UtahAmerican Energy, Inc.

Lila Canyon Project
P. O. Box 910
East Carbon, Utah 84520
Phone: (435) 888-4000
(435) 650-3157
Fax: (435) 888-4002

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

August 31, 2020

C/007/0013
Received 9/1/20
Task #6187

Attn: Steve Christensen
Permit Supervisor

Re: Lila Canyon Mine, UtahAmerican Energy, Inc. C/007/013
L20-004 Upper Pad Extension

Dear Mr. Christensen

Attached you will find the proposed plan to extend the upper pad on the Lila Canyon mine facility. This new pad construction will extend into undisturbed area, but is within the currently existing permit boundary. The design of this pad was originally planned to be built when the property was first constructed, however to cut costs at that time the pad was not constructed fully.
At this time UEI proposes to extend this pad out to the permit boundary, as originally designed.

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

Sincerely,

Karin Madsen
Environmental Permitting Engineer
UtahAmerican Energy, Inc.

APPLICATION FOR PERMIT PROCESSING

Permit Change X	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐	Permit Number: ACT/007/013
L20-004 Upper Pad Extension						Mine: Lila Canyon
						Permittee: UtahAmerican Energy, Inc.

Description, include reason for application and timing required to implement:

Instructions: *If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to your reclamation*

☐ Yes	☐ No	1. Change in the size of the Permit Area? 0 acres Disturbed Area? 1.4 acres X increase ☐ decrease.
☐ Yes	☐ No	2. Is the application submitted as a result of a Division Order? DO #
☐ Yes	☐ No	3. Does application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes	☐ No	4. Does application include operations in hydrologic basins other than as currently approved?
☐ Yes	☐ No	5. Does application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☐ No	6. Does the application require or include public notice/publication?
☐ Yes	☐ No	7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☐ No	8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes	☐ No	9. Is the application submitted as a result of a Violation?
☐ Yes	☐ No	10. Is the application submitted as a result of other laws or regulations or policies? Explain:
☐ Yes	☐ No	11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes	☐ No	12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2?)
☐ Yes	☐ No	13. Does the application require or include collection and reporting of any baseline information?
☐ Yes	☐ No	14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	☐ No	15. Does application require or include soil removal, storage or placement?
☐ Yes	☐ No	16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☐ No	17. Does the application require or include construction, modification, or removal of surface facilities?
☐ Yes	☐ No	18. Does the application require or include water monitoring, sediment or drainage control measures?
☐ Yes	☐ No	19. Does the application require or include certified designs, maps, or calculations?
☐ Yes	☐ No	20. Does the application require or include subsidence control or monitoring?
☐ Yes	☐ No	21. Have reclamation costs for bonding been provided for?
☐ Yes	☐ No	22. Does application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes	☐ No	23. Does the application affect permits issued by other agencies or permits issued to other entities?

X Attach complete copies of the application.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Karin Madsen / Env. Permitting Engineer / 8-31-20

Signed - Name - Position - Date

Subscribed and sworn to before me this 31 day of August, 20 20

Stacy M Headley
Notary Public

My Commission Expires: 1/9, 20 2

Attest: STATE OF Utah
COUNTY OF Carbon

STACY M HEADLEY
NOTARY PUBLIC
STATE OF UTAH
COMMISSION # 703969
COMM. EXP. 01/09/2023

Received by Oil, Gas & Mining

ASSIGNED TRACKING NUMBER

Application for Permit Processing
Detailed Schedule of Changes to the MRP

L20-004 Upper 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	Plate 5-7E-1 – Upper Pad Expansion Plan and Typical Details Plate 5-7E-2 – New Culverts UC-6 and UC-7 Profile and Sections Plate 5-7E-3 – New Culverts UC-6 and UC-7 Sections Plate 5-7E-4 – New Culverts UC-6 and UC-7 Sections Plate 5-7E-5 – Culverts UC-6 and UC-7 Sections and UC-5 Profile and Sections Plate 5-7E-6 – New UC-5 Culvert Sections and Cut / Fill Tabulations
☐ ADD	☐ REPLACE	☐ REMOVE	Plate 2-3 – Soil Salvage and Replacement Map Plate 5-2 – As-Built Surface Facilities Map Plate 7-2 – Disturbed Area Hydrology and Watershed Map Plate 7-5 – Proposed Sediment Control
☐ ADD	☐ REPLACE	☐ REMOVE	Appendix 7-4
☐ ADD	☐ REPLACE	☐ REMOVE	Chapter 2 pages 9 and 10
☐ ADD	☐ REPLACE	☐ REMOVE	Chapter 1 page 13
☐ ADD	REPLACE	☐ REMOVE	Bonding calculations
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	

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

Lila Canyon Extension

Chapter 1
Legal

Volume 1 of 7

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100. GENERAL CONTENTS.

110. Minimum Requirements

111. Intent

The information included within this chapter of the permit application is intended to satisfy the minimum requirements of R645-301-100. All relevant information on the ownership and control of persons who conduct coal mining and reclamation operations, the ownership and control of the property to be affected by the operation, the compliance status and history of those persons, and other important information is provided. The format for the permit application was used to facilitate expedient review and approval.

112. Identification of Interests.

112.100. The applicant, **UtahAmerican Energy, Inc.,** is a corporation organized and existing under the laws of Utah and qualified to do business in Utah.

112.200. The name, address, telephone number, and employer identification number of the applicant, resident agent, and person who will pay the abandoned mine land reclamation fee is as follows:

112.210. The Applicant **UtahAmerican Energy, Inc.,** will also be the operator.

UtahAmerican Energy, Inc.
P.O. Box 986
Price, Utah 84501

Employer Identification Number: 34-1874726

112.220. The resident agent of the applicant, UtahAmerican Energy, Inc., is:

Karin Odendahl-Madsen
UtahAmerican Energy, Inc.
P.O. Box 986
Price, Utah 84501

112.230. The abandoned mine land reclamation fee will be paid by:

Robert E. Murray
UtahAmerican Energy, Inc.
46226 National Road
St. Clairsville, Ohio 43950

112.300. The person's name, address and employer identification number for each person who owns or controls the applicant is listed under Appendix 1-1. In addition Appendix 1-1 shows the persons ownership or control relationship to the applicant, percentage of ownership, and location in the organizational structure.

112.310. Persons who own or control names, address social security numbers and employer identification numbers can be found in Appendix 1-1.

112.320. Persons ownership or control relationship to the applicant can be found in Appendix 1-1.

112.330. Title of the person's position and date position was assumed can be found in Appendix 1-1.

112.340. **UtahAmerican Energy, Inc.,**
The American Coal Company
PennAmerican L.P.
Canterbury Coal Company
Energy Resources, Inc.
Oklahoma Coal Company
Ohio Valley Coal Company
MonValley Transportation Center, Inc.
KenAmerican Resources, Inc.
Belmont Coal, Inc.
UMCO Energy, Inc.

Maple Creek Mining, Inc.
Onieda Coal, Inc.
Spring Church Coal Company

Permit numbers, regulatory authority and issuance dates are found in Appendix 1-2.

112.350. There are no pending coal mine permit applications in any State in the United States.

112.400. Miscellaneous information for coal mining and reclamation operations owned or controlled by the applicant or by any person who owns or controls the applicant follows.

112.410. The name, address, identifying numbers, including employer identification number, Federal or State permit numbers and MSHA number, with date of issuance and the regulatory authority issuing the permit can be found in Appendix 1-2.

112.420. Ownership or control relationship to the applicant is presented in Appendix 1-1.

112.500. The name and address of each legal owner of the surface and mineral property to be mined is shown on Plate 4-1 for surface ownership and Plate 5-4 for coal ownership, and is as follows:

Surface Owners:

Josiah K Eardley:
2433 S HWY 10
Route 1, Box 119
Price, Utah 84501

Bronco Coal Company:
P.O. Box 217
Cleveland, Utah 84518

UTAHAMERICAN ENERGY, INC.:
46226 National Road
St. Clairsville, Ohio 43950

UNITED STATES DEPARTMENT OF THE INTERIOR:
Bureau of Land Management
Utah State Office
324 South State
Salt Lake City, Utah 84111

STATE OF UTAH:
Utah School and Institutional Trust Lands Administration (SITLA)
675 East 500 South Suite 500
Salt Lake City, Utah 84114-5703

COLLEGE OF EASTERN UTAH FOUNDATION:
451 East 400 North
Price, Utah 84501

Subsurface Owners:

UTAHAMERICAN ENERGY, INC.:
46226 National Road
St. Clairsville, Ohio 43950

Bronco Coal Company:
P.O. Box 217
Cleveland, Utah 84518

STATE OF UTAH:
Utah School and Institutional Trust Lands Administration (SITLA)
675 East 500 South Suite 500
Salt Lake City, Utah 84114-5703

UNITED STATES DEPARTMENT OF THE INTERIOR:
Bureau of Land Management
Utah State Office
324 South State
Salt Lake City, Utah 84111

COLLEGE OF EASTERN UTAH FOUNDATION:
451 East 400 North
Price, Utah 84501

112.600. The name and address of each owner (surface and subsurface) of all property contiguous to the proposed permit area is shown on Plate 4-1 for surface, and Plate 5-4 for subsurface. Plate 1-1 is the official boundary map and it will be used to clarify any questions about the permit boundaries. Plate 1-2 shows the disturbed area.

Contiguous Surface Owners:

UNITED STATES DEPARTMENT OF THE INTERIOR:
Bureau of Land Management
Utah State Office
324 South State
Salt Lake City, Utah 84111

STATE OF UTAH:
Utah School and Institutional Trust Lands Administration (SITLA)
675 East 500 South Suite 500
Salt Lake City, Utah 84114-5703

Josiah K Eardley*:*
2433 S HWY 10
Route 1, Box 119
Price, Utah 84501

Bronco Coal Company:
P.O. Box 217
Cleveland, Utah 84518

UTAHAMERICAN ENERGY, INC.:
46226 National Road
St. Clairsville, Ohio 43950

WILLIAM MARSING LIVESTOCK INC.:
4330 E 8900 N
Price, Utah 84501

COLLEGE OF EASTERN UTAH FOUNDATION:
451 East 400 North

Price, Utah 84501

Contiguous Subsurface Owners:

UNITED STATES DEPARTMENT OF THE INTERIOR:
Bureau of Land Management
Utah State Office
324 South State
Salt Lake city, Utah 84111

STATE OF UTAH:
Utah School and Institutional Trust Lands Administration (SITLA)
675 East 500 South Suite 500
Salt Lake City, Utah 84114-5703

UTAHAMERICAN ENERGY, INC.:
46226 National Road
St. Clairsville, Ohio 43950

Bronco Coal Company:
P.O. Box 217
Cleveland, Utah 84518

COLLEGE OF EASTERN UTAH FOUNDATION:
451 East 400 North
Price, Utah 84501

112.700. The following is a list of MSHA numbers associated with the permit.

MSHA ID Number: 42-00100 (Horse Canyon)
MSHA ID Number 42-02241 (Lila Canyon)
Refuse Pile I.D. Number: 1211-UT-09-02241-01

United States Department of Labor
Mine, Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225

112.800. UEI submitted a lease by application to the BLM for 4,192 acres in the William's Draw area as well as 1,117 acres in the Turtle Canyon area that have both been identified as an area of interest to the south and east of current UEI reserves. The LBA delineation and recoverable reserves have yet to be determined by the BLM. If the area of interest is offered for lease, and If UEI bids on the LBA, and if UEI is the successful bidder, then it could be anticipated that mining in the leased area would occur once current Lila reserves are exhausted (by approximately the year 2020).

112.900. After **UtahAmerican Energy, Inc.,** is notified that the application is approved, but before the permit is issued, **UtahAmerican Energy, Inc.,** will update, correct or indicate that no change has occurred in the information previously submitted under R645-301-112.100 to R645-301-112.800.

113. Violation Information.

113.100. Neither **UtahAmerican Energy, Inc.,** nor any subsidiary, affiliate, or persons controlled by or under common control with the applicant, has had any federal or state permit to conduct coal mining and reclamation operations suspended or revoked in the five years preceding the date of submission of the application.

113.110. No federal or state permits to conduct coal mining and reclamation operations has been suspended or revoked in the five years preceding the date of submission of the application.

113.120. Neither **UtahAmerican Energy, Inc.,** nor any

subsidiary, affiliate, or persons controlled by or under common control with the applicant, have forfeited a performance bond or similar security deposited in lieu of bond.

113.200. Since no suspensions revocations, or forfeitures have taken place section 113.200 with subsections is not applicable.

113.300. A list of violations received by the applicant or any subsidiary, affiliate or persons controlled by or under common control with the applicant in connection with any coal mining and reclamation operation during the three year period proceeding the application date is provided in Appendix 1-3. MSHA numbers for the operations listed in Appendix 1-3 can be found in Appendix 1-2.

113.310. Violation information such as: Identifying numbers including Federal and State permit numbers, date issued, and name of issuing agency is included in Appendix 1-3.

113.320. A brief description of violations alleged in the notice is included in Appendix 1-3.

113.330. The date, location, and type of any administrative or judicial proceeding is included in Appendix 1-3.

113.340. The current status of violations is included in Appendix 1-3.

113.350. Actions taken to abate the violation is included in Appendix 1-3.

113.400. After **UtahAmerican Energy, Inc.,** is notified that the application is approved, but before the permit is issued, **UtahAmerican Energy, Inc.,** will update, correct or indicate that no change has occurred in the information previously

submitted under R645-301-113.

114. Right-of-Entry Information.

A Right-of-Way application and the subsequent Environmental Assessment (EA) have been submitted to the BLM. The EA was issued for public comment in the summer of 2000. A Finding of No Significant Impact (FONSI) and record of decision were issued in October 2000. An appeal was filed and a stay requested. The stay was not acted on and an uninhibited Right-of-Way could be issued in the spring of 2003. Appendix 1-6 contains BLM correspondence in regards to Right-of-Entry as provided by the pending Right-of-Way and its related use.

114.100. **UtahAmerican Energy, Inc.,** currently holds 5,549.01 acres of federal coal contained in six federal leases, purchase in June 2000 from Intermountain Power Agency and assigned to UEI by the BLM. (See Table 1-1 and Plate 5-4). These leases are contained in the South Lease - North Block LMU filed May 1996. The leases as described in the North Block LMU are not under any pending litigation. **UtahAmerican Energy, Inc.,** bases its legal right to enter and conduct mining activities in the permit area pursuant to the language contained in the Federal Coal Lease, Part I Lease Rights Granted which reads as follows:

> "That the lessor, in consideration of the rents and royalties to be paid and the covenants to be observed as hereinafter set forth, does hereby grant and lease to the lessee the exclusive right and privilege to mine and dispose of all the coal in, upon, or under the following described tracts of land, situated in the State of Utah.... together with the right to construct all such works, buildings, plants, structures and appliances as may be necessary and convenient for the mining and preparation of the coal for market, the manufacture of coke or other products of coal, the housing and welfare of employees, and subject to the conditions herein provided, to use so much of the surface as may reasonably be required in the exercise of the rights and privileges herein granted."

The surface right-of-entry is in the form of BLM rights-of-way. See Appendix 1-7 for BLM letters assigning rights-of-way numbers.

114.200. Since no private mineral estate is involved this section does not apply.

114.210. Since no private mineral estate is involved this section does not apply.

114.220. Since no private mineral estate is involved this section does not apply.

114.230. Since no private mineral estate is involved this section does not apply.

Table 1-1
Federal Coal Leases Held by Permittee (See Plate 5-4)

Federal Coal Lease	TownShip & Range	Section	Description	Acres
#SL-066490	*T16S, R14E*	*11*	*E1/2*	*2445.00*
	T16S, R14E	*12*	*W1/2*	
	T16S, R14E	*13*	*W1/2*	
	T16S, R14E	*14*	*E1/2,SW1/4*	
	T16S, R14E	*15*	*E1/2SE1/4*	
Lease Modification	*T16S, R14E*	*15*	*SE1/4SE1/4NW1/4SE1/4 NE1/4NE1/4SW1/4SE1/4*	
	T16S, R14E	*22*	*NE1/4NE1/4*	
	T16S, R14E	*23*	*N1/2,E1/2SW1/4,SE1/4*	
	T16S, R14E	*24*	*NW1/4,W1/2SW1/4*	
	T16S, R14E	*26*	N1/2NE1/4	
#U-014218	*T16S, R14E*	12	E1/2	320
#U-0126947	*T16S, R14E*	*13*	*E1/2*	*1059.81*
	T16S, R14E	*24*	*E1/2*	
	T16S, R14E	*25*	*N1/2NE1/4,SE1/4NE1/4*	

	T16S,R15E	19	*SE1/4SW1/4, Lots 3 & 4*	
	T16S,R15E	30	*E1/2NW1/4,SW1/4NE1/4, Lots 1 & 2*	
#U-014217	T16S,R14E	*25*	SW1/4NE1/4	40
#SL-069291	T16S,R14E	24	E1/2SW1/4	*280*
	T16S,R14E	*25*	NW1/4	
	T16S,R14E	26	SE1/4NE1/4	
#SL-066145	T16S,R14E	3	Lots 1-3, 7-11, Ne1/4SW1/4,SE1/4	1404.20
	T16S,R14E	10	E1/2	
	T16S,R14E	11	W1/2	
	T16S,R14E	14	NW1/4	
	T16S,R14E	15	N1/2NE1/4,SE1/4NE1/4	
Totals	Six Leases			5549.01

115. Status of Unsuitability Claims.

115.100. The proposed permit area is not within an area designated as unsuitable for mining. **UtahAmerican Energy, Inc.,** is not aware of any petitions currently in progress to designate the area as unsuitable for coal mining and reclamation activities.

115.200. Since no exemption is requested this section does not apply.

115.300. UtahAmerican Energy, Inc., will not conduct mining operations within 300 feet of a currently occupied dwelling. However, UtahAmerican Energy, Inc., will conduct mining or mining related activities within 100 feet of a public road. UtahAmerican Energy, Inc., has received permission from Emery County to construct facilities and operate coal mining

activities within 100 feet of a public road. Refer to the Emery County letter found in Appendix 1-4.

116. Permit Term.

116.100. The anticipated starting and termination dates of the coal mining and reclamation operations are as follows:

Phase	Begin	Complete
Mining Pad, Support Structures, and Portals	June 2005	Dec. 2005
Begin Underground work	June 2005	
Terminate Mining	Dec. 2027	

Reclamation operation dates can be found in Table 3-3.

Approximately 5,992.07 surface acres, which include federal, state and private land, are included within the permit area. These surface acres are described in Table 4-2, and coal acres are shown on Table 4-2A.

The existing perimeter of the disturbed area contains approximately 41.66 surface acres within the disturbed area. However, only 35.62 acres will be disturbed; leaving 1.84 acres of undisturbed islands within the total disturbed area boundary.

116.200. The initial permit application is for a five year term with anticipated successive five year permit renewals.

116.210 Since the initial permit application is for a term of five years this section does not apply.

116.220 Since the initial permit application is for a term of five years this section does not apply.

117. Insurance, Proof of Publication and Facilities or Structures Used in Common

117.100. The Certificate of Liability Insurance is included as Appendix 8-2.

117.200. A copy of the newspaper advertisement of the permit extension and proof of publication can be found in Appendix 1-5.

117.300. Since no structures are going to be shared by two or more separately permitted coal mining permit applications this section does not apply.

118. Filing Fee.

A filing fee of $5.00 has been submitted.

120. Permit Application Format and Contents.

121. The permit application contains current information and is written in a clear and concise manner in a format satisfactory to the Division.

122. Referenced materials not on file at the Division, or readily available to the Division, will be provided upon request of the Division by the applicant. On August 22, 2000 Dave Darby confirmed a copy of the R2P2 is on file at the Salt Lake City Division office.

123. A notarized statement, attesting to the accuracy of the information can be found in Appendix 1-5.

130. Reporting of Technical Data.

131. Persons or organizations that collected or analyzed data, the dates associated with the collection and/or analysis of the data, can be found in Appendix 1-5.

132. Resumes for the professional qualified persons who planned, directed the collection of or analyzed data can be found in Appendix 1-5.

140. Maps and Plans.

141. Maps have been presented in a consolidated format, to the extent possible, and include all the types of information that are set forth on U.S. Geological Survey of the 1:24,000 scale series. Maps of the permit area are to the scale of 1:6,000 or larger. Maps of the adjacent area will clearly show the lands and waters within those areas.

142. Maps and plans submitted with the permit application distinguish among each of the phases during which coal mining and reclamation operations were or will be conducted at any place within the life of operations.

150. Completeness

This permit extension to the existing Horse Canyon Permit ACT/007-013 to conduct coal mining and reclamation operations is complete and includes the minimum information required under R645-301 and, if applicable, R645-302. Plates 1-1 and 1-2 show the permit area and proposed disturbed area boundaries.

This permit extension is intended to add the Lila Canyon Mine as part “B” to the existing permit, and to leave unchanged the current approved Horse Canyon Mine as part “A”. The Horse Canyon Mine “part A” is for historical purposes only.

WordPerfect Document Compare Summary

Original document: K:\Lila\2020\L20-004 Upper Pad Extension\Original Text\Chapter 2 ORIGINAL.wpd
Revised document: K:\Lila\2020\L20-004 Upper Pad Extension\Chapter 2 New Edits.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 17 Deletions, 17 Insertions, 0 Moves.

Horse Canyon Extension
Lila Canyon Mine

Chapter 2
Soils

Volume 1 of 7

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Appendix 2-3 Soil Survey (1998)
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R645-301-200. Soils.

210. Introduction.

211. Pre-mining soil sources description.

212. Information in this chapter includes soil characteristics, chemical and physical analyses, and their interpretations for soils management and reclamation plans. Information is both qualitative and quantitative in nature.

Evaluation of suitable soil materials, stockpiling, and reclamation procedures are presented in section 220, 230, 240 and 250.

