
								3147

Ref.	Description	Materials
	15 Fuel & Oil Tanks	
	Structure's Demolition Cost	5000 to 12000 gal. abovegrnd steel tank remo
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment Disposal Cost	
	Tank Removal	3000 to 5000 gal. undrgrnd steel tank remova
	Remove Sludge	3000 to 5000 gal. tank, sludge removal
	Tank Disposal	3000 to 5000 gal. tank, disposal, 100 mi RT
	Sludge Disposal	Dispose of sludge off site
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
1305 05.75 0530	1625.00	EA.						
Scamp	6.00	Ton						
02 65 10.30 0110	860.00	EA						
02 65 10.30 0300	285.00	EA						
02 65 10.30 1023	830.00	EA.						
02 65 10.30 0390	6.80	Gal						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						1	EA	1625
2				Ton		2.00	Ton	12
								1637
			3	EA		3	EA	2580
			3	EA		3	EA	855
			3	EA		3	EA	2490
			50	Gal		50	Gal	340
								6265
								7902

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Description	Materials
16 Reclaim Tunnel	
Conveyor Demolition Cost	
Structure's Vol. Demolition	
Rubble's Weight (exclude steel)	
Truck's Capacity	
Haulage	
Transportation Cost Non Steel Truck	
Transportation Cost Non Steel Drive	
Disposal Cost Non Steel	
Steel's Weight	
Truck's Capacity	
Haulage	
Transportation Cost Steel Truck	
Transportation Cost Steel Drive	
Disposal Cost Steel	
Subtotal	
Equipment's Disposal Cost	
Dismantling Cost	
Equipment's Vol. Demolished	
Loading Costs	
Transportation Costs	
Disposal Costs	
Subtotal	
Concrete Demolition	
Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
Concrete Vol. Demolished	
Loading Costs	Front End Loader 3CY
Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
Disposal Costs	On Site Disposal
Subtotal	
Concrete Demolition	
Concrete Cost	
Concrete Vol. Demolished	
Loading Costs	
Transportation Costs	
Disposal Costs	
Subtotal	
Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.17 2500	1.57	CY	810	8	8			960
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
						960	CY	1507
					1.3			
						1248	CY	2758
						1248	CY	4668
						1248	CY	14227
								23160
								23160

Ref.	Description	Materials
	17 Reclaim Conveyor	
	Conveyor Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF	810	4	4			
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				FT		12960	CF	3499
					0.3	144	CY	
	480			lb/CY		35	Ton	210
								0
								3709
								3709

Ref.	Description	Materials
	18 Conveyor to Loadout Bin	
	Structure's Demolition Cost (Conveyor 1)	Building Demolition - Steel
	Structure's Vol. Demolition (Conveyor 1)	
	Structure's Demolition Cost (Conveyor 1)	Building Demolition - Steel
	Structure's Vol. Demolition (Conveyor 1)	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density
02 41 16.13 0020	0.27	CF	230	6	6					
02 41 16.13 0020	0.27	CF	350	4	4					
Scamp	6.00	Ton								480
02 41 16.17 2500	1.57	CY						15		
31 23 16.42 1300	2.21	CY								
31 23 23.20 1014	3.74	CY								
02 41 16.17 4200	11.40	CY								

Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		FT		8280	CF	2236
			0.3	92	CY	
		FT		5600	CF	1512
			0.3	62	CY	
		lb/CY		37	Ton	222
						0
						3970
				15	CY	24
			1.3	20	CY	
				20	CY	44
				20	CY	75
				20	CY	228
						371
						4341

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Ref.	Description	Materials
	19 Crusher MCC Building	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density
02 41 16.13 0020	0.27	CF	20	8	8					
Scamp	6.00	Ton								480

Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		FT		1280	CF	346
			0.3	14	CY	
		lb/CY		3	Ton	18
						0
						364
						0
						364

Ref.	Description	Materials
	20 Truck Loadout	
	Structure's Demolition Cost (Loadout 1)	Building Demolition - Steel
	Structure's Vol. Demolition (Loadout 1)	
	Structure's Demolition Cost (Loadout 2)	Building Demolition - Steel
	Structure's Vol. Demolition (Loadout 2)	
	Dozer Trap Roof Demolition Cost	Building Demolition - Steel
	Dozer Trap Roof Volume	
	Stairway Demolition Cost	Building Demolition - Steel
	Stairway Volume	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density
02 41 16.13 0020	0.27	CF	5	5	20					
02 41 16.13 0020	0.27	CF	20	20	18					
02 41 16.13 0020	0.27	CF	20	12	1					
02 41 16.13 0020	0.27	CF	10	3	1					
Scamp	6.00	Ton								480
02 41 16.17 2500	1.57	CY						207		
31 23 16.42 1300	2.21	CY								
31 23 23.20 1014	3.74	CY								
02 41 16.17 4200	11.40	CY								

Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	500	CF		500	CF	135
			0.3	6	CY	
	7200	CF		7200	CF	1944
			0.3	80	CY	
	240	CF		240	CF	65
			0.3	3	CY	
	30	CF		30	CF	8
			0.3	0.3	CY	
		lb/CY		21	Ton	126
						0
						2278
				207	CY	325
			1.3	269	CY	
				269	CY	594
				269	CY	1006
				269	CY	3067
						4992
						7270

Ref.	Description	Materials
	21 Refuse Conveyor	
	Conveyor Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF	180	4	4			
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				FT		2880	CF	778
					0.3	32	CY	
	480			lb/CY		8	Ton	48
								0
								826
								826

Ref.	Description	Materials
	22 Crusher/Screen Plant	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight
02 41 16.13 0020	0.27	CF						12000	
Scamp	6.00	Ton							
02 41 16.17 2500	1.57	CY						20	
31 23 16.42 1300	2.21	CY							
31 23 23.20 1014	3.74	CY							
02 41 16.17 4200	11.40	CY							

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Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			CF		12000	CF	3240
				0.3	133	CY	
480			lb/CY		32	Ton	192
							0
							3432
					20	CY	31
				1.3			
					26	CY	57
					26	CY	97
					26	CY	296
							481
							3913

Ref.	Description	Materials
	23 Reclaim Escape Tunnel	
	Corrugated Steel	Building Demolition - Steel
	Escape Tunnel	Building Demolition - Steel
	Fan	Building Demolition - Steel
	Fan House	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Excavation and Backfill	
	Reclaim Tunnel	Excavation Bulk Bank 2 CY (322BL)
	Escape Tunnel	Excavation Bulk Bank 2 CY (322BL)
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF						26880
02 41 16.13 0020	0.27	CF						1257
02 41 16.13 0020	0.27	CF						64
02 41 16.13 0020	0.27	CF						512
Scamp	6.00	Ton						
31 23 16.42 0260	1.81	CY	350	14	10			
31 23 16.42 0260	1.81	CY	325	4	10			
02 41 16.17 2500	1.57	CY						20
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				CF		26880	CF	7258
						1257	CF	339
						64	CF	17
						512	CF	138
					0.3	319	CY	
	480			lb/CY		77	Ton	462
								0
								8214
				FT		1815	CY	3285
								0
						481	CY	871
								0
								4156
						20	CY	31
					1.3	26	CY	
						26	CY	57
						26	CY	97
						26	CY	296
								481
								12851

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Ref.	Description	Materials
	24 Reclaim Feeder Gate	
	Structure's Demolition Cost	Fabricated steel demo, 121-500 lb
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation & Disposal Cost Steel	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Foundation	
	Tube	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
05 05 05.10 0380	68.00	EA.						
Scamp	6.00	Ton	3	3				

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						2	EA.	136
	20.4			lb/SF		0.18	Ton	1
								137
								0
								137

Ref.	Description	Materials
	26 Extended ROM Conveyor	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF	300	6	6			
Scamp	6.00	Ton						
02 41 16.17 2500	1.57	CY	10	10	1			
31 23 16.42 1300	2.21							
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				FT		10800	CF	2916
					0.3	120	CY	
	480			lb/CY		29	Ton	174
								0
								3090
			2			7	CY	11
					1.3			
						9	CY	20
						9	CY	34
						9	CY	103
								168
								3258

Ref.	Description	Materials
	27 Refuse/Non-Coal Waste Pile	
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF TH**
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Slab	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume

IE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
								0
								0

Ref.	Description	Materials
	28 Electrical Grounding Field	
	Structure's Demolition Cost	Backhoe loader, 2 laborers, equip operator
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density
Crew B-6	1980.00	Day								
Scamp	6.00	Ton								

Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
1				1	Day	1980
				1	Ton	6
						1986
						0
						1986

Ref.	Description	Materials
	29 Sedimentation Pond Spillways	
	Pond #2 Barrel Excavation	Excavation Bulk Bank 2 CY (322BL)
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Pond #1 - 30" Principal Riser	Demolition, CMP pipe, steel, 30"-36"
	Pond #1 - 30" Emergency Riser	Demolition, CMP pipe, steel, 30"-36"
	Pond #2 - 12" Principal Riser	Demolition, CMP pipe, steel, 12"
	Pond #2 - 15" Emergency Riser	Demolition, CMP pipe, steel, 18"
	Pond #2 Barrel (SP2-1)	Demolition, CMP pipe, steel, 18"
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation & Disposal Costs	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
31 23 16.42 0260	1.81	CY	165	1.5	3			
02 41 13.40 0180	17.65	LF	20					
02 41 13.40 0180	17.65	LF	19					
02 41 13.40 0110	2.60	LF	5					
02 41 13.40 0160	3.90	LF	6					
02 41 13.40 0160	3.90	LF	165					
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				FT		28	CY	50
								50
	30	lb/ft		FT		20	FT	353
	30	lb/ft		FT		19	FT	335
	103	lb/ft		FT		5	FT	13
	10	lb/ft		FT		6	FT	23
	15	lb/ft		FT		165	FT	644
4160	lb					2	Tons	12
								1380
								1430

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Ref.	Description	Materials
	30 Existing ROM Conveyor	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF	475	6	6			
Scamp	6.00	Ton						
02 41 16.17 2500	1.57	CY	24	24	1			
31 23 16.42 1300	2.21							
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				FT		17100	CF	4617
					0.3	190	CY	
	480			lb/CY		46	Ton	276
								0
								4893
			3			64	CY	100
					1.3			
						83	CY	183
						83	CY	310
						83	CY	946
								1539
								6432