220. Environmental Description.

Environmental setting:

The proposed Lila Canyon Mine location is in eastern Emery County, Utah on the east side of the Price River drainage basin at the western edge of the Book Cliffs. The Book Cliffs are oriented northwest-southeast in the vicinity of the proposed permit area. The mine surface facilities would be located at the mouth of Lila Canyon, mostly on an alluvial pediment surface. Lithology is primarily sedimentary rocks of sandstone and shale. Below the steep slopes of the Book Cliffs are alluvial pediments and shale exposures. The elevation differences in the area of the mine site range from approximately 5,800 at the mouth of Lila Canyon to over 8,800 feet on top of Lila Point. Elevations of the proposed mine facilities site range from 5,800 feet to 6,500 feet.

The average annual precipitation in the area of the mine site is 12-14 inches, with the majority of the precipitation occurring from October to March. The mean annual air temperature is 45-47 degrees F and the average frost-free period is 80 to 120 days. The basic vegetation is a pinyon-juniper and grass type.

221. Prime Farmland Investigation.

A Prime Farmland Investigation was conducted by Leland Sasser, Soils Scientist for the USDA Natural Resource Conservation Service (NRCS) in January of 1998. Mr. Sasser confirmed that no such lands

are present within the described permit area. This is due to the lack of a developed irrigation system on the arid soils present, as well as the high erodibility of soils present within the area. It has been determined that no alluvial valley floors are present on the proposed disturbed areas of the Lila Canyon Mine Project. This determination was made by the use of detailed soil surveys and site observations. Also, the order 3 intensity level soil survey by the National Resources Conservation Services shows no alluvial valley floors in the area. A copy of these negative determinations is included as Appendix 2-1.

222. Soil Survey.

222.100. An order 3 intensity level soil survey for Emery County is currently in progress by the USDA, National Resources Conservation Service (NRCS). Soil mapping at a scale of 1:24,000, along with map unit descriptions, has been provided by NRCS to cover the entire Lila Canyon Mine project area. This soil map is presented as Plate 2-1. The detail is suitable for general planning and evaluation purposes over the mining project area.

Since more specific information was needed for the area to be disturbed at the proposed mine facilities site; a detailed soil survey was conducted by Daniel Larsen, Soil Scientist, Environmental Industrial Services in August 1998. Additional information was collected near the ventilation break outs on June 15, 1999. The detailed soil survey report is presented in Appendix 2-3. A soils map, soil descriptions, and laboratory soil testing data are included. The detailed soils map for the mine facilities site (disturbed area) is presented in Plate 2-2.

222.200. Soil types for the proposed project area are identified on Plate 2-1 and in Appendix 2-3. At the mine facilities site the dominant soil is the Strych series. The order 3 intensity soil survey information provided by the Natural Resources Conservation Service identifies four soil map units at the mine surface facilities site:

BNE2	Strych very bouldery, fine sandy loam, 3 to 20 percent slopes
BMD	Strych very stony fine sandy loam, 3 to 30

percent slopes

NGG2 Gerst-strych-badland complex, 30 to 70 percent slopes

RZH Rock outcrop-Atchee-Rubbleland Complex

The detailed soil survey of the facilities site identifies six soil map units:

SBG - Strych boulder fine sandy loam, 5 to 15 percent slopes (grass)

VBJ - Strych very bouldery fine sandy loam 5 to 15 percent slopes (juniper)

XBS - Strych extremely bouldery sandy loam, 10 to 45 percent slopes

RBL - Rubbleland-Strych-Gerst complex, 20 to 70 percent slopes

DSH - Strych fine sandy loam variant, 3 to 8 percent slopes

RBT - Rock outcrop - Travessilla family complex.

These unit designations are specific to this inventory. The Travessilla family has been revised by NRCS and based the changes the Atchee series is more appropriate in Map Unit RBT (personal conversation with Leland Sasser. July, 1999).

Permit Area “B”Soils

Soils in Permit Area “B” include the following Soil Map Units identified in the Soil Survey of the Emery Area, Utah by the Natural Resource Conservation Services:

DHG2 Comodore-Datino Complex

DSG 2 (HUG)	Midfork-Tingey-Comodore Complex
GNA	Neto fine sandy loam
KXH	Podo-Rock outcrop Complex
MHE (MSC)	Podo sandy loam, 1 to 8 percent slopes
MRG	Vassilla-Rock outcrop-Gerst Association
MTH	Cabba-Guben-Rock outcrop Complex
MUE	Cabba-Podo-Doney Complex
NGG2	Gerst-Strych-Badland Complex
NVF2	Gerst-Rubbleland-Badland
NXC	Lazear-Rock outcrop Complex, High rainfall
RR	Rock outcrop
RWG	Rock outcrop-Rubbleland-Vassilla Complex
RZH	Rock outcrop-Atchee-Rubbleland Complex
UMF2	Guben-Pathead-Rabbitex Association
VOH	Guben-Rock outcrop Complex

222.300. Soil descriptions from the NRCS order 3 mapping are contained in Appendix 2-2. Soil descriptions from the detailed soil survey of the facilities site are given in Appendix 2-3.

The soils at the proposed Lila Canyon mine facilities site have formed dominantly in deep, stony and bouldery deposits on an alluvial fan and adjacent mountain toe slopes under a semi-arid climate. Rock fragments (gravel to boulders) are composed almost entirely of sandstone.

Notable features related to soils at the site are the high percentage of stones and boulders that are present on the surface and the relatively hot and dry site conditions. Minimal topsoil development and an accumulation of carbonates in the subsoil are typical characteristics of these soils along with a high rock fragment content. Soil textures are typically fine sandy loam or sandy loam. Thin layers of sandy clay loam and

loamy sand are intermittently present.

The dominant soils are well drained and have moderately rapid permeability. Soil erosion potential is moderately low over most of the area, but ranges from low to severe (on shale exposures). Rooting depths observed were mostly at 30 to 48 inches.

222.400 Present and potential productivity determinations of the existing soils conducted by Mr. George Cook of the NRCS in the summer of 1998 are presented in Appendix 3-2.

223. The soil survey was conducted according to the standards of the National Cooperative Soil Survey as described in the Soil Survey Manual (Soil Survey Staff, 1993), the National Soil Survey Handbook, (soil Survey Staff, 1993), and Keys to Soil Taxonomy, seventh edition (Soil Survey Staff, 1996).

224 Soil inventories indicate that no borrow area will be needed for substitute topsoil. There is an adequate amount of suitable soil as indicated by root distribution and soil characteristics over the proposed area to be disturbed.

230. Operation Plan.

231. General Requirements.

231.100 In reference to topsoil in this plan, it is considered to be the soil down to a maximum depth of 18". The typically dark colored A horizon often referred to as topsoil is very thin (< 6 inches) under the environmental conditions of the project site. Topsoil generally consists of the A and B horizon materials that have suitable characteristics for plant growth and show natural rooting present within the soil. Of the salvageable soil identified, the upper 6 to 12 inches is the most suitable. Below this depth, there is generally an increase in carbonates and rock fragments. However, this layer supports plant roots and is not considered as substitute topsoil in this case.

Where topsoil is to be salvaged, the soils will be removed with

one or more of the following types of equipment: crawler-tractor, grader, front-end loader, and/or trackhoe. A soil scientist will provide on-site consultation during the topsoil removal process to maximize harvest of quality topsoil. Topsoil material will be hauled by truck and stockpiled at designated storage areas located near, but away from the mine yard. This will allow the soil materials to be located away from mining activities to minimize the potential impacts from mine-related activities. The storage areas will be located away from any drainage areas. Drainage ditches will be located along the sides of the stockpiles to divert drainage away from the stockpile surface. Drainage will be diverted by ditches to the downslope end of the stockpile and will be treated by silt fences prior to entering the undisturbed drainage. Refer to Plates 5-2 and 5-7 for the location of the proposed topsoil storage area. Refer to Appendix 7-4 for details of the drainage control designs proposed for these alternate sediment control areas (ASCAs).

During stripping and handling, the soils will be in a loose or friable condition. If the soil sticks to the equipment, the soil will be allowed to dry to a friable state prior to removable. If the soil is too dry and hard to handle, water will be added until the soil is wetted to a loose and friable condition.

The stockpiled material will be loosely piled and have an irregular, pitted surface to help retain runoff from precipitation events and to reduce erosion.

The stockpile will be seeded and mulched during the first favorable period for revegetation. Species selected would give an effective, quick-growing vegetative cover to protect it from wind and water erosion. The seed mix to be utilized for stockpile revegetation is presented in Table 3-4. If supplemental seeding is needed, it will be done the following year. If seeding does not immediately follow topsoil pile construction, the pile will be roughened again immediately prior to seeding. Side slopes will be monitored for erosion and will be repaired if erosion appears to be excessive.

Undisturbed islands located within the disturbed area will not be disturbed unless the mine reclamation plan is amended to allow for the disturbance. The islands will be signed as

undisturbed to help protect them from any disturbance.

231.200. Soil inventories indicate that no topsoil substitutes will be needed.

231.300. Topsoil will be tested as per Section 243. If testing identifies a potential problem, additional samples may be collected to determine the extent and severity of the problem.

Vegetation monitoring will compare the results of plant growth on the replaced topsoil with the growth on the in-place soil materials. If there is a distinct difference between the two areas, the Operator will consult with the DOGM to determine the nature of the problem and will make corrections as recommended for improvement.

231.400. Construction of the topsoil storage site will begin by removing any large boulders and existing vegetation. Diversion ditches will be installed after the stockpiles are in place to channel drainage away from the stockpiles. Once the topsoil stockpile has been created with the material removed during construction of the proposed mine site, it will be reseeded and will remain in place until final reclamation occurs.

The surface of the stockpile will be left rough and irregular to increase retention of rainfall and snow melt. Seeding will be done following placement of the topsoil, and between Sept. 15 and Jan. 15, to take advantage of winter moisture. If seeding does not immediately follow topsoil pile construction, the pile will be roughened again immediately prior to seeding.

A silt fence or berm/ditch configuration will be installed at the perimeter of the pile to protect it from water erosion and vehicular traffic. Maintenance of the topsoil pile, during the life of the mining operation, will consist of: seeding the new stockpile, reseeding if erosion or other elements cause a loss of vegetation, and maintenance of the ditches and/or silt fence in the stockpile areas.

232. Topsoil and Subsoil Removal

232.100 Prior to topsoil removal, eight five gallon buckets of screened 1/4" cryptobiotic soil will be recovered and stored in a cool dry

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~~93**	**~~14435~~14648**
DSH	40	1.56	8389	**18**	**1.48**	**3420**
RBL	8	5.53	5948	**8**	**~~3.822340~~4.53**	**3108**
RBT	6	0.09	73	**6**	**0.00**	**452**
TOTAL		40.12	153415		**~~33.99~~34.83**	**~~603286~~61309**
Bank to Loose Cubic Yards *1.18 (Amount topsoil pile is designed to hold.)						**(1) ~~71987~~72345**

(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~~34.83 acres where soil would be salvaged and stored in the topsoil stockpile.

Total volumes of soil stored in the topsoil pile would be approximately 7~~1~~2,~~987~~345 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~~61,~~000~~309 bank cubic yards x 1.18 which equals ~~66~~72,~~000~~345 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 7~~1~~2,~~987~~345 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 7~~1~~2,~~987~~345 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

not be salvaged or stored (See R645-301-232.700 and 232.710).

The sequence for topsoil removal in general, would be starting from the lower elevations of the site and working up slope. Surface disturbance may not be required on all of the acreage identified as the disturbed area. After removal of the topsoil to be salvaged, underlying soil materials will be used as fill or left in place.

All practical precautions will be taken during design, construction, and reclamation to assure that shales or shale material will not be pushed over the top of or mixed with subsoils. Contamination of the subsoil with shale will not be permitted. The certified soils specialist, or by a person who is determined qualified by the operator and the Division, on site during the construction and reclamations phases will carefully observe the construction and reclamation phases and prevent to the extent possible the mixture of shales and subsoils. Additional topsoil removal, in excess of 18" minimum, may be necessary to prevent the shale from contaminating the subsoil.

232.200. Since topsoil is sufficient this section does not apply.

232.300. The surface soil down to 18" or to the shale which ever is the least will be removed and stored.

232.400. This section is addressed in 232.700.

Lila Canyon
Topsoil
Calculations

Pile Elevation In Feet	Pile Length In Feet	Pile Width In Feet	Volume L X W CYDS	Volume Ends CYDS	Total Volume Cumulative Cubic Yards
	350	250	3240.74		3240.74
1	346	246	3152.44	22.07	6415.26
2	342	242	3065.33	21.78	9502.37
3	338	238	2979.41	21.48	12503.26
4	334	234	2894.67	21.19	15419.11
5	330	230	2811.11	20.89	18251.11
6	326	226	2728.74	20.59	21000.44
7	322	222	2647.56	20.30	23668.30
8	318	218	2567.56	20.00	26255.85
9	314	214	2488.74	19.70	28764.30
10	310	210	2411.11	19.41	31194.81
11	306	206	2334.67	19.11	33548.59
12	302	202	2259.41	18.81	35826.81
13	298	198	2185.33	18.52	38030.67
14	294	194	2112.44	18.22	40161.33
15	290	190	2040.74	17.93	42220.00
16	286	186	1970.22	17.63	44207.85
17	282	182	1900.89	17.33	46126.07
18	278	178	1832.74	17.04	47975.85
19	274	174	1765.78	16.74	49758.37
20	270	170	1700.00	16.44	51474.81
21	266	166	1635.41	16.15	53126.37
22	262	162	1572.00	15.85	54714.22
23	258	158	1509.78	15.56	56239.56
24	254	154	1448.74	15.26	57703.56
25	250	150	1388.89	14.96	59107.41
26	246	146	1330.22	14.67	60452.30
27	242	142	1272.74	14.37	61739.41
28	238	138	1216.44	14.07	62969.93
29	234	134	1161.33	13.78	64145.04
30	230	130	1107.41	13.48	65265.93
31	226	126	1054.67	13.19	66333.78
32	222	122	1003.11	12.89	67349.78
33	218	118	952.74	12.59	68315.11
34	214	114	903.56	12.30	69230.96
35	210	110	855.56	12.00	70098.52

Figure 1

232.410. This section is addressed in 232.700.

232.420. This section is addressed in 232.700.

232.500. Topsoil will be considered as the upper 18 inches of soil in most cases. Subsoil ranging in thickness from 12 to 30 inches from cutslope sites will be used as fill material for site development and replaced in an approximate original sequence during reclamation.

In order to verify subsoil depths, soil pedestals or other survey methods will be utilized for proper identification. Pedestals of undisturbed soil will be left at selected locations as reference points to show the type of soil thickness that has been removed from the slope cut areas. Records will be maintained to keep track of what materials are removed and where they are placed (topsoil storage or fill). Pedestals will vary in size depending on depth of cut. They will be designed to maintain stability of the soil column.

These soil pedestals may have to be removed once they have been properly logged to facilitate the mining operation.

An As-Built map will be prepared to show where soil materials have been used as fill material. This will include thickness records for topsoil, subsoil, and substrata. This information will be used to verify subsoil salvage depths according to Salvageable Soils Map Appendix A-2 of Appendix 2-3. This as built map will be incorporated into the Mining Reclamation Plan.

If shale is encountered in the slope cuts, the shale material will be separated from the other soil and returned to or near its original position upon reclamation.

Subsoils that are stored as pad material will be protected by a surface that is covered by asphalt, concrete, or gravel. The subsoil material will be under parking areas, buildings, roads, and storage sites. Precautions will be taken to avoid contamination. In the unlikely event

visual observations indicate that subsoil has become contaminated from oil and grease, salts, or other visual contaminates, the contaminated soil will be disposed of at a sanitary landfill site (probably East Carbon).

232.600. Topsoil will be removed from excavation areas and stockpiled prior to construction activity. Vegetation and boulders that might interfere with topsoil salvage will be removed prior to removal and stockpiling of the topsoil.

The topsoil will be removed in two Phases. The first phase will remove topsoil, vegetation and boulders in an area large enough to allow for mining of diligence tons. The second phase which will remove the remainder of the approved topsoil and vegetation as per the MRP. The timing between phases is undetermined at this time and will be dictated by coal demand and market. The areas identified for disturbance left undisturbed after phase 1, will be treated as per the MRP.

232.700. It is anticipated that topsoil can be salvaged on areas to be disturbed. Approximate thickness of subsoil by Soil Map Unit are: SBG - 30 inches, DSH - 22 inches, and VBJ - 12 inches.

232.710. Soil removal from some local sites may be difficult due to rockiness and steep slopes. The area between the rock slopes and the ROM coal stockpile is an area of concern. In the area between the rock slopes and ROM coal stockpile the disturbance is minimal. The topsoil will not be removed from this area due to steep slopes. To protect this area from coal contamination the conveyor will be enclosed. Jersey Barriers will be installed to prevent the coal stockpile from encroaching this area. Topsoil will be removed in all areas of disturbance except for the area between the ROM coal pile and the rock slopes where either one or two bents will be constructed. Available underlying soils will be salvaged from stony disturbed areas. Areas too steep and rocky for equipment and where it would be unsafe or impractical for construction activities (approximately 5.95 Acres) will not be included in the site development plan.

232.720. No substitute soil materials will be needed.

233. Topsoil Substitutes and Supplements.

233.100. Soil inventories indicate that no substitute topsoil material will be necessary. Available soil material on the site is adequate for reclamation purposes.

233.200 Preliminary inventories show that no topsoil borrow area is needed.

233.300. This section is addressed in 233.400.

233.310. This section is addressed in 233.400.

233.320. This section is addressed in 233.400.

233.330. This section is addressed in 233.400.

233.340. This section is addressed in 233.400.

233.400 Soil Inventories show that no topsoil or topsoil substitute borrow area will be needed. Adequate amounts of suitable soil for plant growth are present based on root distribution and soil characteristics.

234. Topsoil Storage.

234.100. It will not be possible to redistribute the topsoil immediately. Therefore, the topsoil will be stockpiled for the purpose of final reclamation of the mine site. The rock storage areas are shown on Plate 5-2.

Access to the ventilation break outs will be from inside the mine. There will be minimal surface disturbance with the breakouts so no topsoil will be salvaged. Refer to the Surface Area map Plate 5-

2 for the approximate location of the ventilation breakouts.

Presently there is not a subsoil stockpile required for this project, therefore, details are not provided.

234.200. Section 232.100 contains information on the topsoil stockpile.

234.210. The stockpile site selected is on the Strych soil. It is a well drained and stable site on cobbly alluvium.

234.220. The stockpile will be located and protected to avoid contamination. Unacceptable compaction will not be permitted. In areas where undisturbed soils are in close proximity to coal mining or reclamation activities, "Undisturbed Area" signs will be placed at or near the contact between disturbed and undisturbed. Quarterly inspections will be made to insure there is not an accumulation of coal dust or coal related debris. In the event coal dust is observed, water sprays according to air quality permit (DAQE-702-99) or alternative measures such as wind fence, or broadening of the topsoil salvage area will be employed to control the coal dust and fines.

234.230. The stockpile will be mulched and seeded with the seed mix presented in Table 3-4. Up to 1% by volume of the sifted soil crusts will be added to each load of Wood fiber mulch applied to the top soil pile. The slopes will have an irregular, pitted surface to help retain precipitation and minimize runoff. Silt fencing will be placed at the base of the stockpile. Topsoil stockpiles and other interim reclamation will be seeded when weather conditions are ideal, or prior to November 30th.

234.240. Plans are to leave the topsoil in place for the life of the mine.

234.300. These regulations are not applicable to the action described within this permit document.

234.310. These regulations are not applicable to the action described within this permit document.

234.320. These regulations are not applicable to the action described within this permit document.

240. Reclamation Plan.

241. Reclamation of the proposed disturbed area will begin once all surface facilities and structures have been demolished and removed. Disturbed areas will be restored to approximate original contour. Disturbed areas will be re-graded using pad material. Subsoil from Soil Map Units SBJ, DSH, and VBJ that are used as construction fill will be identified and used during reclamation as root zone subsoils. This information will be collected during the original grading operation and incorporated into the As-Built drawing referred to in Section 232.500. The grading sequence with regards to subsoil will be as follows:

a. Grade all areas where no subsoil is being stored.
b. Replace subsoil on areas from which it was removed.
c. Rip the subsoil to a minimum of 16 inches.
d. Replace topsoil.
e. Replace boulders
f. Gouge the topsoil.

After the disturbed areas have been recontoured and retopsoiled they can then be revegetated.

Sediment control during reclamation will be met by continued use of the sediment pond located below the yard area. All main culverts and an adequate amount of fill to maintain existing headwalls will be left intact during this reclamation phase.

After approximate original contour (AOC) is achieved, the surface will be prepared. The soil will be sampled in a maximum of five locations to be determined jointly by the Division and the Operator. The sampled soil will be analyzed for the parameters descried in tables 3 and 7 of the January 2008 “Guidelines for Management of Topsoil and Overburden”.

Where practical, the disturbed area will be scarified prior to soil redistribution.

The rippers found on the rear of a cat will be used to scarify the disturbed area. The total surface where practical will be ripped on a maximum spacing of 6' to a depth of 16 inches. Pocking, after topsoil redistribution, will be the primary method used to roughen the surface. Pocking consists of imprinting the surface with a pattern of depressions as per Figure 1 in Appendix 5-8. The purpose of these pocks is to capture and retain water (moisture), and provide a cradle for seedlings and other plant materials. To enhance the ability of the soil to absorb moisture, best technology currently available at the time of reclamation will be applied to the soil surface.

In order to regenerate naturally existing soil organisms and assist in reactivating soil activity, an inoculum will be applied to the soil to reestablish soil bacteria, microhorizia and mycelium. To enhance soil microbial establishment and promote more rapid stabilization of the soil the seed mixture (as listed in Chapter 3) will be either hand broadcast over the area or sprayed using a hydromulcher. A wood fiber mulch will be hydro sprayed over the seed bed, then the surface will be sprayed with a tackifier. See Appendix 5-8.

242. Soil Redistribution.

242.100 Topsoil materials that were previously stockpiled will be redistributed on the same areas in a thickness which approximates the reclaimed thickness on the scarified, postmining regraded surface. For example if 8" of topsoil is removed from one area and 16" from another area, reasonable efforts will be made to replace 8" where the 8" was removed from and 16" where the 16" was removed from. (See Plate 2-3 Soil Salvage and Replacement). The material will be hauled to the regraded area by dump truck or loader. The material will be placed using a front-end loader, crawler tractor, and/or trackhoe on steeper slopes and/or crawler tractor on the flat areas. After the backfill is placed to approximate original contour and the topsoil is respread, the site will be revegetated. Boulders will be replaced to achieve a near natural surface condition. The backfill will include subsoil material which was used as fill during the operational phase. Using as-built drawings, refer to 232.500, the subsoil will be replaced to its approximate original position prior to replacement of topsoil from the topsoil stockpile. Subsoil will be replaced in its approximate position in the reconstructed soil profile.

242.110. This section has been addressed in 242.100.

242.120. This section has been addressed in 242.100.

242.130. This section has been addressed in 241.

242.200. This section has been addressed in 242.100.

242.300. This section has been addressed in 242.100.

242.310. This section has been addressed in 242.100.

242.320. This section has been addressed in 242.100.

243. Soil Nutrients and Amendments. Nutrients and soil amendments will be applied to the redistributed material if deemed necessary by assessment of the laboratory analyses. Nutrients and amendments will be added, to make the redistributed soil similar to the undisturbed soils and aid in establishment of the vegetative cover. The nutrients will be added by hydro seeding.

The topsoil will be sampled and tested prior to replacement. Sampling will either be performed by a Certified Soil Scientist or by a person who is determined qualified by the Operator and the Division. Grab samples will be collected from the stockpile after its height is reduced to 10 feet at the deepest end. Four or five grab samples should be sufficient to determine what the effects of darkness, compaction, and sterility have been on the fertility of the topsoil The grab samples will be analyzed for nitrogen, phosphate and potassium. Fertilizer, if needed, will be applied to the topsoil prior to seeding and mulching activities.

244. Soil Stabilization.

244.100 Exposed surface areas will use vegetative stabilization where practical to control erosion and fugitive dust. Revegetative efforts (including regrading, topsoiling, fertilizing and mulching) will be conducted prior to the end of October.

244.200 After approximate original contour (AOC) is achieved, the surface will be prepared. Pocking will be the primary method used to roughen the surface. Pocking consists of imprinting the surface with a pattern of depressions as per Figure 1 in Appendix 5-8. The purpose of these pocks is to capture and

retain water (moisture), and provide a cradle for seedlings and other plant materials.

In the event that soil crusts form on the topsoil stockpile, the Permittee will add up to 2 ounces of the sifted soil crusts to each load of Wood fiber mulch which will be applied to the reclaimed areas that have been regraded and covered by topsoil or substitute topsoil. (See Appendix 5-8).

244.300. Any rills and gullies of an excessive nature, which form on regraded and retopsoiled areas and disrupt the approved postmining land use or cause or contribute to a violation of water quality standards for receiving streams, will be filled, regraded or stabilized. The area will then be reseeded.

244.310. This section has been addressed in 244.300.

244.320. This section has been addressed in 244.300.

250. Performance Standards.

251. All topsoil, subsoil and topsoil substitutes or supplements will be removed, maintained and redistributed according to the plan given under sections 230 and 240.

252. All stockpiled topsoil, subsoil and topsoil substitutes or supplements will be located, maintained and redistributed according to plans given under sections 230 and 240.

Lila Canyon Mine Reclamation Bond Estimate

Bonding Calculations

Direct Costs

Subtotal Demolition and Removal	$963,220.00	
Subtotal Backfilling and Grading	$579,025.00	
Subtotal Revegetation	$169,204.00	
Direct Costs in 2018 Dollars	**$1,711,449.00**	

Indirect Costs

Mob/Demob	$171,145.00	10.0%
Contingency	$85,572.00	5.0%
Engineering Redesign	$42,786.00	2.5%
Main Office Expense	$116,379.00	6.8%
Project Management Fee	$42,786.00	2.5%
Subtotal Indirect Costs 2018 Dollars	**$458,668.00**	**26.8%**
Total Cost	**$2,170,117.00**	
Escalation factor		0.0232
Number of years		4
Escalation	$208,504.00	
Total Reclamation Cost 2023 Dollars	**$2,378,621.00**	
Bond Amount (rounded to nearest $1,000)	**$2,379,000.00**	
2023 dollars		
Bond Posted	$2,335,000.00	
Difference Between Posted Bond and Cost Estimate	**-$44,000.00**	

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 reduced 30% for no interior walls
02 41 16.13 0020	Building Demolition - Steel	0.27	CF	(see 02 41 16.13 5000)
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 increased 10% for reinforcing
02 41 16.17 2500	Concrete Wall/Floor Demo, 12" thick, reinforced	1.57	SF	(see 02 41 16.17 2600)
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 JennChem bid
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 bid
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	
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	
02 41 13.30 0100	Remove roadside delineator	49.35	EA.	Increased 200% per 02 41 13.30 4400
02 41 13.96 0600	Demo/Remove steps, 3 risers	94.50	EA.	
02 41 13.40 0240	Demolition, CMP end section, 60"	445.00	EA.	
31 32 19.16 1510	Geotextile fabric, heavy duty, 600 lb strength	2.36	SY	2019 Means Cost
02 41 19.20 0100	Landfill tipping fee, construction debris	81	Ton	2019 Means Cost
32 91 13.23 4450	Apply manure, tractor spreader, 18 lb/SY	1000	MSF	2019 Means Cost

Lila Canyon Mine Reclamation Bond Estimate

Demolition and Removal Cost Summary

Structure/Item	Cost ($)
01 Office/Bathhouse	49,516
02 ROM Coal Stockpile	0
03 Shop/Warehouse	327,646
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	14,133
11 Electrical Transformers	4,961
12 Overhead Power Lines	2,952
13 Buried Power Lines	860
14 Rock Dust Silo	3,147
15 Fuel & Oil Tanks	8,143
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 Structures	1,583
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	37,698
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	36,390
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	63,372
Culvert Demolition	48,520
Lila Old Fan Portals	24,586
Visual Disconnect	6,279
Drop Box	145
Rain Gauges	303
Geotextile Removal (Culverts UC-5, 6, & 7)	4,257
TOTAL	963,220

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
	01 Office/Bathhouse																			
	Structure's Demolition Cost	Pre-engineered steel bldg demo,>12,500 SF	13 05 05.50 0650	1.68	SF Flr	150	100	15		15000								15000	SF Flr	25200
	Structure's Vol. Demolition										225000						0.3	2500	CY	
	Bathhouse New Addition Demo	Building Demolition - Mixture of Types	02 41 16.13 0100	0.40	CF			10		432	4320						0.3	1296	CF	518
	Truck's Capacity																			
	Haulage																			
	Loading Cost Bathhouse New	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													48		106
	Transportation Cost Bathhouse New	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													48		180
	Disposal Cost Bathhouse New	On Site Disposal	02 41 16.17 4200	11.40	CY													54	CY	616
	Steel's Weight																			
	Demo Steel Stairs	Demo/Remove steps, 3 risers	02 41 13.96 0600	94.50	EA.													4	EA	378
	Haulage																			
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton								486			lb/cy		608	Tons	3648
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			30646
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Load Conex Units	Hydraulic crane, 12 ton, with operator	Crew A-3H	1518.58	Day									1		Day				1519
	Haul Connex Units to SLC, UT	Haul Conex units offsite	01 52 13.20 0800	12.10	Mile										140	Miles		8	EA	13552
	Disposal Costs																			
	Subtotal																			15071
	Office Trailers	Haul Conex units offsite	01 52 13.20 0800	12.10	Mile	70	14	8							140	Miles		2	EA	3388
	Demolish Awning	Torch cutting, steel, 1" thick plate	02 41 19.27 0020	3.21	LF		14											5	EA	225
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton													1	Ton	6
	Subtotal																			3619
	Concrete Walkway Demolition	Concrete Floor Demolition, 4" thick, reinforced	02 41 16.17 0280	0.89	SF	28	6	0.33		168								168	SF	150
	Concrete Cost																			
	Concrete Vol. Demolished										2									
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY												1.3	2.6	CY	30
	Subtotal																			180
	Total																			49516

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
	02 ROM Coal Stockpile																			
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF THE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.**																		
	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																			0
	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																			0
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			0

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
	03 Shop/Warehouse																			
	Structure's Demolition Cost (Shop 1)	Pre-engineered steel bldg demo,>12,500 SF	13 05 05.50 0650	1.68	SF Flr	150	100	20		15000								15000	SF Flr	25200
	Structure's Vol. Demolition (Shop 1)										300000						0.3	3333	CY	
	Structure's Demolition Cost (Shop 2)	Pre-engineered steel bldg demo,>12,500 SF	13 05 05.50 0650	1.68	SF Flr	160	60	30		9600								9600	SF Flr	16128
	Structure's Vol. Demolition (Shop 2)										288000						0.3	3200	CY	
	Structure's Demolition Cost (Warehouse	Pre-engineered steel bldg demo,>12,500 SF	13 05 05.50 0650	1.68	SF Flr	70	50	14		3500								3500	SF Flr	5880
	Structure's Vol. Demolition (Warehouse)										49000						0.3	544	CY	
	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								480			lb/cy		1568	Ton	9408
	Transportation Cost Steel Drive																			
																				0
	Subtotal																			56616
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Load Conex Units	Hydraulic crane, 12 ton, with operator	Crew A-3H	1518.58	Day									1		Day				1519
	Haul Connex Units to SLC, UT	Haul Conex units offsite	01 52 13.20 0800	12.10	Mile										140	Miles		10	EA	16940
	Disposal Costs																			
	Subtotal																			18459
	Slab																			
	Concrete Demolition					420	250	1			3889				105000	SF				
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced	02 41 16.17 2500	1.57	SF													105000	SF	164850
	Concrete Vol. Demolished																1.3	5056	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													5056	CY	11174
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													5056	CY	18909
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													5056	CY	57638
	Subtotal																			252571
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			327646

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
	04 Storage Shed																			
	Structure's Demolition Cost	Building Demolition - Mixture of Types	02 41 16.13 0100	0.40	CF	8	8	8										512	CF	204.8
	Structure's Vol. Demolition																0.3	6	CY	
	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	02 41 16.17 4200	11.40	CY													6	CY	68
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			273
	Concrete Demolition	Concrete Floor Demolition, 4" thick, reinforced	02 41 16.17 0280	0.89	SF	8	8	0.33										64	SF	57
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY										0.8	CY	1.3	1	CY	2
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													1	CY	4
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													1	CY	12
	Subtotal																			75
	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																			348

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
	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	02 41 13.17 5050	9.80	SY			0.33		76200						SF		8467	SY	82977
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY						931					CY	1.3	1210	CY	13794
	Subtotal																			96771
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			96771

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
	06 Truck Loading/Unloading Area																			
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF THE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.**																		
	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																			0
	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																			0
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			0

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
	07 Equipment/Materials Storage Area																			
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF THE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.**																		
	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																			0
	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																			0
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			0

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
	08 Potable Water Tank																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF			20	15									3534	CF	954
	Structure's Vol. Demolition																	1296	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 and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton								1.00			LB/SF		0.65	Ton	4
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			958
	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																			3741

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
	09 Sewer Treatment Plant																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF						1800				CF			1800	CF	486
	Structure's Vol. Demolition																0.3	20	CY	
	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								480			lb/cy		5	Ton	30
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			516
	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		225	SF	250
	Concrete Vol. Demolished																1.3	5.4	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													7		15
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													7		26
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													7		80
	Subtotal																			371
	Total																			887

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
	10 Power Poles																			
	Structure's Demolition Cost	Wood utility poles, 35'-45' high	02 41 13.80 0200	370.00	EA.										18	EA		18	EA	6660
	Structure's Demolition Cost	Wood cross arms, 4'-6' long	02 41 13.80 0300	136.00	EA.										18	EA.		18	EA.	2448
	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	Crew B-7	5025.34	Day													1.00	Day	5025
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			14133
	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																			14133

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
	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																			0
	Equipment's Demolition Cost	Demo of elec transformer, 3 ph, 750kVA	26 05 05.10 1570	1700.00	EA.										2			2	EA.	3400
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs	Hydraulic crane, 12 ton, with operator	Crew A-3H	1518.58	Day													1	Day	1519
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton													7	Ton	42
	Disposal Costs																			
	Subtotal																			4961
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Total																			4961

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
	12 Overhead Power Lines																			
	Structure's Demolition Cost	Electrical demolition, #2 wire, from conduit	26 05 05.10 1900	30.50	CLF	3220									3			9660	FT	2946
	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	Scamp	6.00	Ton								201			lb/MF		0.97	Ton	6
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			2952
	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																			2952

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
	13 Buried Power Lines																			
	Structure's Demolition Cost	Electrical demolition, #2 wire, from conduit	26 05 05.10 1900	30.50	CLF	890									3			2670	FT	814
	Steel Sled for Cable Protection	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	20	8	1			160							160	CF	43
	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	Scamp	6.00	Ton								201			lb/MF		0.54	Ton	3
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			860
	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																			860

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
	14 Rock Dust Silo																			
	Structure's Demolition Cost	Silos, Selective Demolition, steel	13 05 05.60 0050	2900.00	EA										1	EA		1	Ea	2900
	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	Scamp	6.00	Ton							4				Ton		4	Ton	24
	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																			2924
	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	02 41 16.17 2500	1.57	CY	16	16	1			256					CF		9	CY	14
	Concrete Vol. Demolished																1.3	12	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													12	CY	27
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													12	CY	45
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													12	CY	137
	Subtotal																			223
	Total																			3147

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
	15 Fuel & Oil Tanks																			
	Structure's Demolition Cost	5000 to 12000 gal. abovegrnd steel tank removal	1305 05.75 0530	1625.00	EA.													1	EA	1625
	Structure's Demolition Cost																			
	Calcium Chloride Tank	Building Demolition - Steel	02 41 16.13 0020	0.27	CF			30	6		848							848	CF	229
	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		4.00	Ton	24
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Drive																			
	Subtotal																			1878
	Equipment Disposal Cost																			
	Tank Removal	3000 to 5000 gal. undrgrnd steel tank removal	02 65 10.30 0110	860.00	EA										3	EA		3	EA	2580
	Remove Sludge	3000 to 5000 gal. tank, sludge removal	02 65 10.30 0300	285.00	EA										3	EA		3	EA	855
	Tank Disposal	3000 to 5000 gal. tank, disposal, 100 mi RT	02 65 10.30 1023	830.00	EA.										3	EA		3	EA	2490
	Sludge Disposal	Dispose of sludge off site	02 65 10.30 0390	6.80	Gal										50	Gal		50	Gal	340
	Subtotal																			6265
	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																			8143

Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
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																			0
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	02 41 16.17 2500	1.57	CY	810	8	8			960							960	CY	1507
Concrete Vol. Demolished																1.3			
Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													1248	CY	2758
Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													1248	CY	4668
Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													1248	CY	14227
Subtotal																			23160
Concrete Demolition																			
Concrete Cost																			
Concrete Vol. Demolished																			
Loading Costs																			
Transportation Costs																			
Disposal Costs																			
Subtotal																			
Total																			23160

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
	17 Reclaim Conveyor																			
	Conveyor Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	810	4	4								FT		12960	CF	3499
	Structure's Vol. Demolition																0.3	144	CY	
	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	Scamp	6.00	Ton								480			lb/CY		35	Ton	210
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			3709
	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																			3709

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
	18 Conveyor to Loadout Bin																			
	Structure's Demolition Cost (Conveyor 1)	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	230	6	6								FT		8280	CF	2236
	Structure's Vol. Demolition (Conveyor 1)																0.3	92	CY	
	Structure's Demolition Cost (Conveyor 1)	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	350	4	4								FT		5600	CF	1512
	Structure's Vol. Demolition (Conveyor 1)																0.3	62	CY	
	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	Scamp	6.00	Ton								480			lb/CY		37	Ton	222
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			3970
	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	02 41 16.17 2500	1.57	CY						15							15	CY	24
	Concrete Vol. Demolished																1.3	20	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													20	CY	44
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													20	CY	75
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													20	CY	228
	Subtotal																			371
	Total																			4341

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
	19 Crusher MCC Building																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	20	8	8								FT		1280	CF	346
	Structure's Vol. Demolition																0.3	14	CY	
	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	Scamp	6.00	Ton								480			lb/CY		3	Ton	18
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			364
	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																			0
	Total																			364

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
	20 Truck Loadout																			
	Structure's Demolition Cost (Loadout 1)	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	5	5	20							500	CF		500	CF	135
	Structure's Vol. Demolition (Loadout 1)																0.3	6	CY	
	Structure's Demolition Cost (Loadout 2)	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	20	20	18							7200	CF		7200	CF	1944
	Structure's Vol. Demolition (Loadout 2)																0.3	80	CY	
	Dozer Trap Roof Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	20	12	1							240	CF		240	CF	65
	Dozer Trap Roof Volume																0.3	3	CY	
	Stairway Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	10	3	1							30	CF		30	CF	8
	Stairway Volume																0.3	0.3	CY	
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton								480			lb/CY		21	Ton	126
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			2278
	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	02 41 16.17 2500	1.57	CY						207							207	CY	325
	Concrete Vol. Demolished																1.3	269	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													269	CY	594
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													269	CY	1006
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													269	CY	3067
	Subtotal																			4992
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			7270

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
	21 Refuse Conveyor																			
	Conveyor Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	180	4	4								FT		2880	CF	778
	Structure's Vol. Demolition																0.3	32	CY	
	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	Scamp	6.00	Ton								480			lb/CY		8	Ton	48
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			826
	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																			826

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
	22 Crusher/Screen Plant																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF						12000					CF		12000	CF	3240
	Structure's Vol. Demolition																0.3	133	CY	
	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	Scamp	6.00	Ton								480			lb/CY		32	Ton	192
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			3432
	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	02 41 16.17 2500	1.57	CY						20							20	CY	31
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													26	CY	57
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													26	CY	97
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													26	CY	296
	Subtotal																			481
	Total																			3913

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
	23 Reclaim Escape Tunnel																			
	Corrugated Steel	Building Demolition - Steel	02 41 16.13 0020	0.27	CF						26880					CF		26880	CF	7258
	Escape Tunnel	Building Demolition - Steel	02 41 16.13 0020	0.27	CF						1257							1257	CF	339
	Fan	Building Demolition - Steel	02 41 16.13 0020	0.27	CF						64							64	CF	17
	Fan House	Building Demolition - Steel	02 41 16.13 0020	0.27	CF						512							512	CF	138
	Structure's Vol. Demolition																0.3	319	CY	
	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	Scamp	6.00	Ton								480			lb/CY		77	Ton	462
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			8214
	Excavation and Backfill																			
	Reclaim Tunnel	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	350	14	10								FT		1815	CY	3285
																				0
	Escape Tunnel	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	325	4	10										481	CY	871
																				0
	Subtotal																			4156
	Concrete Demolition																			
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced	02 41 16.17 2500	1.57	CY						20							20	CY	31
	Concrete Vol. Demolished																1.3	26	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													26	CY	57
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													26	CY	97
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													26	CY	296
	Subtotal																			481
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			12851

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
	24 Reclaim Feeder Gate																			
	Structure's Demolition Cost	Fabricated steel demo, 121-500 lb	05 05 05.10 0380	68.00	EA.													2	EA.	136
	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	Scamp	6.00	Ton	3	3						20.4			lb/SF		0.18	Ton	1
	Transportation Cost Steel Drive																			
	Subtotal																			137
	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																			0
	Total																			137

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
	26 Extended ROM Conveyor																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	300	6	6								FT		10800	CF	2916
	Structure's Vol. Demolition																0.3	120	CY	
	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	Scamp	6.00	Ton								480			lb/CY		29	Ton	174
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			3090
	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	02 41 16.17 2500	1.57	CY	10	10	1							2			7	CY	11
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21														9	CY	20
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													9	CY	34
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													9	CY	103
	Subtotal																			168
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			3258

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
	27 Refuse/Non-Coal Waste Pile																			
	Structure's Demolition Cost	**WILL BE GRADED WITH THE REMAINDER OF THE FILL AT THE TIME OF RECLAMATION. EXCESS COAL TO BE BURIED AS INDICATED IN THE MRP.**																		
	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																			0
	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																			0
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			0

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
	28 Electrical Grounding Field																			
	Structure's Demolition Cost	Backhoe loader, 2 laborers, equip operator	Crew B-6	1980.00	Day									1				1	Day	1980
	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	Scamp	6.00	Ton													1	Ton	6
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			1986
	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																			0
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			1986

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
	29 Sedimentation Pond Structures																			
	Pond #2 Barrel Excavation	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	165	1.5	3								FT		28	CY	50
	Subtotal																			50
	Catwalk to Pond Spillway	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	60	3	3			540							540	CF	146
	Dismantling Cost																			
	Equipment's Vol. Demolished										20									
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton								0.2				0.3	1.2	Tons	7
	Subtotal																			153
	Pond #1 - 30" Principal Riser	Demolition, CMP pipe, steel, 30"-36"	02 41 13.40 0180	17.65	LF	20							30	lb/ft		FT		20	FT	353
	Pond #1 - 30" Emergency Riser	Demolition, CMP pipe, steel, 30"-36"	02 41 13.40 0180	17.65	LF	19							30	lb/ft		FT		19	FT	335
	Pond #2 - 12" Principal Riser	Demolition, CMP pipe, steel, 12"	02 41 13.40 0110	2.60	LF	5							103	lb/ft		FT		5	FT	13
	Pond #2 - 15" Emergency Riser	Demolition, CMP pipe, steel, 18"	02 41 13.40 0160	3.90	LF	6							10	lb/ft		FT		6	FT	23
	Pond #2 Barrel (SP2-1)	Demolition, CMP pipe, steel, 18"	02 41 13.40 0160	3.90	LF	165							15	lb/ft		FT		165	FT	644
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation & Disposal Costs	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton							4160	lb					2	Tons	12
	Disposal Costs																			
	Subtotal																			1380
	Total																			1583