Ref.	Description	Materials
	31 Portal Closure	
	Canopy Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Earthwork - North & South Breakouts	
	Cut and fill - North Breakout	Cut and fill common earth, 8" lift, 2 passes
	Cut and fill - South Breakout	Cut and fill common earth, 8" lift, 2 passes
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Portal Sealing	
	Seal Construction	Seal portals, materials
	Labor	Seal portals, labor
	Site preparation	Portal seal, site preparation crew
	Block retaining walls	Block wall, reinforced, 4" thick (2 each seal)
	Transportation Costs	Portal seal support, material haulage
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF	16	16	10			
Scamp	6.00	Ton						
G1030 1100	7.00	CY						80
G1030 1100	7.00	CY						20
JennChem	4320.00	EA.						
JennChem	265.00	HR						
Crew B-1	1464.40	Day						
04 22 10.34 1500	8.50	SF		20	8.6		344	
Classic Helicopters	11965.00	Job						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			8	EA		20480	CF	5530
					0.3	228	CY	
	480			lb/CY		55	Ton	330
								0
								5860
				CY		80	CY	560
				CY		20	CY	140
								700
								0
			8	EA.		8	EA.	34560
		4		HR		32	HR	8480
		1		Day		8	Day	11715
			16	EA.		5504	SF	46784
			1	Job		1	Job	11965
								63312

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Ref.	Description	Materials
	32 Concrete Conveyor Bay	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.17 2500	1.57	CY						15
31 23 16.42 1300	2.21							
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
								0
						15	CY	24
					1.3			
						20	CY	44
						20	CY	75
						20	CY	228
								371
								371

Ref.	Description	Materials
	33 ROM Coal Staking Tube	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Cost	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.13 0020	0.27	CF			80	20		
Scamp	6.00	Ton						
02 41 16.17 2500	1.57	CY	25	25	3			
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				CF		25133	CF	6786
					0.3	279	CY	
	480			lb/CY		67	Ton	402
								0
								7188
				FT		69	CY	108
					1.3			
						90	CY	199
						90	CY	337
						90	CY	1026
								1670
								8858

Ref.	Description	Materials
	34 Mine MCC Building and Electrical Tower	
	MCC Bldg Demolition Cost	Pre-engineered steel bldg demo,>12,500 SF
	Elec Tower Demolition Cost	Torch cutting, steel, 1" thick plate
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Front End Loader 3CY
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight
13 05 05.50 0650	1.68	SF Flr	30.5	12	9				
02 41 19.27 0020	3.21	LF	220						
Scamp	6.00	Ton							
31 23 16.42 1300	2.21	CY	30.5	12	0.5				
31 23 16.42 1300	2.21								
31 23 23.20 1014	3.74	CY							
02 41 16.17 4200	11.40	CY							

Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
480			lb/CY	0.3	366	SF Flr	615
76.33			lb/FT		220	LF	706
					17	Ton	102
							1423
					7	CY	15
				1.3			
					9	CY	20
					9	CY	34
					9	CY	103
							172
							0
							1595

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Ref.	Description	Materials
	35 Backup Ventilation Fans	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	Mechanical Equipment Demolition, Heavy
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	On Site Disposal
	Subtotal	
	Shot Crete	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area
23 05 05.10 3600	1225.00	Ton					
Scamp	6.00	Ton					
02 41 16.17 2500	1.57	SF	20	20	0.5		400
02 41 16.17 4200	11.40	CY					

Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
									0
	30				Ton		30	Ton	36750
							30	Ton	180
									36930
					SF		400	SF	628
								CY	0
								CY	0
7.4						1.3	10	CY	110
									738
									0
									37668

Ref.	Description	Materials
	36 Main Ventilation Fan	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Helicopter	Portal seal support, material haulage
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	Mechanical Equipment Demolition, Heavy
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	On Site Disposal
	Subtotal	
	Shot Crete	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area
Classic Helicopters	11965.00	Job					
23 05 05.10 3600	1225.00	Ton					
Scamp	6.00	Ton					
02 41 16.17 2500	1.57	SF	20	20	0.5		400
02 41 16.17 4200	11.40	CY					

Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				0.2	Day		0.2	Day	2393
									2393
	28				Ton		28	Ton	34300
							28	Ton	168
									34468
					SF		400	SF	628
								CY	0
								CY	0
7.4						1.3	10	CY	110
									738
									0
									37599

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	37 Non-Potable Water Tanks																			
	Structure's Demolition Cost	5000 to 12000 gal. abovegrnd steel tank removal	1305 05.75 0530	1625.00	EA.										3	EA.		3	EA.	4875
	Structure's Vol. Demolition																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton							2				Ton		2.00	Ton	12
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			4887
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Subtotal																			
	Concrete Demolition																			
	Concrete Cost	Concrete Floor Demolition, 6" thick, reinforced	02 41 16.17 0420	1.11	SF	15	15	0.5										225	SF	250
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													146		323
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													146		546
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													146		1664
	Subtotal																			2783
	Total																			7670

Ref.	Description	Materials
	38 Powder and Cap Magazines	
	Structure's Demolition Cost	Mechanical Equipment Demolition, Heavy
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
23 05 05.10 3600	1225.00	Ton						
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
4				Ton		4	Ton	4900
4				Ton		4	Ton	24
								4924
								4924

Ref.	Description	Materials
	39 Chain Link Fence	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Fence Demolition	Chain link removal, 8'-10' high
	Transportation and Disposal	Demolition debris, off-site haul and disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 13.60 1700	4.44	FT	1500					
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
				FT		1500	FT	6660
	3.5			lb/FT		2.6	Ton	16
								6676
								6676

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Ref.	Description	Materials
	40 Concrete Electrical Junction Box	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Footing	
	Structure	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.17 2500	1.57	CY	2	2	1			1
02 41 16.17 2500	1.57	CY	4	4	1			2
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				CY		1	CY	2
				CY		2	CY	3
					1.3	4	CY	
						4	CY	9
						4	CY	15
						4	CY	46
								73
								73

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Ref.	Description	Materials
	41 Loadout MCC Building	
	MCC Bldg Demolition Cost	Pre-engineered steel bldg demo,>12,500 SF
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Disposal Cost Steel	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Front End Loader 3CY
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight
13 05 05.50 0650	1.68	SF Flr	16	8	8				
Scamp	6.00	Ton							
31 23 16.42 1300	2.21	CY	16	8	0.5				
31 23 16.42 1300	2.21								
31 23 23.20 1014	3.74	CY							
02 41 16.17 4200	11.40	CY							

Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
					128	SF Flr	215
480			lb/CY	0.3	3	Ton	18
							233
					2	CY	4
				1.3			
					3	CY	7
					3	CY	11
					3	CY	34
							56
							0
							289

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Ref.	Description	Materials
	42 Mine Parking	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Pavement Removal	Pavement Removal, bituminous, 4" to 6" thick
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 13.17 5050	9.80	SY			0.33		27800	
02 41 16.17 4200	11.40	CY						340

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
				SF		3089	SY	30272
				CY	1.3	442	CY	5039
								35311
								35311

Ref.	Description	Materials
	43 Abandoned Concrete Reclaim Room	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Fence Demolition	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.17 2500	1.57	CY	15	20	10			
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
111			2	CY		222	CY	349
					1.3			
						289	CY	639
						289	CY	1081
						289	CY	3295
								5364
								5364

Ref.	Description	Materials
	44 Jersey Barrier	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Median Barrier	Median barrier, precast conc, remove and store
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 13.30 1600	14.00	FT	760					

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						760	FT	10640
								10640
								10640

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Ref.	Description	Materials
	45 Concrete Trash Chute	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Walls	
	Walls	
	Floor	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforc
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
			10	10	0.67			
			50	10	0.67			
			52	12	1			
02 41 16.17 2500	1.57	CY						
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

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Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
5				CY				
25				CY				
23				CY				
53				CY		53	CY	83
					1.3			
						69	CY	152
						69	CY	258
						69	CY	787
								1280
								1280

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Ref.	Description	Materials
	46 Emergency Reclaim Feeder Gate	
	Structure's Demolition Cost	Fabricated steel demo, 121-500 lb
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation & Disposal Cost Steel	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Foundation	
	Tube	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
05 05 05.10 0380	68.00	EA.						
Scamp	6.00	Ton	3	3				

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						1	EA.	68
	20.4			lb/SF		0.09	Ton	1
								69
								0
								69

Ref.	Description	Materials
	47 Gantry Lift Assembly	
	Structure's Demolition Cost	Fabricated steel demo, 121-500 lb
	Structure's Demolition Cost	Fabricated steel demo, 501-1000 lb
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation & Disposal Cost Steel	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Footings	Concrete, Selective Demo, Reinf 1-2% of X Sec
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Foundation	Concrete, Selective Demo, Reinf 1-2% of X Sec
	Tube	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
05 05 05.10 0390	68.00	EA.						
02 41 19.27 0020	91.00	EA.						
03 05 05.10 0060	167.00	CY	80	1.33	1.75			186
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						
03 05 05.10 0060	167.00	CY	85.33	4	1.33			454
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
						12	EA.	816
						4	EA.	364
								1180
								0
						7	CY	1169
					1.3			
						9	CY	20
						9	CY	34
						9	CY	103
								1326
						17	CY	2839
					1.3	22	CY	
						22	CY	49
						22	CY	82
						22	CY	251
								3221
								5727

Ref.	Description	Materials
	Mine Substation	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Demolition Cost	Demo of elec transformer, 3 ph, 750kVA
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	Hydraulic crane, 12 ton, with operator
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Fence Demolition	Chain link removal, 8'-10' high
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Floor Demolition, 6" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
26 05 05.10 1570	1700.00	EA.						
Crew A-3H	1518.58	Day						
Scamp	6.00	Ton						
02 41 13.60 1700	4.44	FT	654					
02 41 16.17 0420	1.11	SF	20	20	0.5			
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
								0
			2			2	EA.	3400
						1	Day	1519
						7	Ton	42
								4961
				FT		654	FT	2904
								2904
			400	SF		400	SF	444
			7.4	CY	1.3			
						9.62	CY	21
						9.62	CY	36
						9.62	CY	110
								611
								8476

Ref.	Description	Materials
	Paved Mine Roads	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Pavement Removal	Pavement Removal, bituminous, 4" to 6" thick
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

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Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 13.17 5050	9.80	SY	1932	24	0.5		46368	
02 41 16.17 4200	11.40	CY						859

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				SF		5152	SY	50490
				CY	1.3	1117	CY	12734
								63224
								63224

Ref.	Description	Materials
	Culvert Demolition	
	DC-1	Excavation Bulk Bank 2 CY (322BL)
	DC-2	Excavation Bulk Bank 2 CY (322BL)
	DC-3	Excavation Bulk Bank 2 CY (322BL)
	DC-4	Excavation Bulk Bank 2 CY (322BL)
	DC-5	Excavation Bulk Bank 2 CY (322BL)
	DC-6	Excavation Bulk Bank 2 CY (322BL)
	DC-7	Excavation Bulk Bank 2 CY (322BL)
	DC-8	Excavation Bulk Bank 2 CY (322BL)
	DC-9	Excavation Bulk Bank 2 CY (322BL)
	DC-10	Excavation Bulk Bank 2 CY (322BL)
	DC-11	Excavation Bulk Bank 2 CY (322BL)
	DC-12a	Excavation Bulk Bank 2 CY (322BL)
	DC-12b	Excavation Bulk Bank 2 CY (322BL)
	DC-12c	Excavation Bulk Bank 2 CY (322BL)
	DC-12d	Excavation Bulk Bank 2 CY (322BL)
	DC-13	**PREVIOUSLY REMOVED**
	DC-14	Excavation Bulk Bank 2 CY (322BL)
	DC-15	Excavation Bulk Bank 2 CY (322BL)
	DC-16	Excavation Bulk Bank 2 CY (322BL)
	DC-17	Excavation Bulk Bank 2 CY (322BL)
	DC-18	Excavation Bulk Bank 2 CY (322BL)
	UC-1	Excavation Bulk Bank 2 CY (322BL)
	UC-1a	Excavation Bulk Bank 2 CY (322BL)
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Demolition Cost 18" CMP	Demolition, CMP pipe, steel, 18"
	Demolition Cost 24" CMP	Demolition, CMP pipe, steel, 24"
	Demolition Cost 60" CMP	Demolition, CMP pipe, steel, 48-60"
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation & Disposal Costs	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
31 23 16.42 0260	1.81	CY	60	1.5	3			
31 23 16.42 0260	1.81	CY	60	1.5	3			
31 23 16.42 0260	1.81	CY	65	1.5	3			
31 23 16.42 0260	1.81	CY	400	2	3			
31 23 16.42 0260	1.81	CY	350	2	3			
31 23 16.42 0260	1.81	CY	107	2	3			
31 23 16.42 0260	1.81	CY	155	2	3			
31 23 16.42 0260	1.81	CY	167	2	3			
31 23 16.42 0260	1.81	CY	186	2	3			
31 23 16.42 0260	1.81	CY	60	2	3			
31 23 16.42 0260	1.81	CY	101	2	3			
31 23 16.42 0260	1.81	CY	140	2.5	3.5			
31 23 16.42 0260	1.81	CY	79	2.5	3			
31 23 16.42 0260	1.81	CY	357	2.5	3			
31 23 16.42 0260	1.81	CY	9	2.5	3.5			
31 23 16.42 0260	1.81	CY	40	1.5	3			
31 23 16.42 0260	1.81	CY	45	1.5	3			
31 23 16.42 0260	1.81	CY	25	1.5	3			
31 23 16.42 0260	1.81	CY	120	1.5	3			
31 23 16.42 0260	1.81	CY	27	1.5	3			
31 23 16.42 0260	1.81	CY	120	5	6			
31 23 16.42 0260	1.81		360	5	6			
02 41 13.40 0160	3.90	LF	402					
02 41 13.40 0170	14.70	LF	2151					
24 41 13.40 0190	22.00	LF	480					
Scamp	6.00	Ton						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
				FT		10	CY	18
				FT		10	CY	18
				FT		11	CY	20
				FT		89	CY	161
				FT		78	CY	141
				FT		24	CY	43
				FT		34	CY	62
				FT		37	CY	67
				FT		41	CY	75
				FT		13	CY	24
				FT		22	CY	41
				FT		45	CY	82
				FT		22	CY	40
				FT		99	CY	179
				FT		3	CY	5
								0
				FT		7	CY	12
				FT		8	CY	14
				FT		4	CY	8
				FT		20	CY	36
				FT		5	CY	8
				FT		133	CY	241
				FT		400	CY	724
								2019
	15	lb/ft		FT		402	FT	1568
	19	lb/ft		FT		2151	FT	31620
	103	lb/ft				480	FT	10560
96339	lb					48	Tons	288
								44036
								46055

Ref.	Description	Materials
	Lila Old Fan Portals	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Old Horse Canyon Lila Fan Portals	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation and Disposal Cost All	
	Disposal Costs	
	Subtotal	
	Portal Sealing	
	Seal Construction	Seal portals, materials
	Labor	Seal portals, labor
	Site preparation	Portal seal, site preparation crew
	Block retaining walls	Block wall, reinforced, 4" thick (2 each sea
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area
JennChem	4320.00	EA.					
JennChem	265.00	HR					
Crew B-1	1464.40	Day					
04 22 10.34 1500	8.50	SF		20	8.6		344

Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
									0
				2	EA.		2	EA.	8640
			8		HR		16	HR	4240
			2		Day		4	Day	5858
				2			688	SF	5848
									24586
									24586

Ref.	Description	Materials
	Visual Disconnect	
	Structure's Demolition Cost	Building Demolition - Steel
	Structure's Demolition Cost	Building Demolition - Steel
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation & Disposal Cost Steel	Demolition debris, off-site haul and disposal
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	Mechanical Equipment Demolition, Heavy
	Loading Costs	
	Transportation & Disposal Cost Steel	Demolition debris, off-site haul and disposal
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight
02 41 16.13 0020	0.27	CF	20	30	8				
02 41 16.13 0020	0.27	CF	40	10	8				
Scamp	6.00	Ton							
23 05 05.10 3600	1225.00	Ton							1
Scamp	6.00	Ton							
02 41 16.17 2500	1.57	CY	4	6	0.5				
31 23 16.42 1300	2.21	CY							
31 23 23.20 1014	3.74	CY							
02 41 16.17 4200	11.40	CY							

Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			FT		4800	CF	1296
			FT		3200	CF	864
480			lb/CY		71	Ton	426
							2586
			Ton		3	Ton	3675
							3675
			FT		0.4	CY	1
				1.3	1	CY	
					1	CY	2
					1	CY	4
					1	CY	11
							18
							6279

Ref.	Description	Materials
	Drop Box	
	Structure's Demolition Cost	
	Structure's Vol. Demolition	
	Rubble's Weight (exclude steel)	
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Haulage	
	Transportation Cost Steel Truck	
	Transportation Cost Steel Drive	
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Concrete Demolition	
	Footing	
	Structure	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced
	Concrete Vol. Demolished	
	Loading Costs	Front End Loader 3CY
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Disposal Costs	On Site Disposal
	Subtotal	
	Concrete Demolition	
	Concrete Cost	
	Concrete Vol. Demolished	
	Loading Costs	
	Transportation Costs	
	Disposal Costs	
	Subtotal	
	Total	

Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume
02 41 16.17 2500	1.57	CY	2	2	3.44			2
02 41 16.17 2500	1.57	CY	4	4	1.5			4
31 23 16.42 1300	2.21	CY						
31 23 23.20 1014	3.74	CY						
02 41 16.17 4200	11.40	CY						

Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
			CY		2	CY	3
			CY		4	CY	6
				1.3	8	CY	
					8	CY	18
					8	CY	30
					8	CY	91
								145
								145

Lila Canyon Mine Reclamation Bond Estimate

Earthwork Costs

Description	Quantity	Units	Production Rate	Units	Production Time	Units
Mine Site Earthwork Estimate						
Load and Haul Backfill						
631G (9-51)(2nd04)	79283	CY	393	CY/HR	201.7	HR
Spread, Compact, and Scarify Backfill						
D8, Track-mounted	79283	CY	1850	CY/Day	42.9	Day
825G (6-13)(4Q03)	79283	CY	4100	CY/Day	19.3	Day
Scarify subsoil	29.96	ac	240	MSF/Day	5.4	Day
Backfill, Grade, and Scarify Upper Road Area						
770 (20-11)(3Q03	5000	CY	882	CY/Day	5.7	Day
988G EROPS (9-38)(3Q04)	5000	CY	1480	CY/Day	3.4	Day
D8, Track-mounted	5000	CY	1850	CY/Day	2.7	Day
Scarify subsoil	4.24	ac	240	MSF/Day	0.8	Day
Load, Haul, and Spread Topsoil - Main Area						
631G (9-51)(2nd04)	61086	CY	393	CY/HR	155.4	HR
D9R Semi-U EROPS (9-54 (2H04)	61086	CY	1850	CY/Day	33	Day
Load, Haul, and Spread Topsoil - Upper Road Area						
770 (20-11)(3Q03	10000	CY	882	CY/Day	11.3	Day
988G EROPS (9-38)(3Q04)	10000	CY	1480	CY/Day	6.8	Day
D8, Track-mounted	10000	CY	1850	CY/Day	5.4	Day
Support						
Water Truck						
Subtotal						

Note: Includes reclamation of 26,000 CY of fill for the new shop and the new loadout, as well as 1.26 addition

Materials/Equipment/Labor	Cost Reference RSMeans Ref #	Unit Cost	Units	Quantity
Self-propelled scraper, 34 CY, 500 HP	Crew B-33K	418.20	HR	201.7
Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	42.9
Sheepsfoot roller, 315 HP, 8" lifts, 2 passes	Crew B-10G	2313.60	Day	19.3
75 HP Dozer with scarifier	32 91 13.23 3100	5.85	MSF	1305
Off-highway rear dump truck, 40 ton, 10 MPH	Crew B-34F	2234.80	Day	5.7
Loader, 500 HP, wheel mounted, 5 CY cap	Crew B-14A	4306.40	Day	3.4
Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	2.7
75 HP Dozer with scarifier	32 91 13.23 3100	5.85	MSF	185
Self-propelled scraper, 34 CY, 500 HP	Crew B-33K	418.20	HR	155.4
Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	33
Off-highway rear dump truck, 40 ton, 10 MPH	Crew B-34F	2234.80	Day	11.3
Loader, 500 HP, wheel mounted, 5 CY cap	Crew B-14A	4306.40	Day	6.8
Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	5.4
5000 gallon water truck	Crew B-9A	2041.01	Day	16.0

al disturbed acres associated with those structures.