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
	30 Existing ROM Conveyor																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	475	6	6								FT		17100	CF	4617
	Structure's Vol. Demolition																0.3	190	CY	
	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	Scamp	6.00	Ton								480			lb/CY		46	Ton	276
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			4893
	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	02 41 16.17 2500	1.57	CY	24	24	1							3			64	CY	100
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21														83	CY	183
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													83	CY	310
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													83	CY	946
	Subtotal																			1539
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			6432

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
	31 Portal Closure																			
	Canopy Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	16	16	10							8	EA		20480	CF	5530
	Structure's Vol. Demolition																0.3	228	CY	
	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	Scamp	6.00	Ton								480			lb/CY		55	Ton	330
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			5860
	Earthwork - North & South Breakouts																			
	Cut and fill - North Breakout	Cut and fill common earth, 8" lift, 2 passes	G1030 1100	7.00	CY						80					CY		80	CY	560
	Cut and fill - South Breakout	Cut and fill common earth, 8" lift, 2 passes	G1030 1100	7.00	CY						20					CY		20	CY	140
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			700
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Portal Sealing																			
	Seal Construction	Seal portals, materials	JennChem	4320.00	EA.										8	EA.		8	EA.	34560
	Labor	Seal portals, labor	JennChem	265.00	HR									4		HR		32	HR	8480
	Site preparation	Portal seal, site preparation crew	Crew B-1	1464.40	Day									1		Day		8	Day	11715
	Block retaining walls	Block wall, reinforced, 4" thick (2 each seal)	04 22 10.34 1500	8.50	SF		20	8.6		344					16	EA.		5504	SF	46784
	Transportation Costs	Portal seal support, material haulage	Classic Helicopters	11965.00	Job										1	Job		1	Job	11965
	Disposal Costs																			
	Subtotal																			
	Total																			63312

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
	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																			0
	Subtotal																			0
	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	02 41 16.17 2500	1.57	CY						15							15	CY	24
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21														20	CY	44
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													20	CY	75
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													20	CY	228
	Subtotal																			371
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			371

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
	33 ROM Coal Staking Tube																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF			80	20							CF		25133	CF	6786
	Structure's Vol. Demolition																0.3	279	CY	
	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	Scamp	6.00	Ton								480			lb/CY		67	Ton	402
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			0
	Subtotal																			7188
	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	02 41 16.17 2500	1.57	CY	25	25	3								FT		69	CY	108
	Concrete Cost																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													90	CY	199
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													90	CY	337
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													90	CY	1026
	Subtotal																			1670
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			8858

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
	34 Mine MCC Building and Electrical Tower																			
	MCC Bldg Demolition Cost	Pre-engineered steel bldg demo,>12,500 SF	13 05 05.50 0650	1.68	SF Flr	30.5	12	9					480			lb/CY	0.3	366	SF Flr	615
	Elec Tower Demolition Cost	Torch cutting, steel, 1" thick plate	02 41 19.27 0020	3.21	LF	220							76.33			lb/FT		220	LF	706
	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	Scamp	6.00	Ton													17	Ton	102
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			1423
	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	31 23 16.42 1300	2.21	CY	30.5	12	0.5										7	CY	15
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21														9	CY	20
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													9	CY	34
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													9	CY	103
	Subtotal																			172
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Total																			1595

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
	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																			0
	Equipment's Disposal Cost																			
	Dismantling Cost	Mechanical Equipment Demolition, Heavy	23 05 05.10 3600	1225.00	Ton							30				Ton		30	Ton	36750
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton													30	Ton	180
	Disposal Costs																			
	Subtotal																			36930
	Concrete Demolition																			
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced	02 41 16.17 2500	1.57	SF	20	20	0.5		400						SF		400	SF	628
	Concrete Vol. Demolished																			
	Loading Costs																		CY	0
	Transportation Costs																		CY	0
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY						7.4						1.3	10	CY	110
	Subtotal																			738
	Shot Crete																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Total																			37668

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
	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	Classic Helicopters	11965.00	Job										0.2	Day		0.2	Day	2393
	Transportation Cost Steel Drive																			
	Subtotal																			2393
	Equipment's Disposal Cost																			
	Dismantling Cost	Mechanical Equipment Demolition, Heavy	23 05 05.10 3600	1225.00	Ton							28				Ton		28	Ton	34300
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton													28	Ton	168
	Disposal Costs																			
	Subtotal																			34468
	Concrete Demolition																			
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced	02 41 16.17 2500	1.57	SF	20	20	0.5		400						SF		400	SF	628
	Concrete Pad-Backup Fan Pwr Cntr	Concrete Floor Demolition, 6" thick, reinforced	02 41 16.17 0420	1.11	SF	6	12	0.5		72						SF		72	SF	80
	Loading Costs																		CY	0
	Transportation Costs																		CY	0
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY						8.7						1.3	11	CY	130
	Subtotal																			837
	Shot Crete																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Total																			37698

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	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	38 Powder and Cap Magazines																			
	Structure's Demolition Cost	Mechanical Equipment Demolition, Heavy	23 05 05.10 3600	1225.00	Ton							4				Ton		4	Ton	4900
	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							4				Ton		4	Ton	24
	Transportation Cost Steel Drive																			
	Subtotal																			4924
	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																			4924

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
	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																			0
	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	02 41 13.60 1700	4.44	FT	1500										FT		1500	FT	6660
	Transportation and Disposal	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton								3.5			lb/FT		2.6	Ton	16
	Subtotal																			6676
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			6676

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
	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	02 41 16.17 2500	1.57	CY	2	2	1			1					CY		1	CY	2
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced	02 41 16.17 2500	1.57	CY	4	4	1			2					CY		2	CY	3
	Concrete Vol. Demolished																1.3	4	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													4	CY	9
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													4	CY	15
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													4	CY	46
	Subtotal																			73
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			73

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
	41 Loadout MCC Building																			
	MCC Bldg Demolition Cost	Pre-engineered steel bldg demo,>12,500 SF	13 05 05.50 0650	1.68	SF Flr	16	8	8										128	SF Flr	215
	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	Scamp	6.00	Ton								480			lb/CY	0.3	3	Ton	18
	Transportation Cost Steel Drive																			
	Disposal Cost Steel																			
	Subtotal																			233
	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	31 23 16.42 1300	2.21	CY	16	8	0.5										2	CY	4
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21														3	CY	7
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													3	CY	11
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													3	CY	34
	Subtotal																			56
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Total																			289

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
	42 Mine Parking																			
	Wooden Shed Demolition Cost	Building Demolition - Mixture of Types	02 41 16.13 0100	0.40	CF	8	8	8			512				4			512	CF	819
	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	On Site Disposal	02 41 16.17 4200	11.40	CY						19				4		0.3	22.8	CY	260
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Drive																			
	Subtotal																			1079
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Pavement Removal	Pavement Removal, bituminous, 4" to 6" thick	02 41 13.17 5050	9.80	SY			0.33		27800						SF		3089	SY	30272
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY						340					CY	1.3	442	CY	5039
	Subtotal																			35311
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			36390

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
	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	02 41 16.17 2500	1.57	CY	15	20	10				111			2	CY		222	CY	349
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													289	CY	639
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													289	CY	1081
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													289	CY	3295
	Subtotal																			5364
	Total																			5364

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
	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	02 41 13.30 1600	14.00	FT	760												760	FT	10640
	Subtotal																			10640
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			10640

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
	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					10	10	0.67				5				CY				
	Walls					50	10	0.67				25				CY				
	Floor					52	12	1				23				CY				
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforc	02 41 16.17 2500	1.57	CY							53				CY		53	CY	83
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													69	CY	152
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													69	CY	258
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													69	CY	787
	Subtotal																			1280
	Total																			1280

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
	46 Emergency Reclaim Feeder Gate																			
	Structure's Demolition Cost	Fabricated steel demo, 121-500 lb	05 05 05.10 0380	68.00	EA.													1	EA.	68
	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	Scamp	6.00	Ton	3	3						20.4			lb/SF		0.09	Ton	1
	Transportation Cost Steel Drive																			
	Subtotal																			69
	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																			0
	Total																			69

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
	47 Gantry Lift Assembly																			
	Structure's Demolition Cost	Fabricated steel demo, 121-500 lb	05 05 05.10 0390	68.00	EA.													12	EA.	816
	Structure's Demolition Cost	Fabricated steel demo, 501-1000 lb	02 41 19.27 0020	91.00	EA.													4	EA.	364
	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																			1180
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			0
	Concrete Demolition																			
	Footings	Concrete, Selective Demo, Reinf 1-2% of X Sec	03 05 05.10 0060	167.00	CY	80	1.33	1.75			186							7	CY	1169
	Concrete Vol. Demolished																1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													9	CY	20
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													9	CY	34
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													9	CY	103
	Subtotal																			1326
	Concrete Demolition																			
	Foundation	Concrete, Selective Demo, Reinf 1-2% of X Sec	03 05 05.10 0060	167.00	CY	85.33	4	1.33			454							17	CY	2839
	Tube																			
	Concrete Cost																			
	Concrete Vol. Demolished																1.3	22	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													22	CY	49
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													22	CY	82
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													22	CY	251
	Subtotal																			3221
	Total																			5727

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
	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																			0
	Equipment's Demolition Cost	Demo of elec transformer, 3 ph, 750kVA	26 05 05.10 1570	1700.00	EA.										2			2	EA.	3400
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs	Hydraulic crane, 12 ton, with operator	Crew A-3H	1518.58	Day													1	Day	1519
	Transportation and Disposal Cost All	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton													7	Ton	42
	Disposal Costs																			
	Subtotal																			4961
	Fence Demolition	Chain link removal, 8'-10' high	02 41 13.60 1700	4.44	FT	654										FT		654	FT	2904
	Subtotal																			2904
	Concrete Demolition																			
	Concrete Cost	Concrete Floor Demolition, 6" thick, reinforced	02 41 16.17 0420	1.11	SF	20	20	0.5							400	SF		400	SF	444
	Concrete Vol. Demolished														7.4	CY	1.3			
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													9.62	CY	21
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													9.62	CY	36
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													9.62	CY	110
	Subtotal																			611
	Total																			8476

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
	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	02 41 13.17 5050	9.80	SY	1932	24	0.5		46368						SF		5152	SY	50490
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY						859					CY	1.3	1117	CY	12734
	Remove Traffic Mirror	Remove roadside delineator	02 41 13.30 0100	49.35	EA.										3	EA		3	EA	148
	Subtotal																			63372
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			63372

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
	Culvert Demolition																			
	DC-1	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	60	1.5	3								FT		10	CY	18
	DC-2	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	60	1.5	3								FT		10	CY	18
	DC-3	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	65	1.5	3								FT		11	CY	20
	DC-4	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	400	2	3								FT		89	CY	161
	DC-5	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	350	2	3								FT		78	CY	141
	DC-6	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	107	2	3								FT		24	CY	43
	DC-7	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	155	2	3								FT		34	CY	62
	DC-8	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	167	2	3								FT		37	CY	67
	DC-9	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	186	2	3								FT		41	CY	75
	DC-10	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	60	2	3								FT		13	CY	24
	DC-11	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	101	2	3								FT		22	CY	41
	DC-12a	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	140	2.5	3.5								FT		45	CY	82
	DC-12b	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	79	2.5	3								FT		22	CY	40
	DC-12c	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	357	2.5	3								FT		99	CY	179
	DC-12d	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	9	2.5	3.5								FT		3	CY	5
	DC-13	**PREVIOUSLY REMOVED**																		0
	DC-14	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	40	1.5	3								FT		7	CY	12
	DC-15	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	45	1.5	3								FT		8	CY	14
	DC-16	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	25	1.5	3								FT		4	CY	8
	DC-17	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	120	1.5	3								FT		20	CY	36
	DC-18	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	27	1.5	3								FT		5	CY	8
	UC-1	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	120	5	6								FT		133	CY	241
	UC-1a	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	360	5	6								FT		400	CY	724
	UC-2	**PREVIOUSLY REMOVED**																		
	UC-3	**PREVIOUSLY REMOVED**																		
	UC-4	**PREVIOUSLY REMOVED**																		
	UC-5	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	53	1.5	2								FT		6	CY	11
	UC-6	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	50	1.5	2								FT		6	CY	10
	UC-7	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	396	1.5	2								FT		44	CY	80
	Subtotal																			2019
	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"	02 41 13.40 0160	3.90	LF	901							15	lb/ft		FT		901	FT	3514
	Demolition Cost 24" CMP	Demolition, CMP pipe, steel, 24"	02 41 13.40 0170	14.70	LF	2151							19	lb/ft		FT		2151	FT	31620
	Demolition Cost 60" CMP	Demolition, CMP pipe, steel, 48-60"	24 41 13.40 0190	22.00	LF	480							103	lb/ft		FT		480	FT	10560
	Culvert Trash Rack Demo	Demolition, CMP end section, 60"	02 41 13.40 0240	445.00	EA.													1	EA	445
	Loading Costs																			
	Transportation & Disposal Costs	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton							103824	lb					52	Tons	312
	Disposal Costs																			
	Subtotal																			46451
	Total																			48520

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
	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																			0
	Portal Sealing																			
	Seal Construction	Seal portals, materials	JennChem	4320.00	EA.										2	EA.		2	EA.	8640
	Labor	Seal portals, labor	JennChem	265.00	HR									8		HR		16	HR	4240
	Site preparation	Portal seal, site preparation crew	Crew B-1	1464.40	Day									2		Day		4	Day	5858
	Block retaining walls	Block wall, reinforced, 4" thick (2 each sea	04 22 10.34 1500	8.50	SF		20	8.6		344					2			688	SF	5848
	Subtotal																			24586
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			24586

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
	Visual Disconnect																			
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	20	30	8								FT		4800	CF	1296
	Structure's Demolition Cost	Building Demolition - Steel	02 41 16.13 0020	0.27	CF	40	10	8								FT		3200	CF	864
	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	Scamp	6.00	Ton								480			lb/CY		71	Ton	426
	Transportation Cost Steel Drive																			
	Subtotal																			2586
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished	Mechanical Equipment Demolition, Heavy	23 05 05.10 3600	1225.00	Ton							1				Ton		3	Ton	3675
	Loading Costs																			
	Transportation & Disposal Cost Steel	Demolition debris, off-site haul and disposal	Scamp	6.00	Ton															
	Disposal Costs																			
	Subtotal																			3675
	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	02 41 16.17 2500	1.57	CY	4	6	0.5								FT		0.4	CY	1
	Concrete Vol. Demolished																1.3	1	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													1	CY	2
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													1	CY	4
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													1	CY	11
	Subtotal																			18
	Total																			6279

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
	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	02 41 16.17 2500	1.57	CY	2	2	3.44			2					CY		2	CY	3
	Concrete Cost	Concrete Wall/Floor Demo, 12" thick, reinforced	02 41 16.17 2500	1.57	CY	4	4	1.5			4					CY		4	CY	6
	Concrete Vol. Demolished																1.3	8	CY	
	Loading Costs	Front End Loader 3CY	31 23 16.42 1300	2.21	CY													8	CY	18
	Transportation Costs	12 CY (16 Ton) Dump Truck 1/2 rod. Trip	31 23 23.20 1014	3.74	CY													8	CY	30
	Disposal Costs	On Site Disposal	02 41 16.17 4200	11.40	CY													8	CY	91
	Subtotal																			145
	Concrete Demolition																			
	Concrete Cost																			
	Concrete Vol. Demolished																			
	Loading Costs																			
	Transportation Costs																			
	Disposal Costs																			
	Subtotal																			
	Total																			145

Ref.	Description	Materials
	Rain Gauges	
	Rain Gauge Removal	Remove Rain Gauges
	Steel Walkway Removal	Building Demolition - 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 & Disposal Cost Steel	
	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
Crew B-1	1464.40	Day							
02 41 16.13 0020	0.27	CF	10	3	1				
Scamp	6.00	Ton							

Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
		2	EA		0.2	Day	293
					30	CF	8
					0.3	Ton	2
							303
							0
							0
							303

Ref.	Description	Materials
	Geotextile Removal (Culverts UC-5, 6, & 7)	
	Geotextile Removal	Geotextile fabric, heavy duty, 600 lb strength
	Truck's Capacity	
	Haulage	
	Transportation Cost Non Steel Truck	
	Transportation Cost Non Steel Drive	
	Disposal Cost Non Steel	
	Steel's Weight	
	Truck's Capacity	
	Geotextile Loading Cost	Front End Loader 3CY
	Geotextile Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 rod. Trip
	Geotextile Disposal Cost	Landfill tipping fee, construction debris
	Subtotal	
	Equipment's Disposal Cost	
	Dismantling Cost	
	Equipment's Vol. Demolished	
	Loading Costs	
	Transportation & Disposal Cost Steel	
	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
31 32 19.16 1510	2.36	SY					10530	SF	
Note: The above unit cost is for installation of geotextile. Use of the above assumes that the removal cost is equa									
31 23 16.42 1300	2.21	CY							
31 23 23.20 1014	3.74	CY							
02 41 19.20 0100	81.00	Ton							

Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
					1170	SY	2761
l to the installation cost.							
					250	CY	553
					250	CY	935
4			oz/SY		0.1	Ton	8
							4257
							0
							0
							4257

Lila Canyon Mine Reclamation Bond Estimate

Earthwork Costs

Description	*Quantity*	*Units*	*Production Rate*	*Units*	*Production Time*	*Units*	*Materials/Equipment/Labor*	*Cost Reference RSMeans Ref #*	*Unit Cost*	*Units*	*Quantity*	*Cost*
Mine Site Earthwork Estimate												
Load and Haul Backfill												
631G (9-51)(2nd04)	81498	CY	393	CY/HR	207.4	HR	Self-propelled scraper, 34 CY, 500 HP	Crew B-33K	418.20	HR	207.4	$86,735
Spread, Compact, and Scarify Backfill												
D8, Track-mounted	81498	CY	1850	CY/Day	44.1	Day	Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	44.1	$131,330
825G (6-13)(4Q03)	81498	CY	4100	CY/Day	19.9	Day	Sheepsfoot roller, 315 HP, 8" lifts, 2 passes	Crew B-10G	2313.60	Day	19.9	$46,041
Scarify subsoil	31.04	ac	240	MSF/Day	5.6	Day	75 HP Dozer with scarifier	32 91 13.23 3100	5.85	MSF	1352	$7,909
Backfill, Grade, and Scarify Upper Road Area												
770 (20-11)(3Q03	5000	CY	882	CY/Day	5.7	Day	Off-highway rear dump truck, 40 ton, 10 MPH	Crew B-34F	2234.80	Day	5.7	$12,738
988G EROPS (9-38)(3Q04)	5000	CY	1480	CY/Day	3.4	Day	Loader, 500 HP, wheel mounted, 5 CY cap	Crew B-14A	4306.40	Day	3.4	$14,642
D8, Track-mounted	5000	CY	1850	CY/Day	2.7	Day	Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	2.7	$8,041
Scarify subsoil	4.24	ac	240	MSF/Day	0.8	Day	75 HP Dozer with scarifier	32 91 13.23 3100	5.85	MSF	185	$1,082
Load, Haul, and Spread Topsoil - Main Area												
631G (9-51)(2nd04)	62567	CY	393	CY/HR	159.2	HR	Self-propelled scraper, 34 CY, 500 HP	Crew B-33K	418.20	HR	159.2	$66,577
D9R Semi-U EROPS (9-54 (2H04)	62567	CY	1850	CY/Day	33.8	Day	Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	33.8	$100,656
Load, Haul, and Spread Topsoil - Upper Road Area												
770 (20-11)(3Q03	10000	CY	882	CY/Day	11.3	Day	Off-highway rear dump truck, 40 ton, 10 MPH	Crew B-34F	2234.80	Day	11.3	$25,253
988G EROPS (9-38)(3Q04)	10000	CY	1480	CY/Day	6.8	Day	Loader, 500 HP, wheel mounted, 5 CY cap	Crew B-14A	4306.40	Day	6.8	$29,284
D8, Track-mounted	10000	CY	1850	CY/Day	5.4	Day	Dozer, 300 HP, 50' haul, sandy clay and loam	Crew B-10M	2978.00	Day	5.4	$16,081
Support												
Water Truck							5000 gallon water truck	Crew B-9A	2041.01	Day	16.0	$32,656
Subtotal												**$579,025**

Note: Includes reclamation of 26,000 CY of fill for the new shop and the new loadout, as well as 1.26 additional disturbed acres associated with those structures.

Lila Canyon Mine Reclamation Bond Estimate

Revegetation Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Mine Site Revegetation Estimate															
	Ground Preparation															
	Pocking	Excavation Bulk Bank 2 CY (322BL)	31 23 16.42 0260	1.81	CY	38.10	ac		340	CY/ac				12954	CY	23447
	Inoculate soil beneath UC-5,6,&7	Apply manure, tractor spreader, 18 lb/SY	32 91 13.23 4450	1000.00	MSF	10530.00	SF							10.53	MSF	10530
	Site Revegetation															
	Mulch Material, Labor, and Equipment	Power mulcher, large, hay 1" deep	32 91 13.16 0390	30.50	MSF	38.10						ac		1660	MSF	50630
	Seeding Material	Lila Canyon Seed Mix (see below)	Great Basin Seed	155.80	ac	38.10						ac		38.10	AC	5936
	Seeding Equipment and Labor	Hydroseeder (equipment and labor only)	32 92 19.14 4600	22.00	MSF	38.10						ac		1660	MSF	36520
	Fertilizer equipment, materials, & labor	Fertilizer, hydro spread, 1.5 lb/MSF	32 01 90.13 0180	5.00	MSF	38.10						ac		1660	MSF	8300
	Subtotal															**135,363**
	Mine Site															
	Re-revegetate 25% of area															33841
	Subtotal															**33,841**
	Total															**169,204**

Seed mix cost based on the application rates provided in Table 3.4/3.5 of the MRP
Seed prices downloaded October 2017 from greatbasinseeds.com

Common Name	Seeding Rate (lb PLS/ac)	Unit Cost ($/lb)	Mix Cost ($/ac)
Grasses			
Needle and Thread	2.00	39.5	79.00
Indian Ricegrass	2.00	6.95	13.90
Basin Wild Rye	1.00	16.95	16.95
Galleta	1.00	24.00	24.00
Bluebunch Wheatgrass	1.00	8.95	8.95
Slender Wheatgrass	2.00	2.95	5.90
Blue Gramma	1.00	16.00	16.00
Forbs			
Blue Flax	1.00	8.75	8.75
Palmer penstemon	0.25	10.00	2.50
Globemallow	0.50	59.00	29.50
Indian Paintbrush	0.10	150.00	15.00
Fringed Sage	0.10	18.00	1.80
Shrubs			
Wyoming Big Sage	0.25	9.50	2.38
Green Rabbitbrush	0.10	18.00	1.80
Fourwing Saltbush	0.84	13.00	10.92
Winterfat	1.00	18.00	18.00
Shadscale	1.00	9.00	9.00
Cliffrose	1.00	38.00	38.00
Black Sage	0.25	15.95	3.99
		Subtotal =	141.63
		10% increase to account for PLS requirement =	14.16
		Seed mix unit cost =	155.80

WordPerfect Document Compare Summary

Original document: X:\Shared Data\HP-ProjectBackup\UtahAmerican\Lila Hydrology\2019\Shop Revision 3\Appendix 7-4 9-2019 Shop expansion.wpd
Revised document: X:\Shared Data\HP-ProjectBackup\UtahAmerican\Lila Hydrology\2020\Appendix 7-4 7-2020 Coal Pile Protection Expansion.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 86 Deletions, 123 Insertions, 0 Moves.

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
February 2019 PJ
September 2019 PJ
July 2020 PJ

SEDIMENTATION AND DRAINAGE CONTROL PLAN

TABLE OF CONTENTS

Section **Page Number**

1- Introduction: . . . . . Page -1-

2- Design of Drainage Control Structures: . . . . . Page -3-

3- Design of Sediment Control Structures: . . . . . Page -41-

4- Design of Drainage Control Structures for Reclamation: . . . . . Page -54-

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:

where:

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

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~~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 100 year - 6 hour event 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~~UC-6	~~Right Fork Lila Canyon~~Highwall Drainage
UA-9	UC-5	Highwall Drainage

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	DD-6b	Sediment Pond
DA-6b	DD-6b	Sediment Pond
DA-6c	DC-6	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-12a	DD-8	Sediment Pond
DA-12b	DD-9	Sediment Pond
DA-13	DD-23	Sediment Pond
DA-14a	DD-10	Sediment Pond
DA-14b	DD-15	Sediment Pond
DA-15a	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	DC-19	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-19	Sediment Pond
DA-24	DC-12a2	Sediment Pond
DA-25	DC-12a3	Sediment Pond
DA-26	DC-12b	Sediment Pond
DA-27	DD-30	Sediment Pond
DA-28	DD-31	Sediment Pond
DA-29	DD-27	Sediment Pond
DA-30	DD-28	Sediment Basin
DA-31	DD-28	Sediment Basin
Fan Portal	ASCA Area	Right Fork Lila Canyon
TS-1	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~~9.48	1435	1010	70.~~17~~38	75
UA-9	0.91	~~160~~420	~~16~~305	72.62	75
UA-10	~~10~~0.05	50	35	70.00	~~75~~80
UA-11	0.52	260	40	15.38	80
Disturbed Watersheds to Sediment Pond 1					
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-12a	4.48	895	89	9.94	90
DA-12b	0.75	290	37	12.76	90
DA-13	0.32	460	32	6.96	90
DA-14a	0.56	630	55	8.73	90
DA-14b	0.51	490	42	8.57	90
DA-15a	1.15	497	77	15.49	90
DA-15b	3.50	885	71	8.02	90
DA-16a	0.12	160	30	18.75	90

~~DA-16b0.67256259.7790DA-16c0.341902513.1690~~

TABLE 3 (Continued)

Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
DA-16b	0.67	256	25	9.77	90
DA-16c	0.34	190	25	13.16	90
DA-16d	1.12	520	60	11.54	90
DA-20	0.84	550	60	10.91	90
DA-21	1.14	370	50	13.51	90
DA-24	0.57	210	10	4.76	90
DA-25	0.60	190	6	3.16	90
DA-26	0.22	200	6	3.00	90
DA-27	0.66	710	295	41.55	80
DA-28	0.57	505	225	44.55	80
DA-29	0.07	120	5	4.17	80
TS-01	1.87	310	53	17.10	75
POND 1	1.92	815	30	3.68	100
Disturbed Watersheds Sediment Pond 2					
DA-17	1.08	240	9	3.75	90
DA-18	0.48	490	38	7.76	90
DA-19	0.55	764	63	8.25	90
DA-22	0.56	517	26	5.03	90
DA-23	0.08	107	12	11.21	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	0.34	0.95	2.56	3.29	0.26
UA-9	0.04	0.11	0.28	0.35	0.03
UA-10	0.01	0.021	0.053	0.073	0.01
UA-11	0.09	0.14	0.25	0.30	0.09

TABLE 5

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
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 to Sediment Pond 1				
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-12a	2.21	2.05	4.56	0.38
DA-12b	0.39	0.50	0.79	0.06
DA-13	0.16	0.21	0.33	0.03
DA-14a	0.28	0.36	0.58	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-16a	0.06	0.08	0.13	0.01
DA-16b	0.35	0.45	1.02	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-21	0.60	0.76	1.20	0.10
DA-24	0.30	0.38	0.60	0.05
DA-25	0.31	0.40	0.63	0.05
DA-26	0.11	0.15	0.23	0.02
DA-27	0.11	0.17	0.37	0.03

TABLE 5

Runoff Summary Watershed Drainage to Sediment Pond 1				
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-28	0.09	0.15	0.33	0.02
DA-29	0.01	0.02	0.04	0.01
TS-1	0.96	1.24	1.95	0.05
POND 1				3.~~41~~51
Disturbed Watersheds To Sediment Pond 2				
Fan Portal	0.21	0.27	0.40	0.03
DA-17	0.56	0.71	1.13	0.09
DA-18	0.25	0.32	0.50	0.04
DA-19	0.27	0.35	0.56	0.05
DA-22	0.28	0.36	0.56	0.05
DA-23	0.04	0.05	0.08	0.01
POND 2				0.31
Watersheds To South By-Pass Culvert				
UA-8	0.34	0.95	3.29	0.26
UA-9	0.04	0.11	0.35	0.03
UA-10	0.01	0.01	0.03	0.01
UA-11	0.09	0.14	0.30	0.02

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-12a
DD-9	Ditch	DA-12b

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-12a1	Culvert	DD-8, DD-9
DC-12a2	Culvert	DC-12a1, DA-24
DC-12a3	Culvert	DA-25, DC-12a4
DC-12a4	Culvert	DD-23
DC-12b	Culvert	DC-12a2, DC-12a3
DC-12c	Culvert	DC-12b
DC-12d	Culvert	DC-12c
DC-12e	Culvert	DC-12d
DD-10	Ditch	DA-14a
DD-15	Ditch	DA-14b
DD-31	Ditch	DA-28
DD-30	Ditch	DA-27
DD-27	Ditch	DA-29, DD-30, DD-31
DD-11a	Ditch	DA-15a
DD-11b	Ditch	DA-15b
DD-12a	Ditch	DD-11a, DA-16c
DD-12b	Ditch	DA-16a, DD-12
DD-12c	Ditch	DD-12b, DA-16b
DD-13	Ditch	DA-20
DC-14	Culvert	DD-12d
DD-15	Ditch	DC-14, DA-14b, DD-13
DD-16	Ditch	DC-12d, DC-18, DD-15
DD-17	Ditch	DA-18
DD-18	Ditch	DA-19
DD-22	Ditch	DA-22, DC-19

TABLE 6

Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-15	Culvert	DD-18
DC-16	Culvert	DC-13, DD-17
DC-17	Culvert	DA-17
DC-19	Culvert	DA-23
DC-20	Culvert	DD-22
DD-25	Ditch	UA-9
DD-26	Ditch	UA-8
UC-5	Culvert	UD-5
UC-6	Culvert	UD-26, Mine Water
UC-7	Culvert	UC-5. UC-6
UD-8	Ditch	UC-7, UA-10, UA-11

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	7.66	16.51	- -
DD-9	Ditch	0.39	0.79	- -
DC-12a1	Culvert	8.05	17.30	- -
DC-12a2	Culvert	8.35	17.90	- -

TABLE 7

Runoff Control Structure Flow Summary				
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
DD-23	Ditch	0.16	0.33	- -
DC-12a3	Culvert	0.47	0.96	- -
DC-12a4	Culvert	0.16	18.86	- -
DC-12b	Culvert	8.82	18.86	- -
DC-12c	Culvert	8.82	18.86	- -
DC-12d	Culvert	8.82	18.86	- -
DC-12e	Culvert	8.82	18.86	- -
DD-10	Ditch	0.26	0.58	- -
DD-11a	Ditch	~~0.79~~1.~~60~~00	2.34	- -
DD-11b	Ditch	1.56	3.20	- -
DD-12	Ditch	1.56	3.20	- -
DD-12a	Ditch	1.~~36~~18	~~1~~2.~~96~~70	- -
DD-12b	Ditch	1.91	3.33	- -
DD-12c	Ditch	2.26	4.04	- -
DC-13	Culvert	2.26	4.04	- -
DD-12d	Ditch	~~4~~3.~~22~~75	7.~~20~~94	- -
DC-14	Culvert	~~4~~3.~~22~~75	7.~~20~~94	- -
DD-13	Ditch	0.42	~~0~~1.~~87~~19	- -
DD-15	Ditch	4.~~90~~50	~~8~~9.~~60~~59	- -
DD-16	Ditch	13.~~32~~60	2~~8~~9.0~~4~~3	- -
DD-17	Ditch	0.52	1.06	- -
DC-16	Culvert	0.52	1.06	- -
DC-19	Culvert	0.04	0.08	- -
DD-22	Ditch	0.32	0.65	- -
UD-5	Ditch	0.38	3.64	- -

TABLE 7

Runoff Control Structure Flow Summary				
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
UD-6	Ditch	4.70	4.70	- -
UC-5	Culvert	0.38	3.64	- -
UC-6	Culvert	4.70	4.70	- -
UC-7	Culvert	5.08	8.34	- -
UD-7	Ditch	5.18	8.67	- -
DD-30	Ditch	0.11	0.37	- -
DD-31	Ditch	0.09	0.33	- -
DC-17	Culvert	0.56	1.13	- -
DC-20	Culvert	0.32	0.65	- -

* 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~~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	DD-10	DD-11a
Slope (%)	11.76	5.38	8.11	4.38	1.69	7.78	7.31
Length (ft.)	170	130	148	209	118	630	260
Manning's No.	0.030	0.030	0.035	0.035	0.030	0.030	0.030
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
~~*Bottom~~Bottom Width (ft.)	0.00	0.00	2.00	2.00	0.00	0.00	2.00
Peak Flow 10/6 (cfs)	0.06	0.45	5.45	7.66	0.39	0.26	1.0~~.79~~0
Peak Flow 10/24 (cfs)	0.13	0.91	11.95	16.51	0.79	0.60	~~1~~2.~~60~~34
Flow Depth (ft.) 10/6	0.11	0.28	0.38	0.60	0.28	0.21	0.1~~3~~5
Flow Depth (ft.) 10/24	0.15	0.36	0.58	0.89	0.37	0.29	0.2~~0~~4
Flow Area (ft.^{2}) 10/6	0.03	0.16	1.05	1.94	0.16	0.09	0.~~24~~34
Flow Area (ft.^{2}) 10/24	0.05	0.27	1.83	3.38	0.27	0.17	0.~~47~~61
Velocity (fps) 10/6	2.33	2.87	5.21	3.95	2.43	2.88	2.~~70~~92
Velocity (fps) 10/24	2.83	3.43	6.55	4.88	2.90	3.52	3.~~42~~87
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-12	DD-12a	DD-12b	DD-12c	DD-12d	DD-13
Slope (%)	0.93	3.33	15.32	14.29	8.95	1.25	9.05
Length (ft.)	540	60	235	70	190	240	475
Manning's No.	0.030	0.035	0.035	0.030	0.035	0.035	0.030
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
~~*Bottom~~Bottom Width (ft.)	2.00	2.0	0.0	0.0	2.0	2.0	0.0
Peak Flow 10/6 (cfs)	1.56	1.56	1.~~36~~18	1.91	2.26	~~4~~3.~~22~~75	0.42
Peak Flow 10/24 (cfs)	3.20	3.20	~~1~~2.~~96~~70	3.33	4.04	7.~~20~~94	0.87
Flow Depth (ft.) 10/6	0.32	0.24	0.3~~7~~5	0.40	0.21	0.5~~5~~0	0.25
Flow Depth (ft.) 10/24	0.47	0.36	0.~~42~~22	0.49	0.31	0.7~~2~~6	0.33
Flow Area (ft.^{2}) 10/6	0.83	0.60	0.2~~7~~5	0.32	0.51	1.~~69~~56	0.12
Flow Area (ft.^{2}) 10/24	1.38	0.98	0.~~36~~54	0.49	0.83	2.~~49~~67	0.21
Velocity (fps) 10/6	1.87	2.60	~~5~~4.~~00~~82	4.13	4.40	2.4~~9~~1	3.43
Velocity (fps) 10/24	2.31	3.26	~~5~~4.~~48~~97	6.84	4.92	2.~~89~~97	4.12
Rip-Rap Req'd (Y/N)	N	N	~~Y~~N	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-22	DD-23	UD-5
Slope (%)	7.96	1.52	8.43	7.75	4.38	2.17	8.28
Length (ft.)	490	260	415	710	480	276	145
Manning's No.	0.030	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	2:1
~~*Bottom~~Bottom Width (ft.)	3.0	4.0	0.0	0.0	0.0	0.0	0.0
Peak Flow 10/6 (cfs)	4.90	13.32	0.25	0.27	0.43	0.16	0.38
Peak Flow 10/24 (cfs)	8.60	28.04	0.50	0.56	0.97	0.33	3.64
Flow Depth (ft.) 10/6	0.30	0.61	0.21	0.22	0.29	0.23	0.08
Flow Depth (ft.) 10/24	0.38	0.91	0.27	0.28	0.39	0.30	0.30
Flow Area ($ft.^2$) 10/6	1.08	3.20	0.09	0.09	0.16	0.10	0.18
Flow Area ($ft.^2$) 10/24	1.42	5.26	0.14	0.16	0.30	0.17	0.78
Velocity (fps) 10/6	4.55	3.71	2.94	2.90	2.63	1.58	2.16
Velocity (fps) 10/24	6.05	4.60	3.49	3.48	3.22	1.89	4.65
Rip-Rap Req'd (Y/N)	Y	N	N	N	N	N	N
Rip-Rap D_{50}	3"	-	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Disturbed Ditch Design Summary							
Ditch	UD-6	DD-27	UD-7	DD-29	UD-10	UD-11	
Slope (%)	80.0	4.17	14.58	12.00	40.85	44.55	
Length (ft.)	30	120	240	375	710	505	
Manning's No.	0.045	0.030	0.035	0.030	0.035	0.035	
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	
Bottom Width (ft.)	2.0	0.0	6.0	0.0	0.0	0.0	
Peak Flow 10/6 (cfs)	4.70	0.21	5.18	0.07	0.11	0.09	
Peak Flow 10/24 (cfs)	4.70	0.74	8.67	0.25	0.37	0.33	
Flow Depth (ft.) 10/6	0.21	0.22	0.19	0.12	0.12	0.11	
Flow Depth (ft.) 10/24	0.21	0.35	0.27	0.19	0.19	0.18	
Flow Area ($ft.^2$) 10/6	0.51	0.10	1.18	0.03	0.03	0.02	
Flow Area ($ft.^2$) 10/24	0.51	0.25	1.76	0.08	0.07	0.06	
Velocity (fps) 10/6	9.18	2.16	4.40	2.44	3.85	3.78	
Velocity (fps) 10/24	9.18	2.96	4.93	3.35	5.21	5.24	
Rip-Rap Req'd (Y/N)	N	N	Y	N	N	N	
Rip-Rap D_{50}	Bedrock	-	6"	-	-	-	
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 (%)	27.78	10.00	53.85	9.81	4.71	28.04
Length (ft.)	72	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-12a1	DC-12a2
Slope (%)	7.74	5.99	5.91	2.37	4.79	0.69
Length (ft.)	155	167	186	43	193	215
Manning's No.	0.024	0.024	0.024	0.024	0.015	0.015
Peak Flow 10/6 (cfs)	4.88	5.09	5.25	5.45	8.05	8.35
Peak Flow 10/24 (cfs)	10.80	11.23	11.55	11.95	17.30	17.90
Diam. Proposed (ft.)	2.0	2.0	2.0	2.0	2.0	2.0
Velocity (fps) 10/6	7.70	7.11	7.14	4.77	10.47	5.22
Rip-Rap D_{50}	-*	-*	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-12a3	DC-12a4	DC-12b	DC-12c	DC-12d	DC-12e	DC-13
Slope (%)	8.95	6.54	1.77	2.72	1.32	1.67	2.50
Length (ft.)	39	65	82	235	106	12	40
Manning's No.	0.015	0.015	0.015	0.015	0.015	0.015	0.024
Peak Flow 10/6 (cfs)	0.47	0.16	8.82	8.82	8.82	8.82	2.26
Peak Flow 10/24 (cfs)	0.96	0.33	18.86	18.86	18.86	18.86	4.04
Diam. Proposed (ft.)	1.25	1.25	2.0	2.0	2.0	2.0	2.0
Velocity (fps) 10/6	5.91	3.87	7.50	8.77	6.73	7.34	4.13
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-14	DC-16	DC-17	DC-19	DC-20	SP2-1*
Slope (%)	5.00	15.20	34.00	3.10	14.81	0.50
Length (ft.)	40	25	50	65	27	165
Manning's No.	0.024	0.024	0.024	0.015	0.024	0.024
Peak Flow 10/6 (cfs)	~~4~~3.~~22~~75	0.52	0.56	0.04	0.32	-
Peak Flow 10/24 (cfs)	7.~~20~~94	1.06	1.13	0.08	0.65	2.72*
Diam. Proposed (ft.)	2.0	1.50	1.50	1.25	1.50	1.50
Velocity (fps) 10/6	6.~~31~~11	5.21	9.80	1.96	6.19	2.45
Rip-Rap D_{50}	3"	6"	6"	-	6"	-
Note: Slope/Lengths from Plate 7-5. Velocity: (Hydraulic Toolbox Program)						

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

TABLE 9 (Continued)

Disturbed Culvert Design Summary						
Culvert	UC-5	UC-6	UC-7			
Slope (%)	15.09	34.00	27.27			
Length (ft.)	53	50	396			
Manning's No.	0.024	0.024	0.024			
Peak Flow 10/6 (cfs)	0.38	4.70	5.08			
Peak Flow 10/24 (cfs)	3.64	4.70	8.34			
Diam. Proposed (ft.)	1.5	1.5	1.5			
Velocity (fps) 10/6	4.73	13.28	12.56			
Rip-Rap D_{50}	-*	-*	6"			
Note: Slope/Lengths from Plate 7-5. Velocity: (Hydraulic Toolbox Program)						

* Discharge is into a manhole - no riprap required

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-12a	14.34	0.500	4.48	895	9.94	4.04	1.20	34.76	0.07159
DA-12b	14.34	0.5000	0.75	290	12.76	3.36	1.20	28.93	0.0100
DA-13	14.34	0.500	0.32	460	6.96	1.75	1.20	15.03	0.00227
DA-14a	14.34	0.500	0.56	630	8.73	2.80	1.20	24.13	0.0062
DA-14b	14.34	0.500	0.51	490	8.57	2.41	1.20	20.72	0.0049
DA-15a	14.34	0.500	1.15	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	160	18.75	4.62	1.20	39.74	0.0022
DA-16b	14.34	0.500	0.67	256	9.77	2.11	1.20	18.12	0.0056
DA-16c	14.34	0.500	0.34	190	13.16	2.86	1.20	24.57	0.0038
DA-16d	14.34	0.500	1.12	520	11.54	3.86	1.20	33.17	0.0171
DA-20	14.34	0.500	0.84	550	10.91	3.64	1.20	31.33	0.0121
DA-21	14.34	0.500	1.14	362	13.81	4.25	1.20	36.58	0.0191
DA-24	14.34	0.500	0.57	210	4.76	0.90	1.20	5.63	0.00150
DA-25	14.34	0.500	0.60	190	3.16	0.40	1.20	3.46	0.0010
DA-26	14.34	0.500	0.22	200	3.00	0.35	1.20	3.03	0.0003
DA-27	14.34	0.500	0.66	710	41.55	35.61	1.20	306.37	0.0928
DA-28	14.34	0.500	0.57	505	44.55	33.46	1.20	287.92	0.0754
DA-29	14.34	0.500	0.07	120	4.17	0.45	1.20	3.86	0.0001
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.~~9157~~9248

Drainage	R	K	Area (ac)	Slope Length (Ft)	Slope (%)	LS	CP	A (T/ac)	Yield (ac-ft)
Draining to Sediment Pond 2									
DA-17	14.34	0.500	1.08	240	3.75	0.53	1.20	4.53	0.00228
DA-18	14.34	0.500	0.48	490	7.76	2.09	1.20	18.01	0.00403
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	0.56	517	5.03	1.22	1.20	10.50	0.00271
DA-23	14.34	0.500	0.08	107	11.21	1.67	1.20	14.40	0.00051
POND 2	14.34	0.500	0.47	45	12.82	1.33	1.20	11.48	0.0025
TOTAL									0.01815