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Cost
$84,351
$127,756
$44,652
$7,634
$12,738
$14,642
$8,041
$1,082
$64,988
$98,274
$25,253
$29,284
$16,081
$32,656
$567,433

Lila Canyon Mine Reclamation Bond Estimate
Revegetation Costs

Ref.	Description	Materials
	Mine Site Revegetation Estimate	
	Ground Preparation	
	Pocking	Excavation Bulk Bank 2 CY (322BL)
	Site Revegetation	
	Mulch Material, Labor, and Equipment	Power mulcher, large, hay 1" deep
	Seeding Material	Lila Canyon Seed Mix (see below)
	Seeding Equipment and Labor	Hydroseeder (equipment and labor only)
	Fertilizer equipment, materials, & labor	Fertilizer, hydro spread, 1.5 lb/MSF
	Subtotal	
	Mine Site	
	Re-revegetate 25% of area	
	Subtotal	
	Total	

Seed mix cost based on the application rates provid
Seed prices downloaded October 2017 from greatba

Common Name
Grasses
Needle and Thread
Indian Ricegrass
Basin Wild Rye
Galleta
Bluebunch Wheatgrass
Slender Wheatgrass
Blue Gramma
Forbs
Blue Flax
Palmer penstemon
Globemallow
Indian Paintbrush
Fringed Sage
Shrubs
Wyoming Big Sage
Green Rabbitbrush
Fourwing Saltbush
Winterfat

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Shadscale
Cliffrose
Black Sage
10% increase

Means Reference Number	Unit Cost	Unit	Area	Volume	Weight	Density	Time
31 23 16.42 0260	1.81	CY	37.02	ac		340	CY/ac
32 91 13.16 0390	30.50	MSF	37.02				
Great Basin Seed	155.80	ac	37.02				
32 92 19.14 4600	22.00	MSF	37.02				
32 01 90.13 0180	5.00	MSF	37.02				

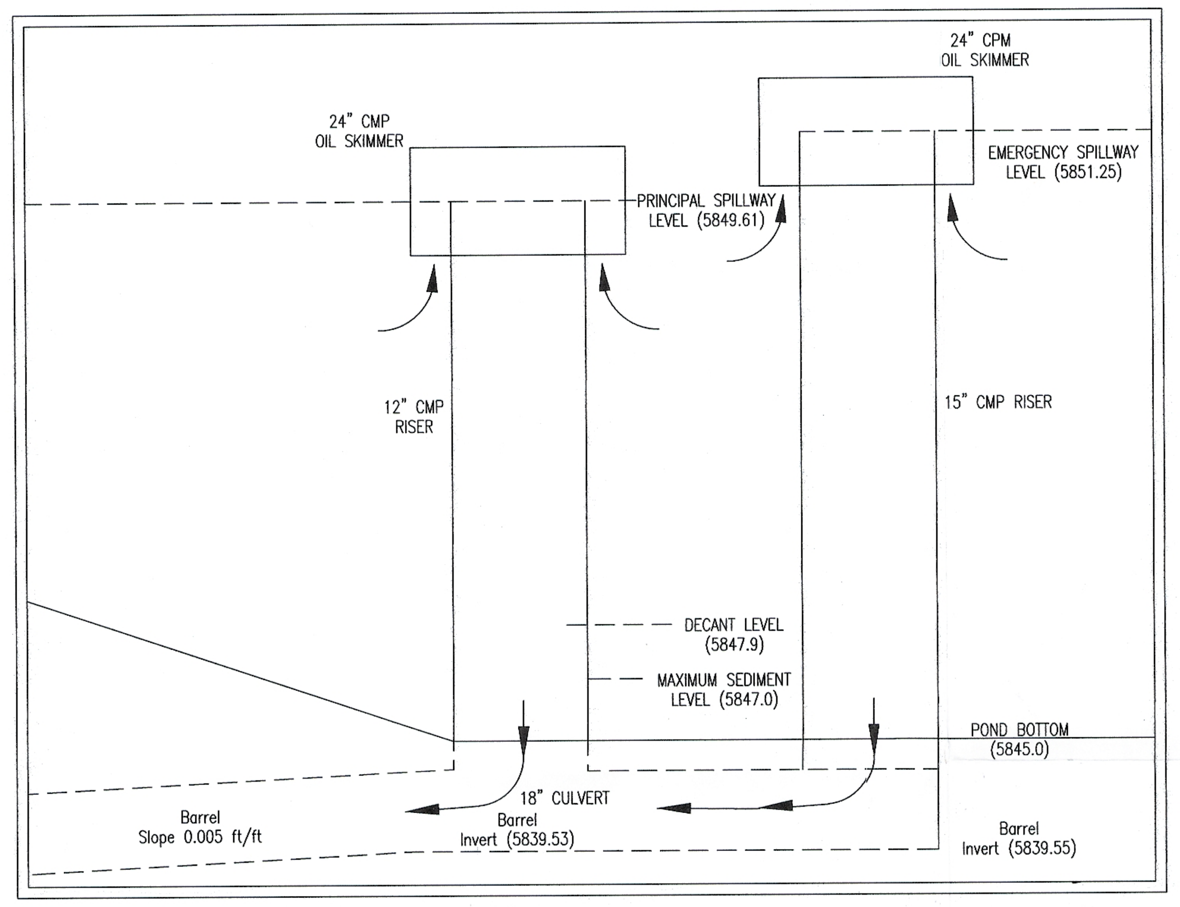
ed in Table 3.4/3.5 of the MRP
asinseeds.com

Seeding Rate (lb PLS/ac)	Unit Cost ($/lb)	Mix Cost ($/ac)
2.00	39.5	79.00
2.00	6.95	13.90
1.00	16.95	16.95
1.00	24.00	24.00
1.00	8.95	8.95
2.00	2.95	5.90
1.00	16.00	16.00
1.00	8.75	8.75
0.25	10.00	2.50
0.50	59.00	29.50
0.10	150.00	15.00
0.10	18.00	1.80
0.25	9.50	2.38
0.10	18.00	1.80
0.84	13.00	10.92
1.00	18.00	18.00

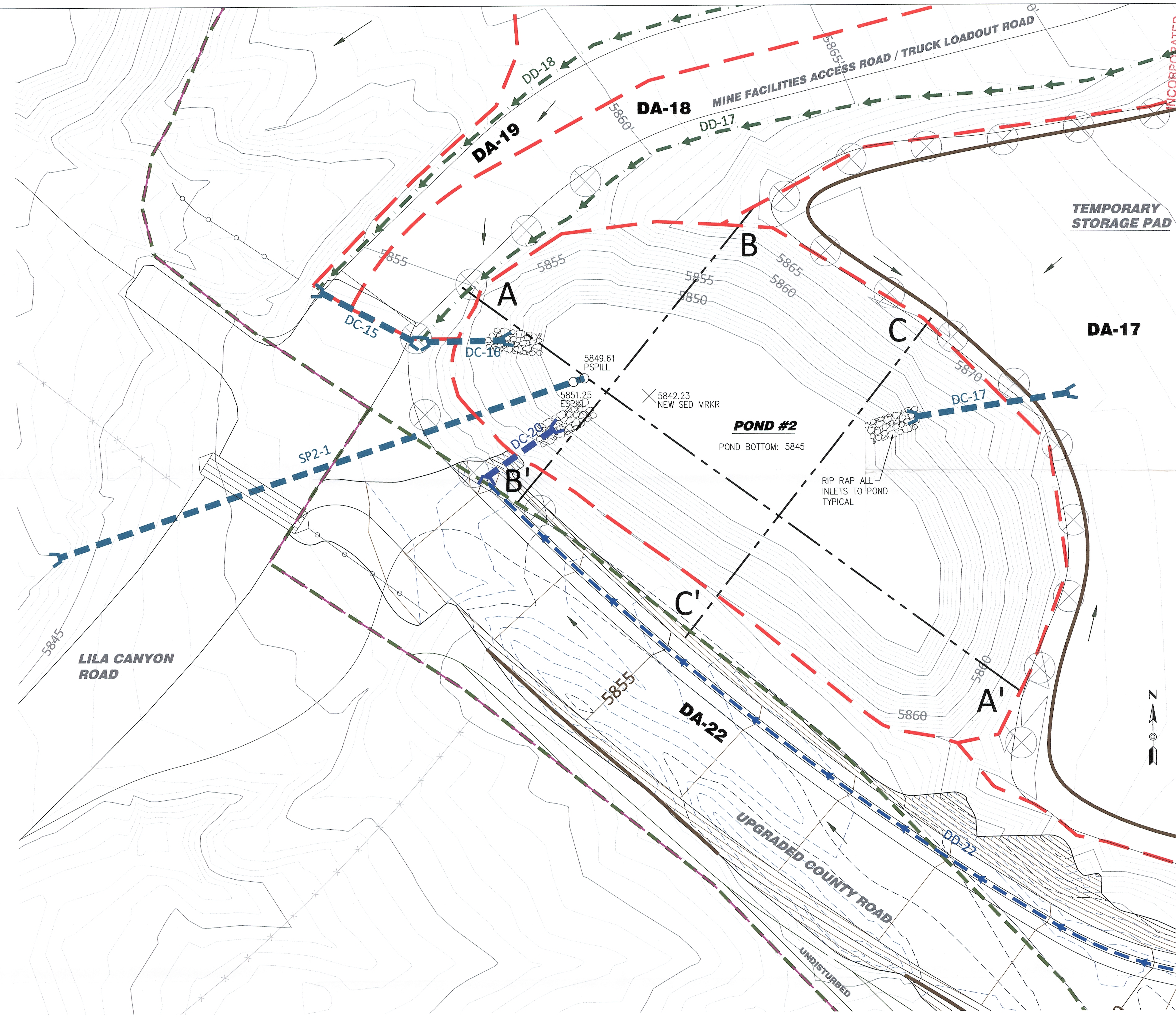
1.00	9.00	9.00
1.00	38.00	38.00
0.25	15.95	3.99
	Subtotal =	141.63
	to account for PLS requirement =	14.16
	Seed mix unit cost =	155.80