* 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 - (from Table 5, 10yr/24hr Vol) =	3.45 ac-ft
3. Sediment Storage Volume USLE 0.~~9157~~9248 ac-ft./yr. x 3.0 yrs. =	2.7~~5~~7 ac-ft
4. Total Required Pond Volume 3.4~~1~~5 + 2.7~~5~~7 =	6.2~~0~~2 ac-ft
5. Peak Flow (25 yr. - 6 hr. event) =	24.81 cfs
6. Pond Design Volume @ Principle Spillway = (See Table 12a)	13.04 ac-ft
7. Excess water storage [1]	6.8~~4~~2 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
5830	28640	27755	0.64	
5831	30480	29560	1.32	Sediment Storage - 2.7~~5~~7 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 - 3.45 ac-ft
5846	40120	39115	5.36	
5847	42160	41140	6.30	Runoff + Sed Storage - 6.2~~0~~2 ac-ft
5848	44260	43210	7.29	
5849	46390	45325	8.33	
5850	48550	47470	9.42	Extra Water Storage - 6.8~~4~~2 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) =	0.31 ac-ft.
3. Sediment Storage Volume USLE 0.0181 ac-ft./yr. x 3 yrs. =	0.05 ac-ft
4. Total Required Pond Volume 0.31 + 0.05 =	0.36 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

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 ft^2, R=1.5', g= 32.2 ft/sec^2

Pipe Flow Controlled

$Q = \frac{a\,(2gH')^{0.5}}{(1+Ke+Kb+KcL)^{0.5}}$; where a = Area of Pipe = 7.07 ft^2, 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

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

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 6.20 acre feet, including 3.0 years of sediment storage. The proposed sediment pond size will have a volume of approximately 13.04 acre feet (at the principal spillway), which is more than adequate. The extra storage 6.84 acre-foot in Pond 1 will be used for excess water handling. The required volume for Sediment Pond #2 is calculated at 0.36 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

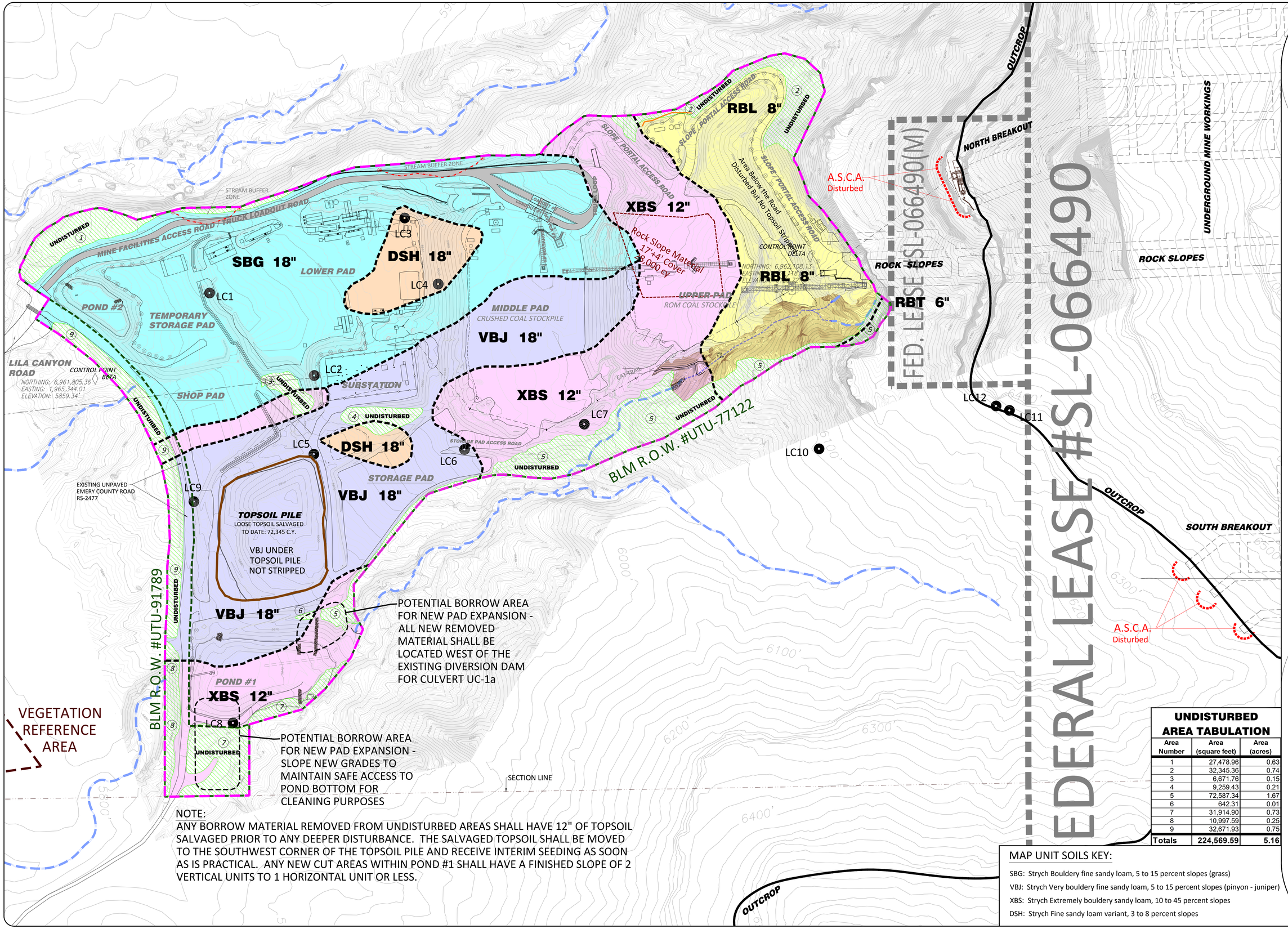
$$Q = \frac{(P-0.2S)^2}{P+0.8S} = 1.01\text{" of runoff}$$

Total run-off = 0.03 acre feet

Lila Canyon Mine
Watershed Peakflow Calculations

Lila Canyon Mine - 10yr-6hr
Ditch And Culvert Calculations

Lila Canyon Mine 10yr-24hr
Ditch And Culvert Calculations



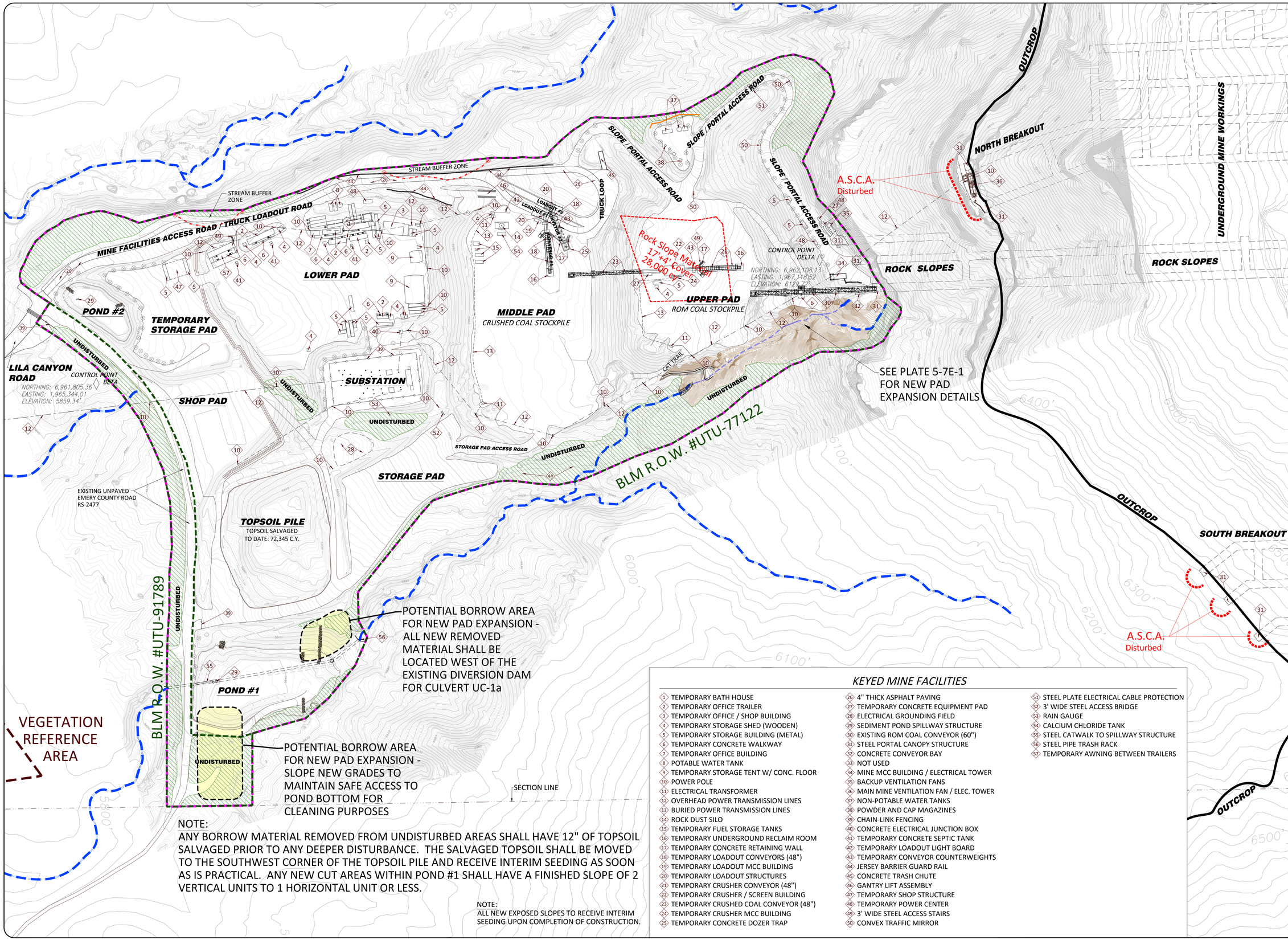
NOTE:
ANY BORROW MATERIAL REMOVED FROM UNDISTURBED AREAS SHALL HAVE 12" OF TOPSOIL SALVAGED PRIOR TO ANY DEEPER DISTURBANCE. THE SALVAGED TOPSOIL SHALL BE MOVED TO THE SOUTHWEST CORNER OF THE TOPSOIL PILE AND RECEIVE INTERIM SEEDING AS SOON AS IS PRACTICAL. ANY NEW CUT AREAS WITHIN POND #1 SHALL HAVE A FINISHED SLOPE OF 2 VERTICAL UNITS TO 1 HORIZONTAL UNIT OR LESS.

UNDISTURBED AREA TABULATION

Area Number	Area (square feet)	Area (acres)
1	27,478.96	0.63
2	32,345.36	0.74
3	6,671.76	0.15
4	9,259.43	0.21
5	72,587.34	1.67
6	642.31	0.01
7	31,914.90	0.73
8	10,997.59	0.25
9	32,671.93	0.75
Totals	224,569.59	5.16

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



NOTE:
ANY BORROW MATERIAL REMOVED FROM UNDISTURBED AREAS SHALL HAVE 12" OF TOPSOIL SALVAGED PRIOR TO ANY DEEPER DISTURBANCE. THE SALVAGED TOPSOIL SHALL BE MOVED TO THE SOUTHWEST CORNER OF THE TOPSOIL PILE AND RECEIVE INTERIM SEEDING AS SOON AS IS PRACTICAL. ANY NEW CUT AREAS WITHIN POND #1 SHALL HAVE A FINISHED SLOPE OF 2 VERTICAL UNITS TO 1 HORIZONTAL UNIT OR LESS.

NOTE:
ALL NEW EXPOSED SLOPES TO RECEIVE INTERIM SEEDING UPON COMPLETION OF CONSTRUCTION.

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. NOT USED
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
47. TEMPORARY SHOP STRUCTURE
48. TEMPORARY POWER CENTER
49. 3' WIDE STEEL ACCESS STAIRS
50. CONVEX TRAFFIC MIRROR
51. STEEL PLATE ELECTRICAL CABLE PROTECTION
52. 3' WIDE STEEL ACCESS BRIDGE
53. RAIN GAUGE
54. CALCIUM CHLORIDE TANK
55. STEEL CATWALK TO SPILLWAY STRUCTURE
56. STEEL PIPE TRASH RACK
57. TEMPORARY AWNING BETWEEN TRAILERS

LILA CANYON MINE

AS-BUILT SURFACE FACILITIES

DATE:	DRAWN BY:	PAGE #
APRIL 2016	R. Jay Marshall	5-2
SCALE:		
AS SHOWN		

REVISION DATE:

DATE:	BY:	DATE:	BY:	DATE:	BY:	DATE:	BY:
JAN. 2008	RJM	JUNE 2011	PJJ	JUNE 2017	PJJ	MAY 2020	PJJ
APR. 2009	PJJ	JAN. 2012	PJJ	APRIL 2018	PJJ	AUGUST 2020	PJJ
DEC. 2009	PJJ	MAR. 2014	PJJ	JANUARY 2019	PJJ		
AUGUST 2010	PJJ	JULY 2014	PJJ	FEBRUARY 2019	PJJ		
SEPT. 2010	PJJ	DEC. 2015	PJJ	MAY 2019	PJJ		
APRIL 2011	PJJ	JUNE 2016	PJJ	DECEMBER 2019	PJJ		
MAY 2011	PJJ	NOV. 2016	PJJ	FEBRUARY 2020	PJJ		

NOTE:
CONTROL POINT COORDINATE SYSTEM IS U.S. STATE PLANE 1983 - UTAH CENTRAL (4302) ADJUSTED TO SEA LEVEL.

Sec. 15, T 16 S, R14 E

50' 0' 100' 200'

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)

NOTES: 1. REFER TO PLATE 5-7A&B FOR CROSS-SECTIONS.

G:\Current Drawings\MRP Maps\Lila Canyon\Layout Files\Plate 5-2 As-Built Surface Facilities - Expand Pad.dwg, MRP Plate 5-2, 8/31/2020 10:01:20 AM

NEW CULVERT SYSTEM GENERAL NOTES

1. THE AREA FOR THIS PROJECT IS CONTAINED WITHIN THE EXISTING DISTURBED AREA BOUNDARY, AND WITHIN THE EXISTING BLM RIGHT-OF-WAY #UTU-77122. ACCESS TO THE NEW WORK AREA CAN BE MADE THE EXISTING UPPER PAD (ROM COAL STORAGE) OR VIA THE EXISTING BENCH SUPPORTING THE BENTS' FOUNDATIONS FOR THE R.O.M. CONVEYOR.

2. PRIOR TO THE COMMENCEMENT OF ANY WORK ON THIS PROJECT, A CONTINUOUS SILT FENCE (SEDIMENT CONTROL DEVICE) SHALL BE CONSTRUCTED DOWNSTREAM FROM THE ANTICIPATED WORK AREA – SEE PLAN THIS SHEET. THE SILT FENCE SHALL EXTEND THROUGH THE EXISTING STREAM CHANNEL AND UP BOTH SIDES OF THE STREAM BANK IN ORDER TO PRECLUDE ANY SEDIMENT FROM THE WORK AREA TO ENTER THE STREAM CHANNEL BELOW THE SILT FENCE.

3. CLEARING AND GRUBBING OF THE PROPOSED NEW CULVERT ALIGNMENT ONLY WILL COMMENCE ONLY AFTER THE NEW SEDIMENT CONTROL STRUCTURES ARE IN-PLACE AND FULLY FUNCTIONAL. CLEARING WILL BEGIN BY REMOVING LARGE BOULDERS FROM THE ALIGNMENT, PLACING THEM EITHER AT THE PROJECTED LOCATION OF THE FURTHEST DOWNSTREAM BERM, OR STORE THEM IN SEPARATE PILES, PRIOR TO PLACEMENT OF THE NEW LINER. CLEARING AND GRUBBING SHALL EXTEND BEYOND THE PROJECTED TOE OF THE NEW FILL AREAS COVERING THE NEW CULVERT SYSTEM. ALL SURFACE OBJECTS, TREES, STUMPS, ROOTS AND OTHER PROTRUDING OBJECTS SHALL BE CLEARED AND GRUBBED. UNDISTURBED STUMPS, ROOTS, AND NONPERISHABLE SOLID OBJECTS LOCATED TWO (2) FEET OR MORE BELOW THE EXISTING SUBGRADE MAY REMAIN IN PLACE. ALL HOLES RESULTING FROM THE REMOVAL OF OBSTRUCTIONS SHALL BE BACKFILLED. ALL CLEARED TIMBER AND VEGETATIVE MATERIAL SHALL BE MOVED TO THE AREA NEAR THE TOPSOIL PILE FOR LATER USE AS MULCH FOR THE TOPSOIL PILE.

4. AFTER THE AREA HAS BEEN CLEARED AND GRUBBED WITHIN THE GENERAL ALIGNMENT AREA OF THE NEW CULVERT, A NEW WOVEN GEOTEXTILE FABRIC WILL BE LAID ATOP THE EXISTING TOPSOIL. NEW FILL MATERIAL WILL APPLIED OVER THE NEW GEOTEXTILE FABRIC IN 12" MAXIMUM LIFTS, THEN COMPACTED TO 95% OF STANDARD DENSITY TO THE APPROXIMATE BOTTOM ELEVATION OF THE BOTTOM OF THE NEW CULVERT, LESS A MINIMUM OF 6". THE NEW GEOTEXTILE FABRIC SHALL EXTEND ABOVE THE EXISTING TOPSOIL AND BELOW ALL NEW FILL AREAS FOR THE SUPPORT AND BURIAL OF THE CULVERT SYSTEM, INCLUDING THE ROCK APRON AT THE DOWNSTREAM END OF THE CULVERT SYSTEM. A 6" MINIMUM THICKNESS LAYER OF BEDDING SAND WILL BE APPLIED OVER THE NEW BUILT-UP SUPPORT FOR THE CULVERT. THE NEW CULVERT SECTIONS WILL THEN BE INSTALLED OVER THE BEDDING SAND LAYER. THE HAUNCHES OF THE CULVERT WILL BE HAND-PACKED TO A MINIMUM DEPTH OF 6" AS MEASURED FROM THE BOTTOM OF THE CULVERT. THE MAXIMUM SLOPE OF ALL BUILT-UP FILL MATERIAL SHALL BE 2 HORIZONTAL UNITS TO 1 VERTICAL UNIT. ONCE THE CULVERT SECTION IS INSTALLED, THE CULVERT WILL BE BACKFILLED WITH A MINIMUM OF 2'-0" OF FILL, INSTALLED IN 12" MAXIMUM LIFTS. EACH BACKFILL LIFT WILL BE COMPACTED TO 95% OF STANDARD DENSITY BEFORE MOVING TO THE NEXT LIFT. THIS PROCESS SHALL CONTINUE THROUGH THE COMPLETE INSTALLATION OF THE CULVERT SYSTEM.

5. ONCE THE ENTIRE NEW CULVERT SYSTEM HAS BEEN INSTALLED, THE AREAS ON EITHER SIDE OF THE CULVERT WHERE SURFACE DRAINAGE WOULD REPORT TO THE ORIGINAL STREAM SHALL BE GRUBBED AS DESCRIBED ABOVE. ON THE NORTHERN SIDE OF THE CULVERT SYSTEM (TOWARD THE MINE'S SURFACE FACILITIES), AREAS TO BE GRUBBED SHALL EXTEND TO THE TOE OF EXISTING SLOPES CREATED BY PREVIOUS DISTURBANCES. ON THE SOUTHERN SIDE OF THE CULVERT SYSTEMS (AWAY FROM THE MINE'S SURFACE FACILITIES), THE MAXIMUM AREAS TO BE GRUBBED EXTEND UP THE BANK SLOPE TO ENCOMPASS AREAS WHERE SURFACE RUNOFF WOULD REPORT TO THE STREAM ABOVE THE NEW CULVERT SYSTEM (SEE PLAN THIS SHEET). COORDINATE WITH A DESIGNATED MINE REPRESENTATIVE FOR THE EXTENT OF GRUBBING ON THE SOUTHERN SIDE OF THE CULVERT.

6. ONCE GRUBBING IS COMPLETED ON THE NORTH AND SOUTH BANKS OF THE STREAM CHANNEL, EXISTING TOPSOIL SHALL BE SALVAGED STARTING AT THE EDGE OF THE BUILT-UP FILL TO BURY THE CULVERT SYSTEM, AND EXTEND TO BOUNDARY OF THE GRUBBED AREAS AS NOTED ABOVE AND SHOWN ON THE PLAN BELOW. TOPSOIL SHALL BE EXCAVATED TO A DEPTH OF 8" TO 12", THEN TRANSPORTED TO THE SOUTHWEST CORNER OF THE EXISTING TOPSOIL PILE. TOPSOIL SHALL BE REMOVED TO THE REQUIRED DEPTH PRIOR TO ANY OTHER REQUIRED EXCAVATION WORK. SALVAGED TOPSOIL SHALL BE PLACED IN NEAT PILES AND RECEIVE INTERIM SEEDING IMMEDIATELY AFTER FINAL SHAPING OF THE PILE.

7. EXPOSED SLOPES NOT SUBJECT TO VEHICULAR TRAFFIC SHALL RECEIVE INTERIM SEEDING AS SOON AS IS PRACTICAL AFTER THE COMPLETION OF EARTHWORK OPERATIONS.

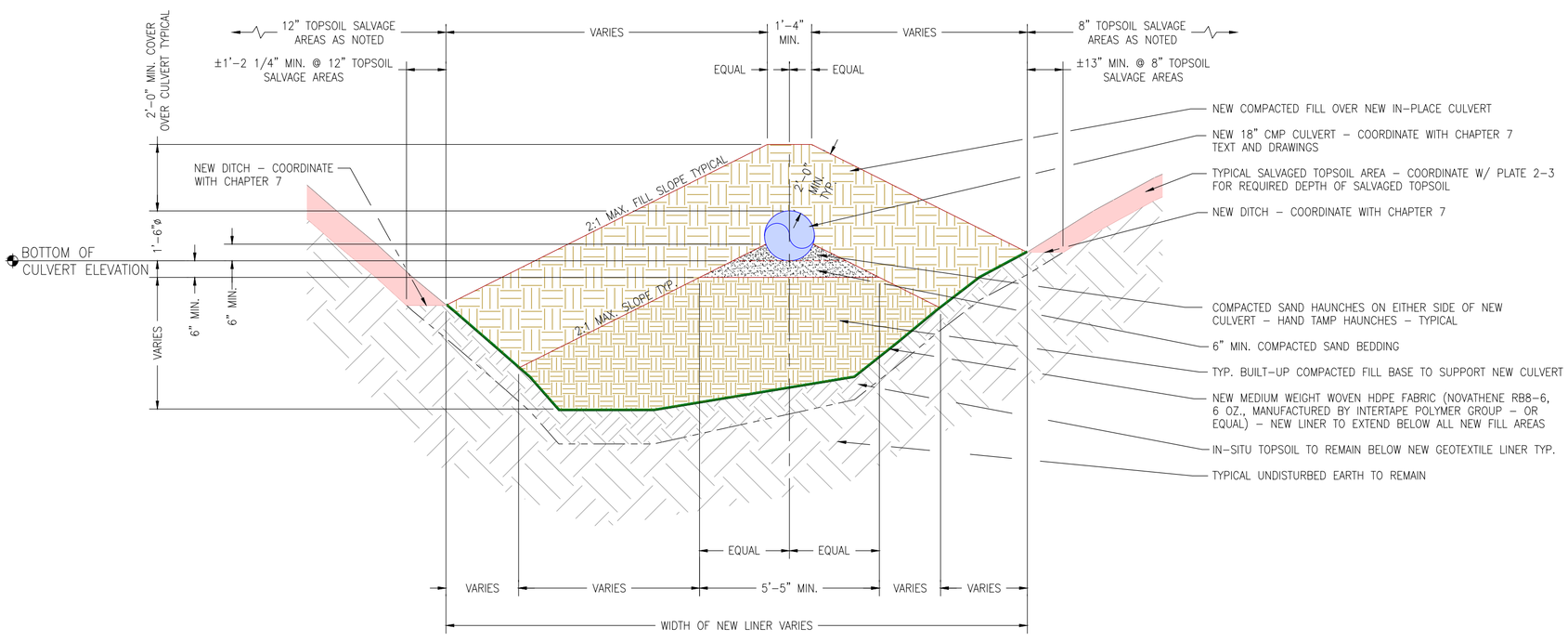
8. FINAL RECLAMATION OF THE DISTURBED AREA BELOW AND AROUND THE NEW CULVERT SYSTEM WILL OCCUR GENERALLY ACCORDING TO THE APPROVED RECLAMATION PLAN, WITH SOME EXCEPTIONS. THESE EXCEPTIONS RELATE TO THE STREAM CHANNEL THAT WILL BE COVERED BY THE GEOTEXTILE FABRIC DURING THE CONSTRUCTION OF THE CULVERT SYSTEM. THE GEOTEXTILE FABRIC WILL BE INSTALLED TO PRESERVE THE INDIGENOUS SOIL AND MORPHOLOGY OF THE EXISTING CREEK CHANNEL.

A) THE REMOVAL OF THE CULVERT SYSTEM AND ASSOCIATED FILL MATERIAL WILL BE MADE IN LIFTS BETWEEN 5 TO 10 FEET EACH. IT IS ANTICIPATED THAT AFTER THE FILL IS REMOVED IN LIFTS, AND THE GEOTEXTILE FABRIC IS PEELED AWAY IN VERTICAL INCREMENTS, THE UNDERLYING SOIL MATERIAL COULD BE SOMEWHAT COMPACTED. TO ENHANCE THE ABILITY OF THE SOIL TO ABSORB MOISTURE, A MIXTURE OF PAM (POLYACRYLAMIDE), OR BEST TECHNOLOGY CURRENTLY AVAILABLE AT THE TIME OF RECLAMATION, WILL BE APPLIED TO THE SOIL SURFACE AFTER SOILS SAMPLES HAVE BEEN TAKEN FOR ANALYSIS TO DETERMINE IF OTHER NUTRIENTS ARE NEEDED WITHIN THE EXISTING SOIL. PAM IS DESIGNED TO RELIEVE COMPACTION OF THE SOIL AND OPEN UP CHANNELS FOR AIR AND WATER PENETRATION. THIS TREATMENT WILL BE APPLIED IN SUCCESSIVE 5-10' LIFTS AS THE FILL IS REMOVED AND THE EXISTING STREAM CHANNEL IS EXPOSED.

B) THE NEWLY RE-EXPOSED SOIL STRUCTURE WILL MOST LIKELY BE UNDAMAGED, BUT LACKING IN MICROBES AND NUTRIENTS. IN ORDER TO REGENERATE NATURALLY EXISTING SOIL ORGANISMS AND ASSIST IN REACTIVATING SOIL ACTIVITY, AN INOCULUM WILL BE APPLIED TO THE SOIL TO REESTABLISH SOIL BACTERIA, MICROHORIZIA AND MYCELIUM. TO ENHANCE SOIL MICROBIAL ESTABLISHMENT AND PROMOTE MORE RAPID STABILIZATION OF THE SOIL, THE APPROVED SEED MIXTURE WILL BE HAND BROADCAST OVER THE AREA AND RAKED INTO THE SOIL SURFACE. THE PERMITTEE IS COMMITTED TO ADDING NUTRIENTS AS DETERMINED BY LABORATORY ANALYSES CONDUCTED ON EXISTING TOPSOIL SAMPLES TAKEN AS SOIL MATERIALS ARE EXPOSED. THE METHOD USED TO ENSURE ADEQUATE AND REPRESENTATIVE SAMPLES FROM DIFFERENT LOCATIONS AND DEPTHS WITHIN THE EXISTING TOPSOIL LAYER INCLUDE: TAKING ONE SOIL SAMPLE PER LIFT, AND COLLECTING SAMPLES WITH A SOIL AUGER AT TWO FOOT INCREMENTS. SAMPLES OF UNDISTURBED SOIL NEAR THE REGRADED AREA WILL ALSO BE TAKEN FOR A BASELINE CHEMICAL REFERENCE. FERTILIZER WILL BE ADDED TO THE EXISTING TOPSOIL, PRIOR TO SEEDING, IF A NEED IS INDICATED BY LABORATORY RESULTS. THE FERTILIZER WILL BE SPREAD ON THE EXISTING TOPSOIL AND HAND-RAKED INTO THE SOIL.

C) IN STEEP-SLOPED, REGRADED AREAS, THE APPROVED SEED MIXTURE WILL BE HAND BROADCAST OVER THE RECENTLY APPLIED TOPSOIL AND RAKED INTO THE SOIL SURFACE. THEN, A WOOD FIBER MULCH WILL BE APPLIED OVER THE SEED BED, THEN THE SURFACE WILL BE SPRAYED WITH A BONDED FIBER MATRIX TACKIFIER. THIS TYPE OF TACKIFIER HAS APPEARED TO HAVE A MUCH GREATER ABILITY THAN REGULAR TACKIFIER TO HOLD AND STABILIZE THE SOIL SURFACE. THE BONDED FIBER MATRIX TACKIFIER WILL BE APPLIED AT A RATE OF 3,500 POUNDS PER ACRE (OR PER THE MANUFACTURER'S RECOMMENDED APPLICATION IF GREATER). ANY RECLAMATION WORK PERFORMED DIRECTLY ON STEEP SLOPES WILL BE DONE UTILIZING HAND LABOR AND TOOLS.

D) SEDIMENT CONTROL DURING THE RECLAMATION OF THE STREAM CHANNEL AREA WILL BE ACCOMPLISHED UTILIZING THE AFOREMENTIONED SILT FENCE THAT WILL REMAIN BELOW THE AREA OF THE NEW CULVERT. THIS SILT FENCE WILL REMAIN IN-PLACE AND MAINTAINED FOR A MINIMUM OF TWO (2) YEARS AFTER FINAL RECLAMATION, OR UNTIL THE NEW VEGETATION INTRODUCED AT FINAL RECLAMATION HAS MATURED SUFFICIENTLY TO STOP THE FLOW OF SEDIMENTS INTO THE WATER CHANNELS, WHICHEVER IS LONGER, TO PREVENT THE INTRODUCTION OF NEW SEDIMENTS INTO THE THE STREAM CHANNEL.



2 / 5-7e-1 *TYPICAL NEW CULVERT INSTALLATION DETAIL*

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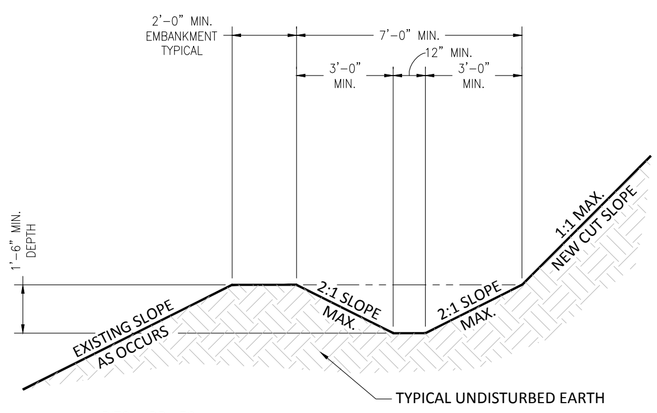

3 / 5-7e-1 *DITCH DD-30* *NEW INCISED DITCH DETAIL*

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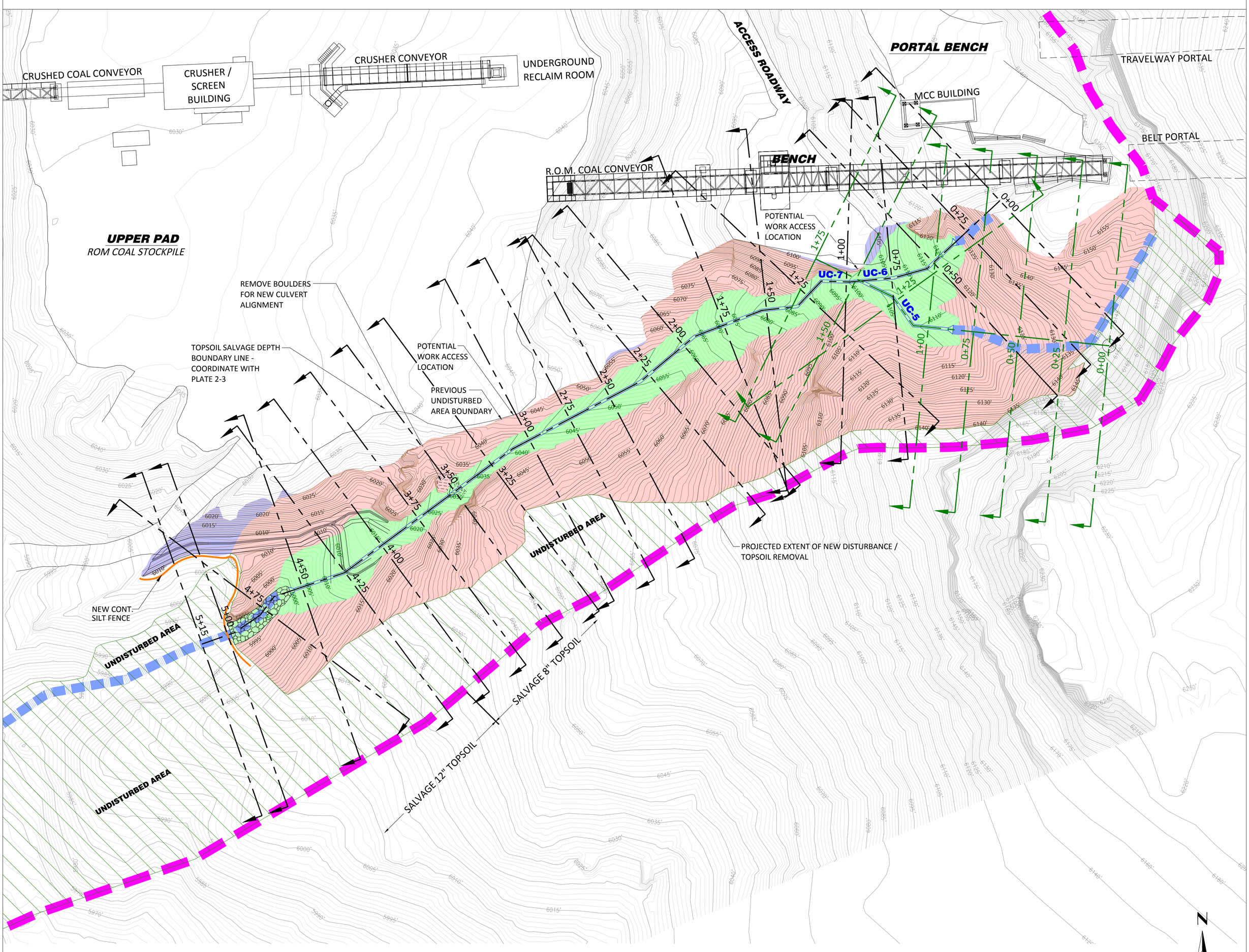

1 / 5-7e-1 *NEW PAD EXPANSION / CULVERT PLAN*

0 30 60 FEET
SCALE: 1" = 30'

PLAN LEGEND

UNDISTURBED CONTOURS (5' INTERVALS)	DISTURBED AREA BOUNDARY LINE
UNDISTURBED CONTOURS (1' INTERVALS)	PREVIOUS DISTURBED AREA LINE
NEW CUT CONTOURS (5' INTERVALS)	UNDISTURBED STREAM DRAINAGE
NEW CUT CONTOURS (1' INTERVALS)	
NEW FILL CONTOURS (5' INTERVALS)	CULVERTS UC-6/UC-7 SECTIONS
NEW FILL CONTOURS (1' INTERVALS)	
NEW LINER BELOW COMPACTED FILL	
CUT AREA – NEW DISTURBANCE	CULVERT UC-5 SECTIONS
CUT AREA – PREVIOUSLY DISTURBED AREA	

GENERAL NOTES

1. MAXIMUM SLOPE FOR ALL NEW FILL AREAS TO BE 2 UNITS HORIZONTAL TO 1 UNIT VERTICAL.

2. MAXIMUM SLOPE FOR ALL NEW CUT SLOPES SHALL BE 1 UNIT HORIZONTAL TO 1 UNIT VERTICAL.

3. NEW DITCHES SHALL SLOPE A MINIMUM OF 2% TO DRAIN.

4. SEDIMENT CONTROL STRUCTURES (SILT FENCES) SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK, AND SHALL REMAIN INTACT AND SHALL BE MAINTAINED AFTER THE PROJECT IS COMPLETED.

5. ALL NEW SLOPES SHALL RECEIVE INTERIM SEEDING PER THE APPROVED INTERIM SEED MIX.

REVISION DATE:

DATE:	BY:	DATE:	BY:

LILA CANYON MINE

Upper Pad Expansion
Plan and Typical Details

DATE: AUGUST 2020	DRAWN BY: PJJ
SCALE: AS SHOWN	PLATE #: Plate 5-7E-1

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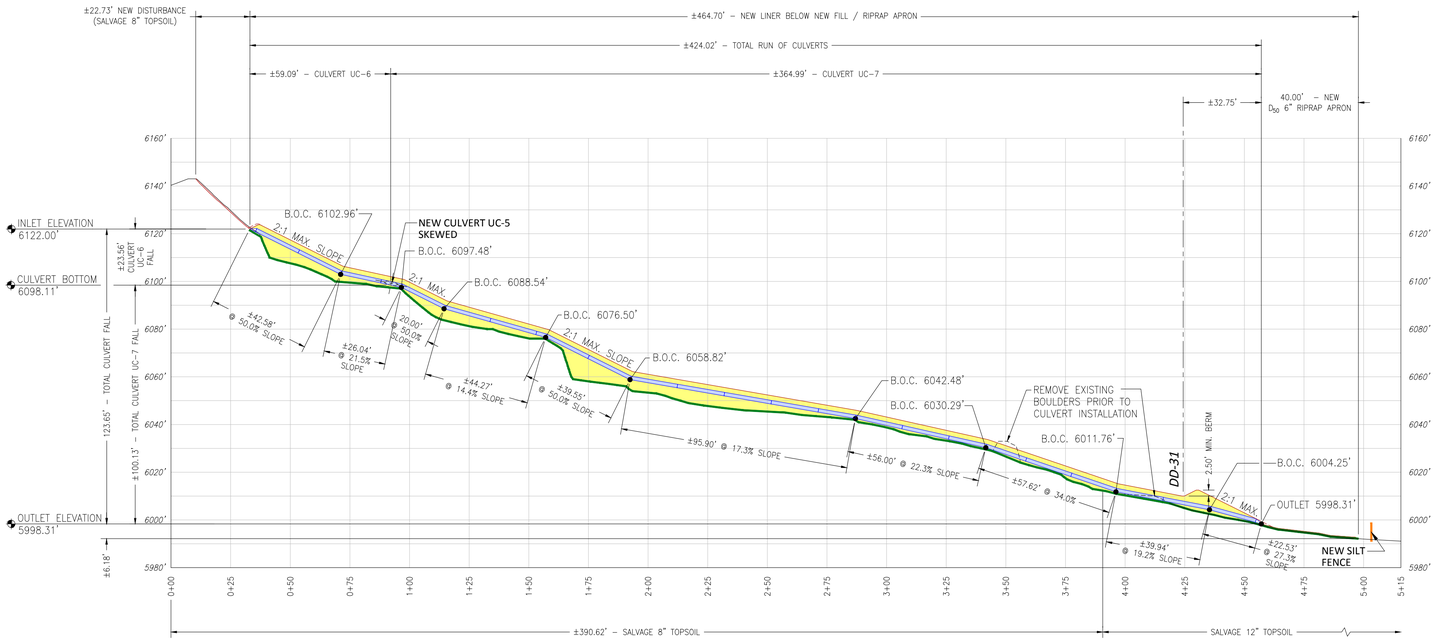

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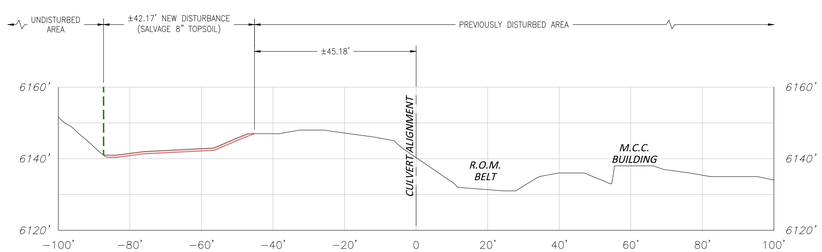
5-7e-2

NEW CULVERTS UC-6 and UC-7 LONGITUDINAL SECTION (LOOKING NORTHWESTERLY)

SCALE: 1" = 30'

0 30 60 FEET

NOTE:
INSTALL THE CONTINUOUS SILT FENCE BELOW THE PROJECTED WORK AREA PRIOR TO BEGINNING ANY CLEARING, GRUBBING, OR ANY OTHER EARTHWORK.



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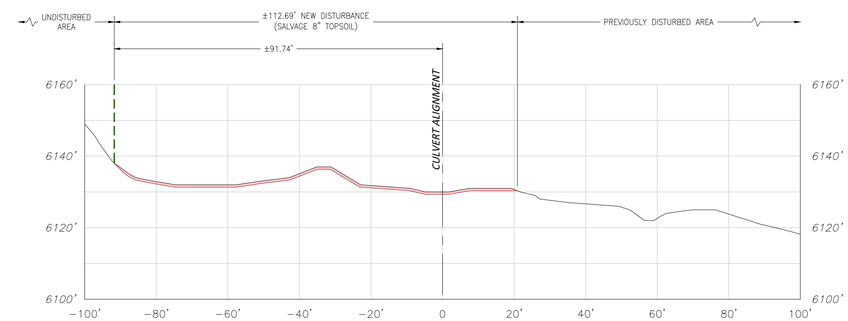

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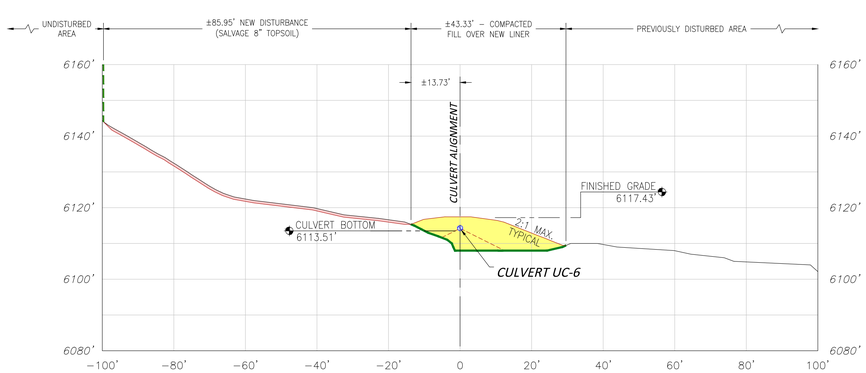

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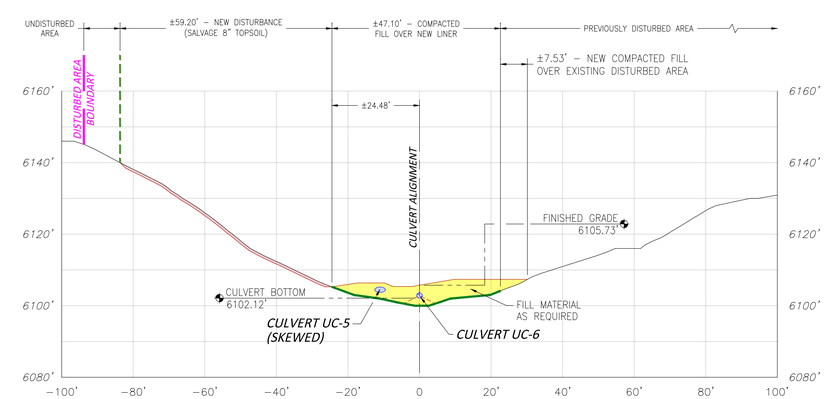

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GENERAL NOTES
1. MAXIMUM SLOPE FOR ALL NEW FILL AREAS TO BE 2 UNITS HORIZONTAL TO 1 UNIT VERTICAL.
2. MAXIMUM SLOPE FOR ALL NEW CUT SLOPES SHALL BE 1 UNIT HORIZONTAL TO 1 UNIT VERTICAL.
3. NEW DITCHES SHALL SLOPE A MINIMUM OF 2% TO DRAIN.
4. SEDIMENT CONTROL STRUCTURES (SILT FENCES) SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK, AND SHALL REMAIN INTACT AND SHALL BE MAINTAINED AFTER THE PROJECT IS COMPLETED.
5. ALL NEW SLOPES SHALL RECEIVE INTERIM SEEDING PER THE APPROVED INTERIM SEED MIX.