Number	Unit	Swell Factor	Quantity	Unit	Cost
			12586.8	CY	22782
	ac		1613	MSF	49197
	ac		37.00	AC	5764
	ac		1613	MSF	35486
	ac		1613	MSF	8065
					121,294
					30324
					30,324
					151,618


LILA CANYON MINE
PROPOSED SURFACE FACILITIES (FINAL CONFIGURATION)
NOVEMBER 2016
AS SHOWN
8-1
MAY 14 2019
INCORPORATED
Oil, Gas & Mining
FEDERAL LEASE #SL-066490
FED. LEASE SL-066490(M)
BLM R.O.W. #UTU-77122
BLM R.O.W. #UTU-91789
VEGETATION REFERENCE AREA
A.S.C.A. Disturbed
Rock Slope Material 17'+4' Cover ±37,500 cy
MINE FACILITIES ACCESS ROAD / TRUCK LOADOUT ROAD
SLOPE / PORTAL ACCESS ROAD
STREAM BUFFER ZONE
LOWER PAD
EMPLOYEE PARKING 191 SPACES
MINE PARKING 51 SPACES
MIDDLE PAD
UPPER PAD
STORAGE PAD
STORAGE PAD ACCESS ROAD
SUBSTATION
TOPSOIL PILE
TOPSOIL SALVAGED TO DATE: 70,295 C.Y.
POND #1
POND #2
LILA CANYON ROAD
ONE WAY
UNDISTURBED
CONTROL POINT BETA
NORTHING: 6,961,805.36
EASTING: 1,965,344.01
ELEVATION: 5859.34'
CONTROL POINT DELTA
NORTHING: 6,962,108.13
EASTING: 1,967,118.52
ELEVATION: 6129.72'
EXISTING UNPAVED EMERY COUNTY ROAD RS-2477 - R.O.W. WIDTH OF DISTURBANCE
ROCK SLOPES
NORTH BREAKOUT
SOUTH BREAKOUT
OUTCROP
UNDERGROUND MINE WORKINGS
CAT TRAIL
SECTION LINE
NOTE: CONTROL POINT COORDINATE SYSTEM IS U.S. STATE PLANE 1983 - UTAH CENTRAL (4302) ADJUSTED TO SEA LEVEL.
REVISION DATE:
NOV. 2016 PJJ
JUNE 2017 PJJ
JAN. 2019 PJJ
FEB. 2019 PJJ
R 14 E, T 16 S
LEGEND:
UNDISTURBED WITHIN THE DISTURBED AREA
DISTURBED AREA BOUNDARY:
NATURAL DRAINAGE:
6' HIGH CHAIN LINK FENCE
INCIDENTAL ROCK DISTRIBUTION:
STREAM BUFFER ZONE SIGNS:
SURFACE CONTOURS (5' INTERVALS):
TEMPORARY ROADWAYS:
BLM R.O.W. BOUNDARY LINE:
STRUCTURAL FILL:
LEASE BOUNDARY LINES:
NOTES: 1. REFER TO PLATE 5-7A&B FOR CROSS-SECTIONS.
KEYED MINE FACILITIES
1 OFFICE / BATH HOUSE BUILDING
2 ROM COAL STOCKPILE
3 SHOP/ WAREHOUSE BUILDING
4 STORAGE SHED (WOODEN)
5 PAVED PARKING AREA
6 TRUCK LOADING / UNLOADING AREA
7 EQUIPMENT / MATERIALS STORAGE AREA
8 POTABLE WATER TANK
9 SEWER TREATMENT PLANT
10 POWER POLE
11 ELECTRICAL TRANSFORMER
12 OVERHEAD POWER TRANSMISSION LINE
13 BURIED POWER TRANSMISSION LINE
14 ROCK DUST SILO
15 FUEL STORAGE TANK
16 UNDERGROUND RECLAIM TUNNEL
17 RECLAIM CONVEYOR ASSEMBLY (48")
18 LOADOUT CONVEYOR ASSEMBLY (48")
19 CRUSHER MCC BUILDING
20 TRUCK LOADOUT STRUCTURE
21 REFUSE CONVEYOR STRUCTURE (48")
22 CRUSHER / SCREEN BUILDING
23 UNDERGROUND RECLAIM ESCAPE TUNNEL AND FAN
24 RECLAIM FEEDER GATE
25 NOT USED
26 EXTENDED ROM COAL CONVEYOR (60")
27 REFUSE / NON-COAL WASTE PILE
28 ELECTRICAL GROUNDING FIELD
29 POND SPILLWAY STRUCTURE
30 EXISTING ROM COAL CONVEYOR (60")
31 STEEL PORTAL CANOPY STRUCTURE
32 CONCRETE CONVEYOR BAY
33 ROM COAL STACKING TUBE
34 MINE MCC BUILDING / ELECTRICAL TOWER
35 BACKUP VENTILATION FAN
36 MAIN MINE VENTILATION FAN / ELEC. TOWER
37 NON-POTABLE WATER TANKS
38 POWDER AND CAP MAGAZINES
39 CHAIN-LINK FENCE
40 CONCRETE ELECTRICAL JUNCTION BOX
41 LOADOUT MCC BUILDING
42 PAVED PARKING AREA
43 ABANDONED CONC. RECLAIM ROOM
44 JERSEY BARRIER GUARD RAIL
45 CONCRETE TRASH CHUTE
46 EMERGENCY RECLAIM FEEDER GATE
47 SEPTIC TANK AND DRAIN FIELD



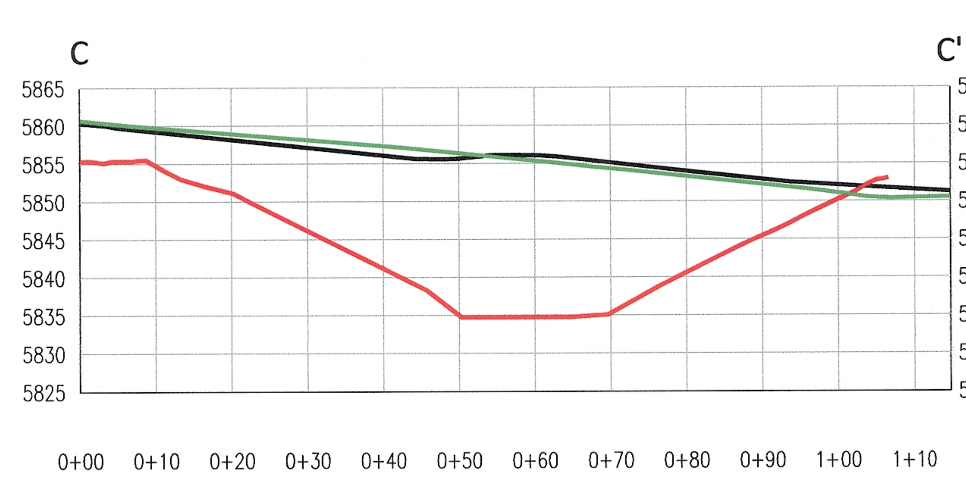
DETAIL "A"



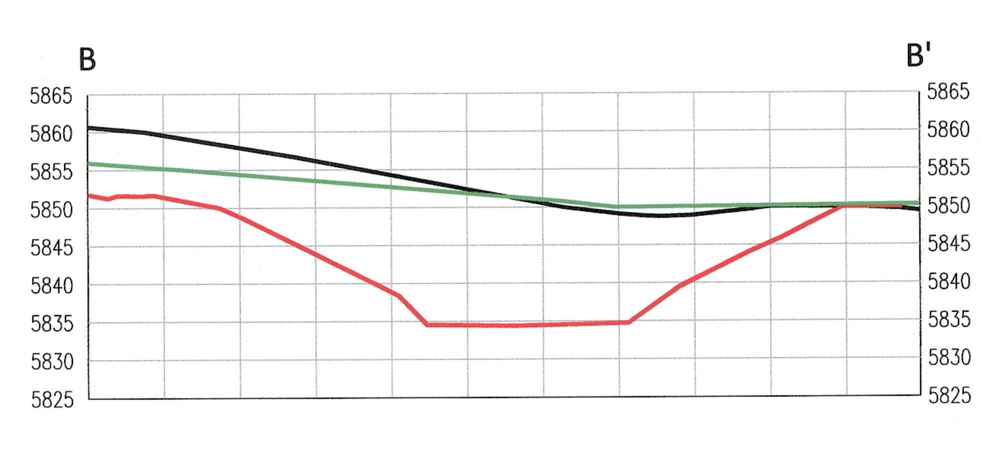
SEDIMENT POND #2 - PLAN VIEW

SECTION LEGEND

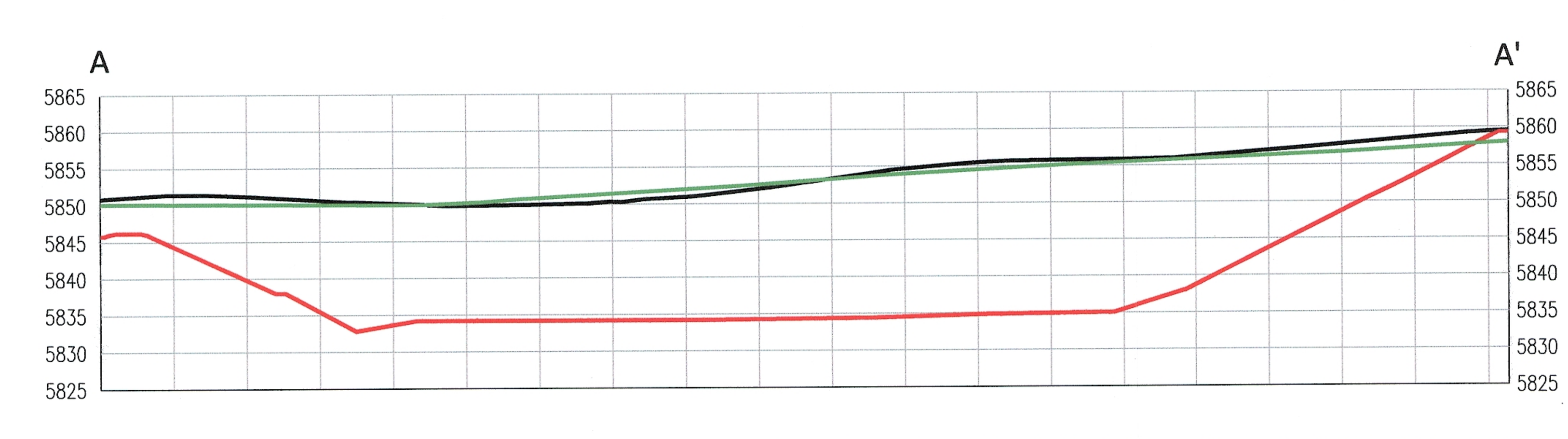
WORKING SURFACE:
PRE-MINING SURFACE:
RECLAIMED SURFACE:



SEDIMENT POND #2 - SECTION C-C'



SEDIMENT POND #2 - SECTION B-B'



SEDIMENT POND #2 - SECTION A-A'

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LILA CANYON MINE

PROPOSED SEDIMENT POND #2

DATE: APRIL 2008
DESIGNED BY: HYDROLOGIC DESIGN
SCALE: AS SHOWN
PLATE #: 7-6b

REVISION DATE:

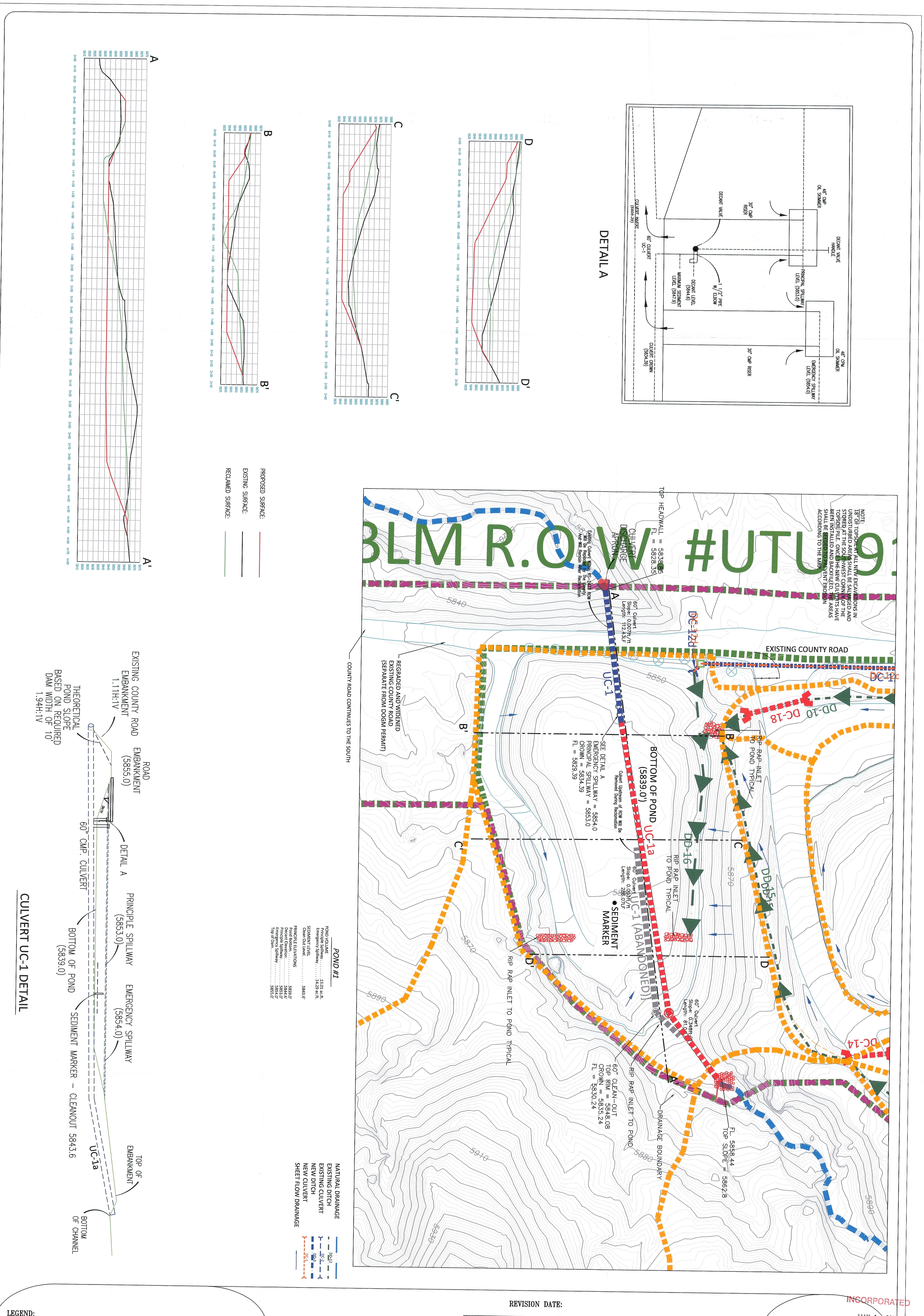
DATE:	BY:	DATE:	BY:
Apr 2008	TJS		
Apr 2009	TJS		
Jul 2015	TJS		
Oct 2015	TJS		
JUNE 2016	PJJ		
Feb 2019	PJJ		

R 14 E, T 16 S

LEGEND:

PROPOSED CONTOURS:
EXISTING CONTOURS:
RECLAIMED CONTOURS:
DISTURBED AREA BOUNDARY:
BLM RIGHT-OF-WAY BOUNDARY:
NEW CULVERTS:
EXISTING CULVERTS:
NEW / REWORKED DITCH:
EXISTING DITCH
FENCE LINE:
BERM (DURING OPERATIONS):
UNDISTURBED DRAINAGE:

S:\Current Drawings\MRP Maps\Lila Canyon\New Shop Building and Second Loadout\ACAD-Plate 7-6a 2015.dwg, Model, 2/25/2019 10:45:38 AM



LEGEND:

PROPOSED CONTOURS:
EXISTING CONTOURS:
RECLAIMED CONTOURS:
DISTURBED AREA BOUNDARY:
UNDISTURBED AREA BOUNDARY:
EXISTING DRAINAGE BOUNDARY:
NEW DRAINAGE AREA BOUNDARY:
FENCE LINE:

R 14 E, T 16 S

20' 0' 40' 80'

REVISION DATE:

DATE:	BY:	DATE:	BY:
Apr 2008	TJS	Dec 2018	PJJ
Apr 2009	TJS	Feb 2019	PJJ
Jul 2015	TJS		
Oct 2015	TJS		
Feb. 2016	PJJ		
March 2016	PJJ		
Sept 2016	PJJ		

PROFESSIONAL ENGINEER
No.
J. THOMAS PALUSO
STATE OF UTAH

INCORPORATED
MAY 14 2019
Div. of Oil, Gas & Mining

LILA CANYON MINE

PROPOSED SEDIMENT POND #1

DATE: APRIL 2008	DESIGNED BY: HYDROLOGIC DESIGN
SCALE: AS SHOWN	PLATE #: 7-6a

KEYED MINE FACILITIES

1. TEMPORARY BATH HOUSE
2. TEMPORARY OFFICE TRAILER
3. TEMPORARY OFFICE / SHOP BUILDING
4. TEMPORARY STORAGE SHED (WOODEN)
5. TEMPORARY STORAGE BUILDING (METAL)
6. TEMPORARY CONCRETE WALKWAY
7. TEMPORARY OFFICE BUILDING
8. POTABLE WATER TANK
9. TEMPORARY STORAGE TENT W/ CONC. FLOOR
10. POWER POLE
11. ELECTRICAL TRANSFORMER
12. OVERHEAD POWER TRANSMISSION LINES
13. BURIED POWER TRANSMISSION LINES
14. ROCK DUST SILO
15. TEMPORARY FUEL STORAGE TANKS
16. TEMPORARY UNDERGROUND RECLAIM ROOM
17. TEMPORARY CONCRETE RETAINING WALL
18. TEMPORARY LOADOUT CONVEYORS (48")
19. TEMPORARY LOADOUT MCC BUILDING
20. TEMPORARY LOADOUT STRUCTURES
21. TEMPORARY CRUSHER CONVEYOR (48")
22. TEMPORARY CRUSHER / SCREEN BUILDING
23. TEMPORARY CRUSHED COAL CONVEYOR (48")
24. TEMPORARY CRUSHER MCC BUILDING
25. TEMPORARY CONCRETE DOZER TRAP
26. 4" THICK ASPHALT PAVING
27. TEMPORARY CONCRETE EQUIPMENT PAD
28. ELECTRICAL GROUNDING FIELD
29. SEDIMENT POND SPILLWAY STRUCTURE
30. EXISTING ROM COAL CONVEYOR (60")
31. STEEL PORTAL CANOPY STRUCTURE
32. CONCRETE CONVEYOR BAY
33. SHOP / WAREHOUSE BUILDING
34. MINE MCC BUILDING / ELECTRICAL TOWER
35. BACKUP VENTILATION FANS
36. MAIN MINE VENTILATION FAN / ELEC. TOWER
37. NON-POTABLE WATER TANKS
38. POWDER AND CAP MAGAZINES
39. CHAIN-LINK FENCING
40. CONCRETE ELECTRICAL JUNCTION BOX
41. TEMPORARY CONCRETE SEPTIC TANK
42. TEMPORARY LOADOUT LIGHT BOARD
43. TEMPORARY CONVEYOR COUNTERWEIGHTS
44. JERSEY BARRIER GUARD RAIL
45. CONCRETE TRASH CHUTE
46. GANTRY LIFT ASSEMBLY

NOTE:
ALL NEW EXPOSED SLOPES TO RECEIVE INTERIM SEEDING UPON COMPLETION OF CONSTRUCTION.

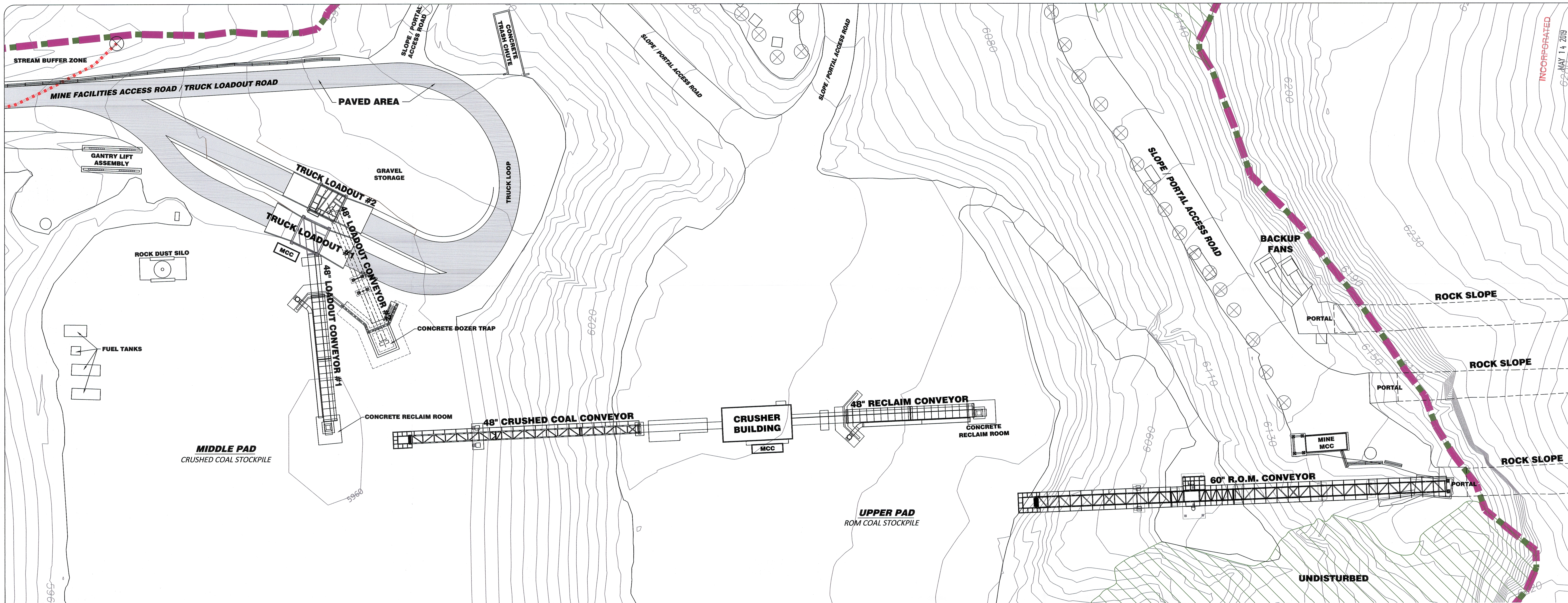
NOTES:

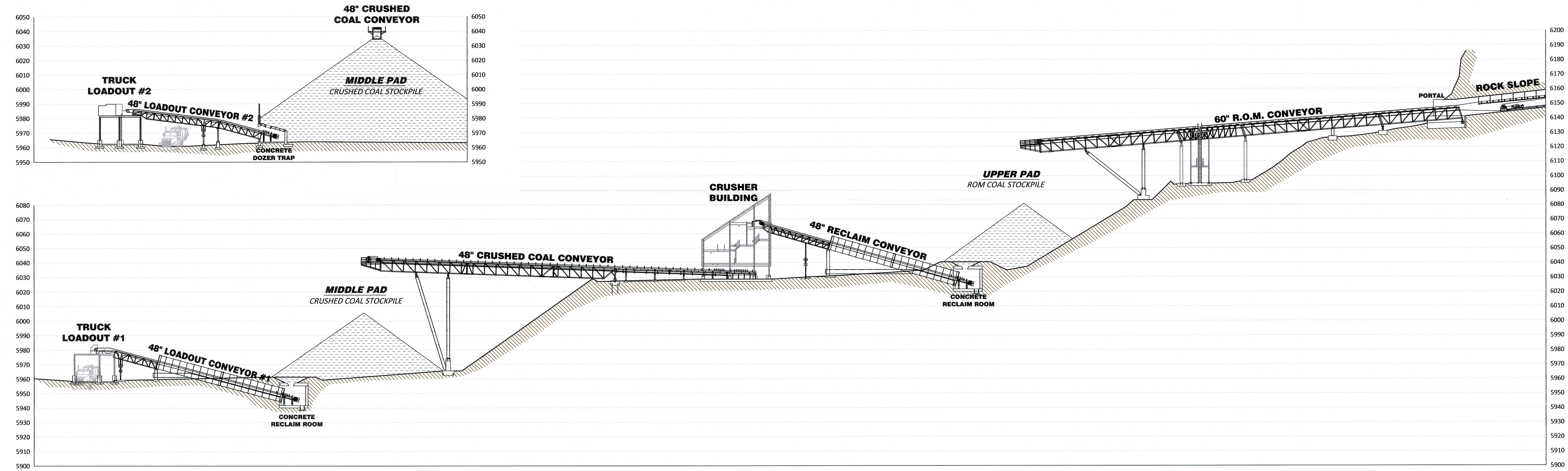
1. REFER TO PLATES 5-7A AND 5-7B FOR CROSS-SECTIONS.

2. AT ALL NEW EXCAVATIONS FOR NEW DITCHES AND CULVERTS IN "UNDISTURBED" AREAS, 18" OF TOPSOIL SHALL BE SALVAGED AND STORED AT THE SOUTHWEST CORNER OF THE TOPSOIL PILE FOR FUTURE RECLAMATION. AFTER THE INSTALLATION OF NEW CULVERTS, BACKFILL SHALL BE PLACED TO APPROXIMATE EXISTING CONTOURS AND SEEDED WITH INTERIM SEED MIXTURE.

3. AREAS TO REMAIN UNDISTURBED SHALL BE PROTECTED DURING AND AFTER THE CONSTRUCTION / INSTALLATION OF THE CULVERTS AND DITCHES WITH THE USE OF SEDIMENT CONTROL DEVICES SUCH AS SILT FENCES OR EXCELSIOR LOGS.


LILA CANYON MINE
DISTURBED AREA HYDROLOGY AND WATERSHED MAP
R. Jay Marshall
January 2008
AS SHOWN
7-2
Div. of Oil, Gas & Mining
INCORPORATED
FED. LEASE #SL-066490(M)
FEDERAL LEASE #SL-066490
BLM R.O.W. #UTU-91789
BLM R.O.W. #UTU-77122
VEGETATION REFERENCE AREA
A.S.C.A. Disturbed
NORTH BREAKOUT
SOUTH BREAKOUT
OUTCROP
ROCK SLOPES
UNDERGROUND MINE WORKINGS
UPPER PAD
ROM COAL STOCKPILE
MIDDLE PAD
CRUSHED COAL STOCKPILE
LOWER PAD
TEMPORARY STORAGE PAD
SUBSTATION
STORAGE PAD
TOPSOIL PILE
TS-01
POND #1
POND #2
LILA CANYON ROAD
CONTROL POINT BETA
NORTHING: 6,961,805.36
EASTING: 1,965,344.01
ELEVATION: 5859.34
CONTROL POINT DELTA
NORTHING: 6,962,108.13
EASTING: 1,967,118.52
ELEVATION: 6129.72
EXISTING UNPAVED EMERY COUNTY ROAD RS-2477
SLOPE / PORTAL ACCESS ROAD
TRUCK LOOP
STORAGE PAD ACCESS ROAD
STREAM BUFFER ZONE
SECTION LINE
UNDISTURBED
NOTE: "UNDISTURBED" DENOTES DRAINAGE AND IS NOT APPLICABLE TO SOILS.
NOTE: CONTROL POINT COORDINATE SYSTEM IS U.S. STATE PLANE 1983 – UTAH CENTRAL (4302) ADJUSTED TO SEA LEVEL.
REVISION DATE:
JAN 2008 | APR 2008 | JUL 2008 | JUN 2009 | JAN 2010 | DEC 2010 | Nov. 2013
AUG. 2014 | DEC. 2015 | Feb. 2016 | March 2016 | Sept 2016 | DEC 2018 | Feb 2019
OFF-SITE FOOTPRINT
R 14 E, T 16 S
LEGEND:
UNDISTURBED WITHIN THE DISTURBED AREA
DISTURBED AREA BOUNDARY
6' HIGH CHAIN LINK FENCE
INCIDENTAL ROCK DISTRIBUTION
STREAM BUFFER ZONE SIGNS
Earthen Berm
TEMPORARY ROADWAYS
NEW CONTOURS (5' INTERVALS)
NEW CONTOURS (1' INTERVALS)
EXISTING CONTOURS (5' INTERVALS)
EXISTING WS BOUNDS
NEW WS BOUNDS
NATURAL DRAINAGE
EXISTING DITCH
EXISTING CULVERT
NEW/REWORKED DITCH
NEW CULVERT
SHEET FLOW DRAINAGE
EXISTING DROP BOX MANHOLE
NEW DROP BOX MANHOLE
BLM R.O.W. BOUNDARY
NOTES:
1. REFER TO PLATES 5-7A AND 5-7B FOR CROSS-SECTIONS.
2. AT ALL NEW EXCAVATIONS FOR NEW DITCHES AND CULVERTS IN "UNDISTURBED" AREAS, 18" OF TOPSOIL SHALL BE SALVAGED AND STORED AT THE SOUTHWEST CORNER OF THE TOPSOIL PILE FOR FUTURE RECLAMATION. AFTER THE INSTALLATION OF NEW CULVERTS, BACKFILL SHALL BE PLACED TO APPROXIMATE EXISTING CONTOURS AND SEEDED WITH INTERIM SEED MIXTURE.
3. AREAS TO REMAIN UNDISTURBED SHALL BE PROTECTED DURING AND AFTER THE CONSTRUCTION / INSTALLATION OF THE CULVERTS AND DITCHES WITH THE USE OF SEDIMENT CONTROL DEVICES SUCH AS SILT FENCES OR EXCELSIOR LOGS.





Sec. 15, T 16 S, R14 E

LEGEND:

- UNDISTURBED WITHIN THE DISTURBED AREA
- DISTURBED AREA BOUNDARY:
- 6' HIGH CHAIN LINK FENCE
- INCIDENTAL ROCK DISTRIBUTION:
- STREAM BUFFER ZONE SIGNS:
- BLM R.O.W. BOUNDARY LINE:
- TEMPORARY ROADWAYS:
- EXISTING INDEX CONTOURS (5' INTERVALS):

NOTES: 1. REFER TO PLATE 5-7A&B FOR CROSS-SECTIONS.

REVISION DATE:

DATE:	BY:
Feb. 28 2008	RJM
Feb. 25, 2019	PJJ

INCORPORATED
MAY 14 2019
Div. of Oil, Gas & Mining

PROFESSIONAL ENGINEER No. 150267-2203 THOMAS PALUSO STATE OF UTAH

LILA CANYON MINE

Coal Handling Facilities

DATE: February 2008
DESIGNED BY: UtahAmerican Energy, Inc.
SCALE: AS SHOWN
PLATE #: PLATE 5-8

LILA CANYON MINE
AS-BUILT SURFACE FACILITIES
DATE: APRIL 2016
DESIGNED BY: R. Jay Marshall
SCALE: AS SHOWN
PLATE #: 5-2
Div. of Oil, Gas & Mining
INCORPORATED
MAY 14 2019
PROFESSIONAL ENGINEER No. 22-150267-2203 J. THOMAS PALUSO STATE OF UTAH
NOTE:
CONTROL POINT COORDINATE SYSTEM IS U.S. STATE PLANE 1983 - UTAH CENTRAL (4302) ADJUSTED TO SEA LEVEL.
REVISION DATE:
JAN. 2008 RJM
APR. 2009 PJJ
DEC. 2009 PJJ
AUGUST 2010 PJJ
SEPT. 2010 PJJ
APRIL 2011 PJJ
MAY 2011 PJJ
JUNE 2011 PJJ
JAN. 2012 PJJ
MAR. 2014 PJJ
JULY 2014 PJJ
DEC. 2015 PJJ
JUNE 2016 PJJ
NOV. 2016 PJJ
JUNE 2017 PJJ
APRIL 2018 PJJ
JANUARY 2019 PJJ
FEBRUARY 2019 PJJ
MARCH 2019 PJJ
Sec. 15, T 16 S, R14 E
N
LEGEND:
UNDISTURBED WITHIN THE DISTURBED AREA
DISTURBED AREA BOUNDARY:
NATURAL DRAINAGE:
6' HIGH CHAIN LINK FENCE
INCIDENTAL ROCK DISTRIBUTION:
STREAM BUFFER ZONE SIGNS:
BLM R.O.W. BOUNDARY LINE:
TEMPORARY ROADWAYS:
STRUCTURAL FILL:
LEASE BOUNDARY LINES:
EXISTING INDEX CONTOURS (5' INTERVALS):
NEW INDEX CONTOURS (5' INTERVALS):
NEW INTERMEDIATE CONTOURS (1' INTERVALS):
REMOVED INDEX CONTOURS (5' INTERVALS):
NOTES: 1. REFER TO PLATE 5-7A&B FOR CROSS-SECTIONS.
KEYED MINE FACILITIES
1 TEMPORARY BATH HOUSE
2 TEMPORARY OFFICE TRAILER
3 TEMPORARY OFFICE / SHOP BUILDING
4 TEMPORARY STORAGE SHED (WOODEN)
5 TEMPORARY STORAGE BUILDING (METAL)
6 TEMPORARY CONCRETE WALKWAY
7 TEMPORARY OFFICE BUILDING
8 POTABLE WATER TANK
9 TEMPORARY STORAGE TENT W/ CONC. FLOOR
10 POWER POLE
11 ELECTRICAL TRANSFORMER
12 OVERHEAD POWER TRANSMISSION LINES
13 BURIED POWER TRANSMISSION LINES
14 ROCK DUST SILO
15 TEMPORARY FUEL STORAGE TANKS
16 TEMPORARY UNDERGROUND RECLAIM ROOM
17 TEMPORARY CONCRETE RETAINING WALL
18 TEMPORARY LOADOUT CONVEYORS (48")
19 TEMPORARY LOADOUT MCC BUILDING
20 TEMPORARY LOADOUT STRUCTURES
21 TEMPORARY CRUSHER CONVEYOR (48")
22 TEMPORARY CRUSHER / SCREEN BUILDING
23 TEMPORARY CRUSHED COAL CONVEYOR (48")
24 TEMPORARY CRUSHER MCC BUILDING
25 TEMPORARY CONCRETE DOZER TRAP
26 4" THICK ASPHALT PAVING
27 TEMPORARY CONCRETE EQUIPMENT PAD
28 ELECTRICAL GROUNDING FIELD
29 SEDIMENT POND SPILLWAY STRUCTURE
30 EXISTING ROM COAL CONVEYOR (60")
31 STEEL PORTAL CANOPY STRUCTURE
32 CONCRETE CONVEYOR BAY
33 SHOP / WAREHOUSE BUILDING
34 MINE MCC BUILDING / ELECTRICAL TOWER
35 BACKUP VENTILATION FANS
36 MAIN MINE VENTILATION FAN / ELEC. TOWER
37 NON-POTABLE WATER TANKS
38 POWDER AND CAP MAGAZINES
39 CHAIN-LINK FENCING
40 CONCRETE ELECTRICAL JUNCTION BOX
41 TEMPORARY CONCRETE SEPTIC TANK
42 TEMPORARY LOADOUT LIGHT BOARD
43 TEMPORARY CONVEYOR COUNTERWEIGHTS
44 JERSEY BARRIER GUARD RAIL
45 CONCRETE TRASH CHUTE
46 GANTRY LIFT ASSEMBLY
NOTE:
ALL NEW EXPOSED SLOPES TO RECEIVE INTERIM SEEDING UPON COMPLETION OF CONSTRUCTION.
LOWER PAD
MIDDLE PAD
CRUSHED COAL STOCKPILE
UPPER PAD
ROM COAL STOCKPILE
SUBSTATION
SHOP PAD
STORAGE PAD
STORAGE PAD ACCESS ROAD
TOPSOIL PILE
LOOSE TOPSOIL SALVAGED TO DATE: 79,274 C.Y.
POND #1
POND #2
TEMPORARY STORAGE PAD
LILA CANYON ROAD
CONTROL POINT BETA
NORTHING: 6,961,805.36
EASTING: 1,965,344.01
ELEVATION: 5859.34'
CONTROL POINT DELTA
NORTHING: 6,962,106.13
EASTING: 1,967,118.62
ELEVATION: 6129.72'
MINE FACILITIES ACCESS ROAD / TRUCK LOADOUT ROAD
STREAM BUFFER ZONE
SLOPE / PORTAL ACCESS ROAD
TRUCK LOOP
CAT TRAIL
UNDISTURBED
Rock Slope Material
12"+4' Cover
28,000 cy
ROCK SLOPES
NORTH BREAKOUT
SOUTH BREAKOUT
UNDERGROUND MINE WORKINGS
OUTCROP
A.S.C.A.
Disturbed
BLM R.O.W. #UTU-77122
BLM R.O.W. #UTU-91789
EXISTING UNPAVED EMERY COUNTY ROAD RS-2477
SECTION LINE
VEGETATION REFERENCE AREA
E 1,965,250
E 1,965,500
E 1,965,750
E 1,966,000
E 1,966,250
E 1,966,500
E 1,966,750
E 1,967,000
E 1,967,250
E 1,967,500
E 1,967,750
E 1,968,000
E 1,968,250
N 6,962,500
N 6,962,250
N 6,962,000
N 6,961,750
N 6,961,500
N 6,961,250
N 6,961,000
N 6,960,750
N 6,960,500
5800'
6000'
6100'
6200'
6300'
6400'
6500'
6600'


LILA CANYON MINE
SOIL SALVAGE AND REPLACEMENT
NOVEMBER 1999
AS SHOWN
UEI
2-3
INCORPORATED
MAY 14 2019
Div. of Oil, Gas & Mining
NOTE: CONTROL POINT COORDINATE SYSTEM IS U.S. STATE PLANE 1983 – UTAH CENTRAL (4302) ADJUSTED TO SEA LEVEL.
REVISION DATE:
2/4/08 RJM
12/28/09 RJM
12/08/10 RJM
11/20/13 PJJ
Dec. 2014 RJM
March 2019 PJJ
Sec. 15, T 16 S, R14 E
NOTE: SEE PLATE 2-3a FOR SOIL SALVAGE DATA.
MAP UNIT | SALVAGE DEPTH
SBG 18"
VBJ 18"
XBS 12"
DSH 18"
RBL 8"
RBT 6"
UNDISTURBED
LEGEND:
SOIL DESCRIPTION SITE
COAL MINE WASTE
DISTURBED AREA BOUNDARY
SOIL TYPE BOUNDARY
TOPSOIL BERM
MAP UNIT SOILS KEY:
SBG: Strych Bouldery fine sandy loam, 5 to 15 percent slopes (grass)
VBJ: Strych Very bouldery fine sandy loam, 5 to 15 percent slopes (pinyon - juniper)
XBS: Strych Extremely bouldery sandy loam, 10 to 45 percent slopes
DSH: Strych Fine sandy loam variant, 3 to 8 percent slopes
SBG 18"
DSH 18"
VBJ 18"
XBS 12"
RBL 8"
RBT 6"
LOWER PAD
MIDDLE PAD
CRUSHED COAL STOCKPILE
UPPER PAD
ROM COAL STOCKPILE
STORAGE PAD
SHOP PAD
SUBSTATION
TEMPORARY STORAGE PAD
POND #2
POND #1
TOPSOIL PILE
LOOSE TOPSOIL SALVAGED TO DATE: 79,274 C.Y.
VBJ UNDER TOPSOIL PILE NOT STRIPPED
Rock Slope Material 17'+4' Cover 18,000 cy
Area Below the Road Disturbed But No Topsoil Stripped
SLOPE / PORTAL ACCESS ROAD
MINE FACILITIES ACCESS ROAD / TRUCK LOADOUT ROAD
STORAGE PAD ACCESS ROAD
STREAM BUFFER ZONE
LILA CANYON ROAD
EXISTING UNPAVED EMERY COUNTY ROAD RS-2477
BLM R.O.W. #UTU-91789
BLM R.O.W. #UTU-77122
UNDISTURBED
VEGETATION REFERENCE AREA
SECTION LINE
NORTH BREAKOUT
SOUTH BREAKOUT
ROCK SLOPES
UNDERGROUND MINE WORKINGS
OUTCROP
A.S.C.A. Disturbed
LC1 LC2 LC3 LC4 LC5 LC6 LC7 LC8 LC9 LC10 LC11 LC12