LEGEND

EXISTING GRADE / RECLAIMED GRADE LINE
NEW WORKING PROFILE LINE
NEW LINER BELOW COMP. FILL
NEW CULVERT – SEE CHAPTER 7
NEW COMPACTED FILL AREA
CUT AREA – NEW DISTURBANCE

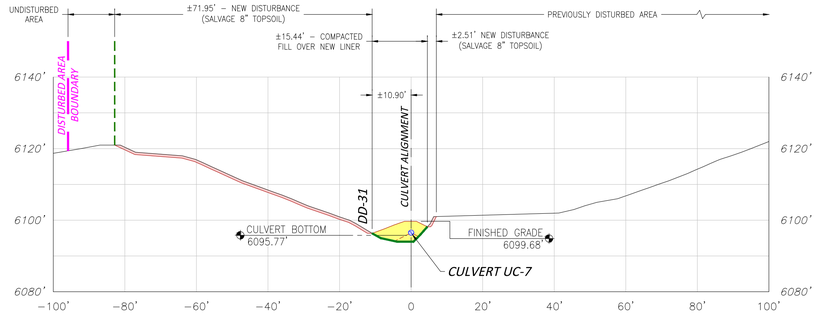
LILA CANYON MINE

New Culverts UC-6 and UC-7 Profile and Sections

DATE: AUGUST 2020
DRAWN BY: PW
SCALE: 1" = 20'
PLATE #: Plate 5-7E-2

REVISION DATE:

DATE:	BY:	DATE:	BY:



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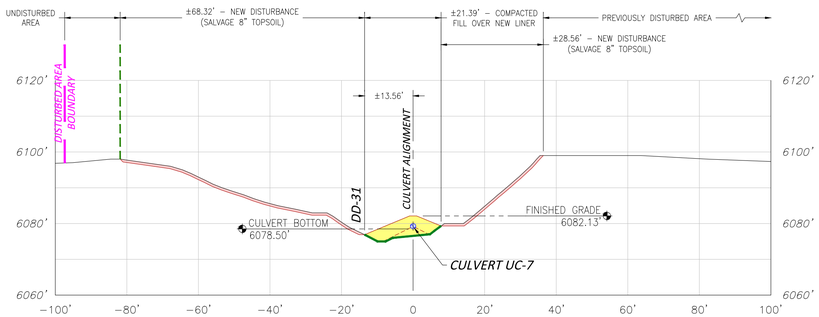

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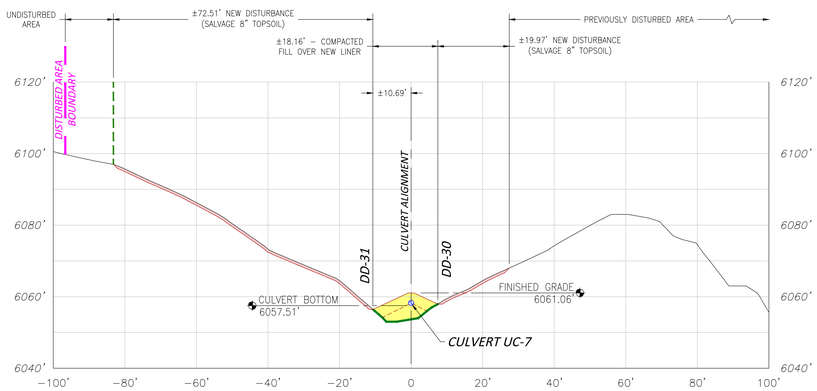

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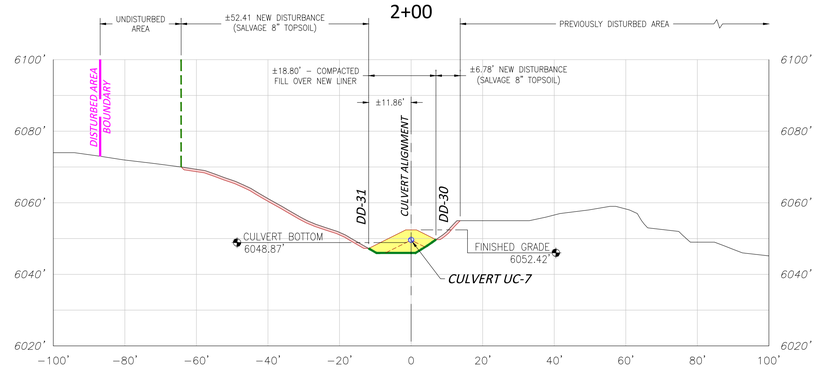

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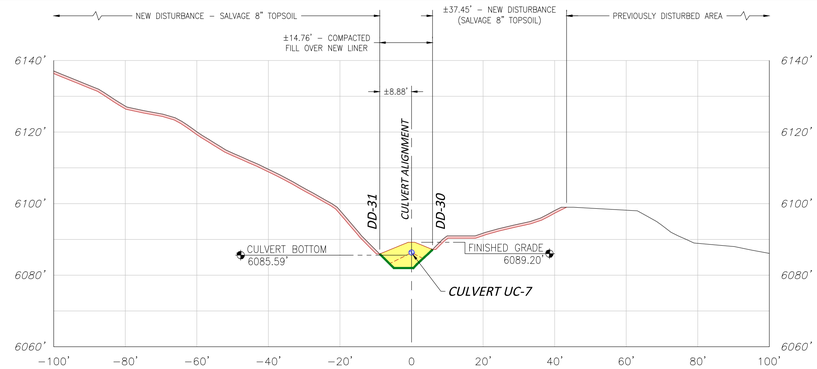

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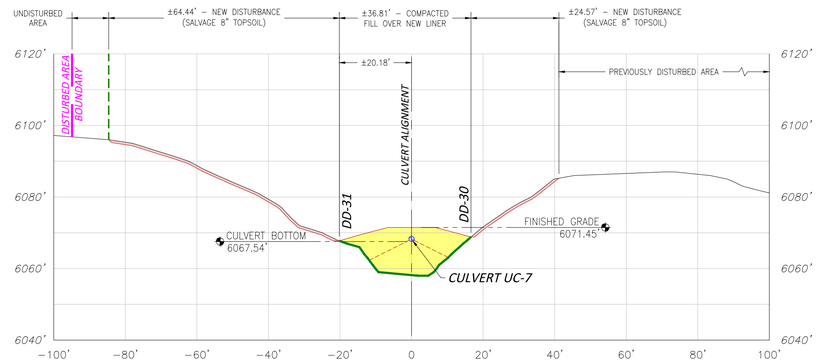

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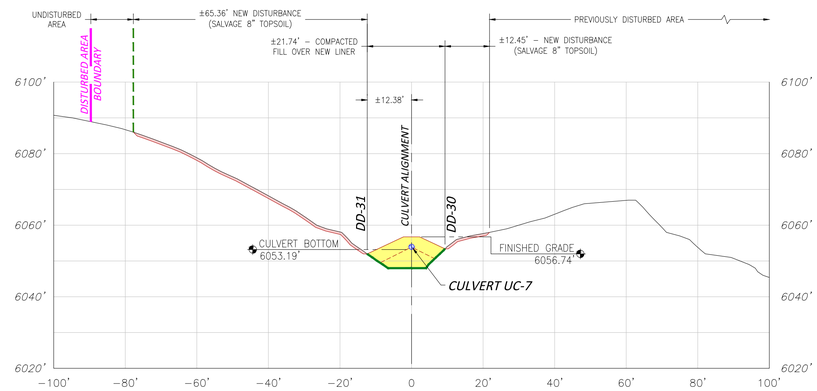

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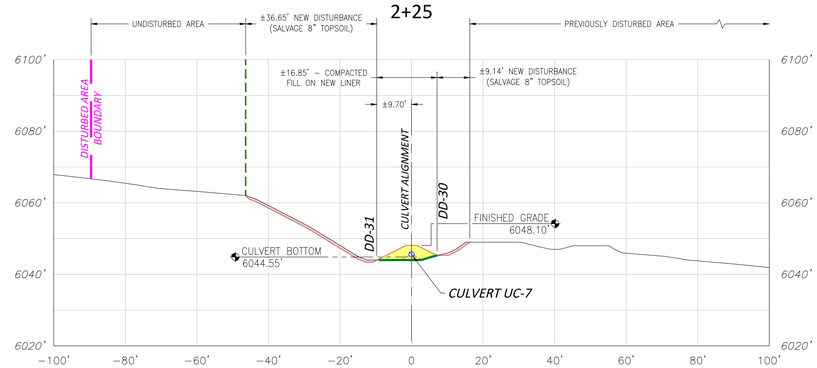

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LILA CANYON MINE

New Culverts UC-6 and UC-7 Sections

DATE: AUGUST 2020 | DRAWN BY: PM | SCALE: 1" = 20'-0" | PLATE #: Plate 5-7E-3

REVISION DATE:

DATE:	BY:	DATE:	BY:

GENERAL NOTES

1. MAXIMUM SLOPE FOR ALL NEW FILL AREAS TO BE 2 UNITS HORIZONTAL TO 1 UNIT VERTICAL.
2. MAXIMUM SLOPE FOR ALL NEW CUT SLOPES SHALL BE 1 UNIT HORIZONTAL TO 1 UNIT VERTICAL.
3. NEW DITCHES SHALL SLOPE A MINIMUM OF 2% TO DRAIN.
4. SEDIMENT CONTROL STRUCTURES (SILT FENCES) SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK, AND SHALL REMAIN INTACT AND SHALL BE MAINTAINED AFTER THE PROJECT IS COMPLETED.
5. ALL NEW SLOPES SHALL RECEIVE INTERIM SEEDING PER THE APPROVED INTERIM SEED MIX.

LEGEND

- EXISTING GRADE / RECLAIMED GRADE LINE
- NEW WORKING PROFILE LINE
- NEW LINER BELOW COMP. FILL
- NEW CULVERT – SEE CHAPTER 7
- NEW COMPACTED FILL AREA
- CUT AREA – NEW DISTURBANCE

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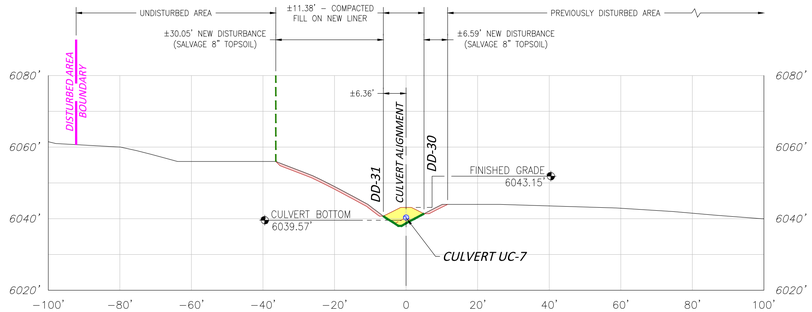

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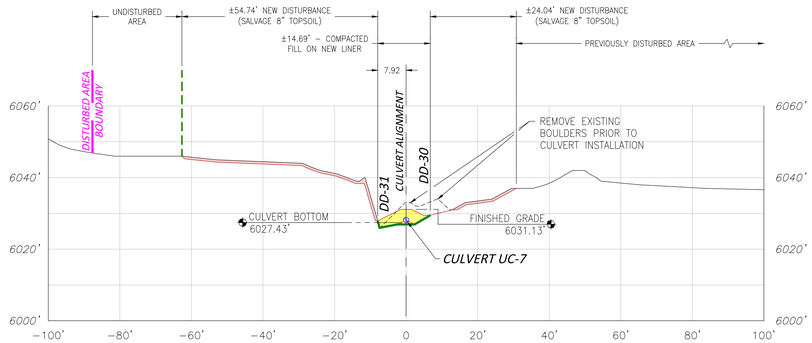

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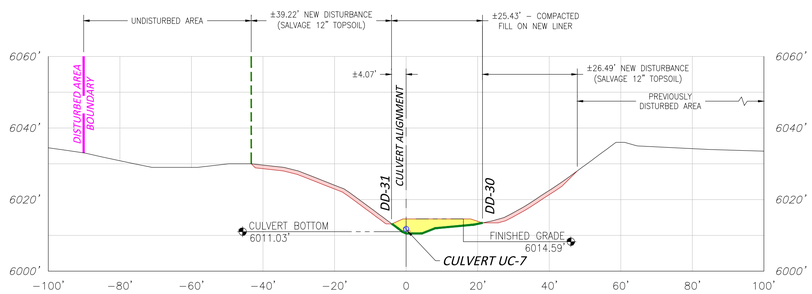

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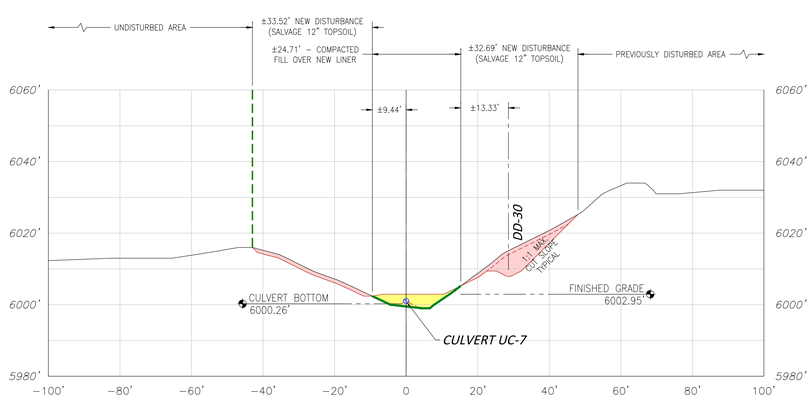

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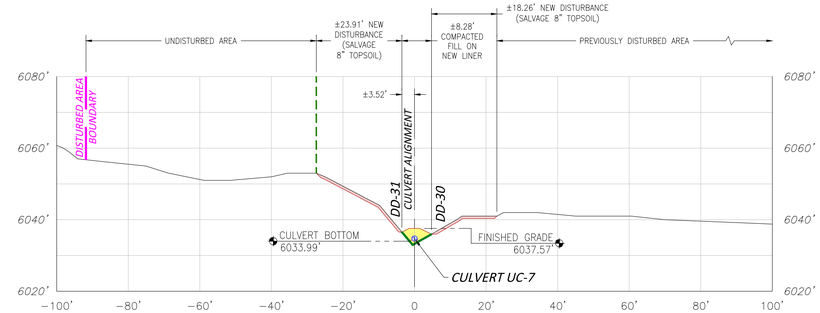

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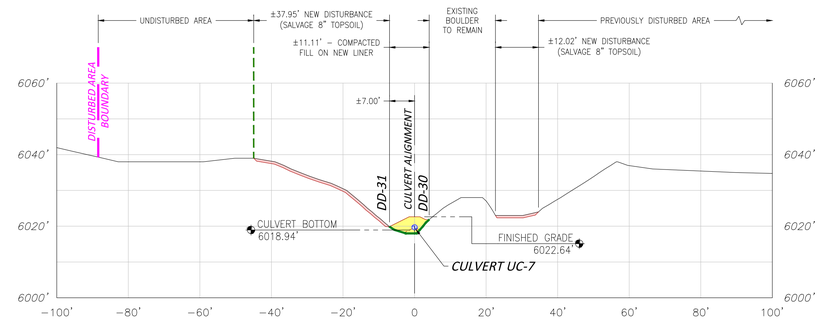

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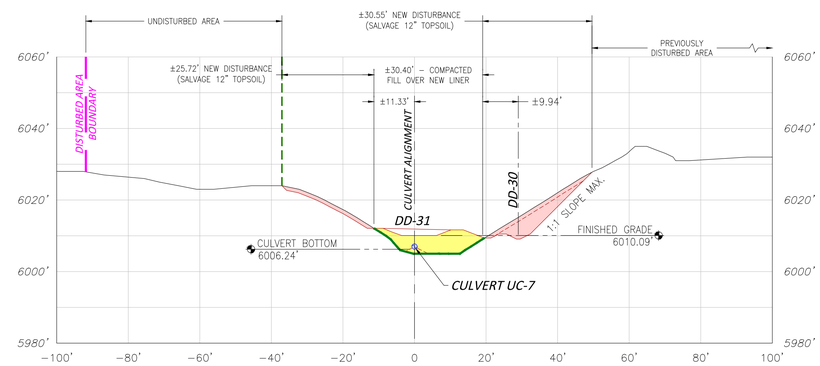

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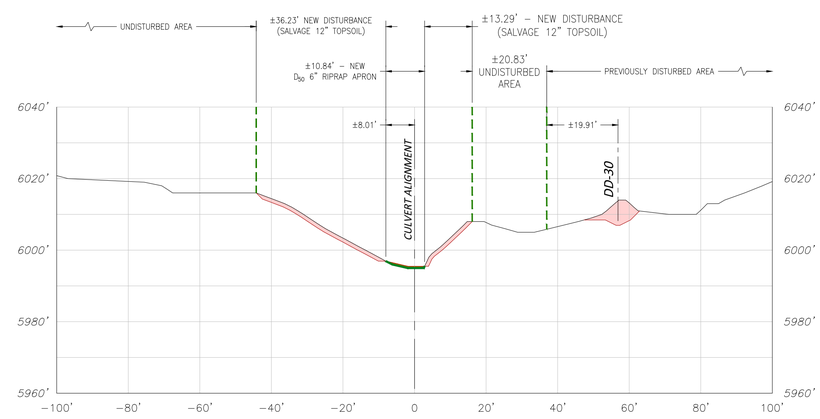

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GENERAL NOTES
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LEGEND

EXISTING GRADE / RECLAIMED GRADE LINE
NEW WORKING PROFILE LINE
NEW LINER BELOW COMP. FILL
NEW CULVERT – SEE CHAPTER 7
NEW COMPACTED FILL AREA
CUT AREA – NEW DISTURBANCE

REVISION DATE:

DATE:	BY:	DATE:	BY:	DATE:	BY:

LILA CANYON MINE

New Culverts UC-6 and UC-7 Sections

DRAWN BY: PM

PLATE #: Plate 5-7E-4

DATE: AUGUST 2020

SCALE: 1" = 20'-0"

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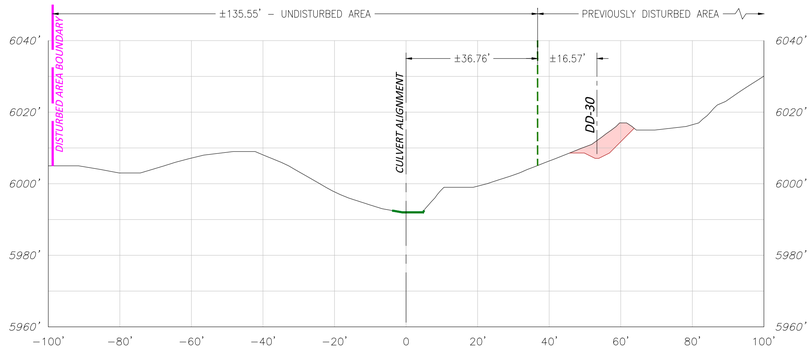

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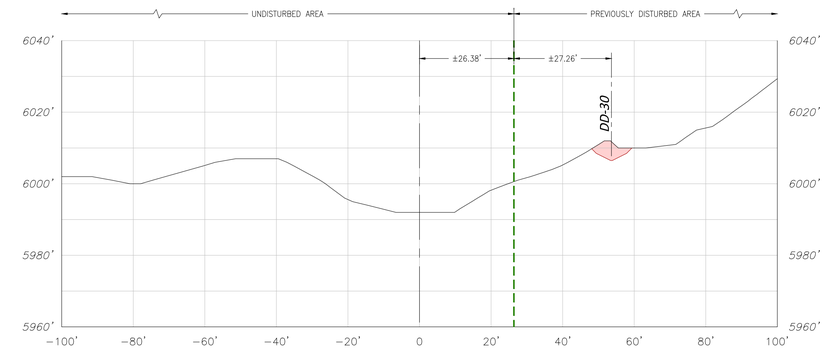

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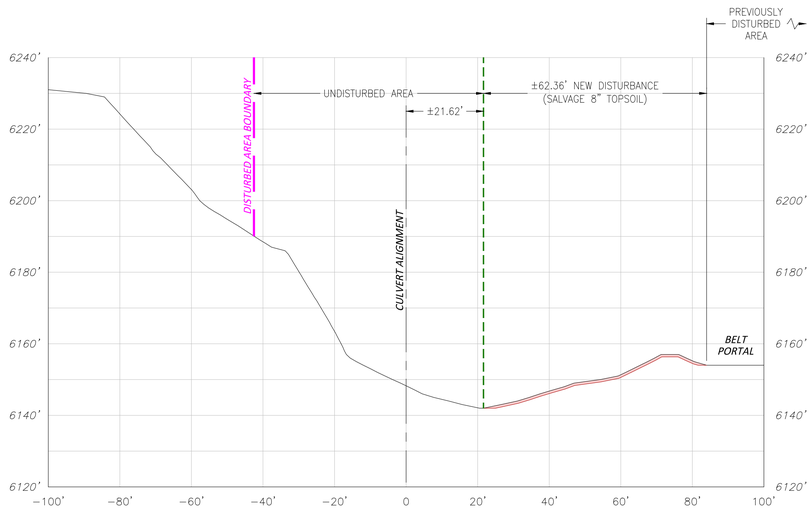
CULVERTS UC-6 AND UC-7

CULVERT UC-5



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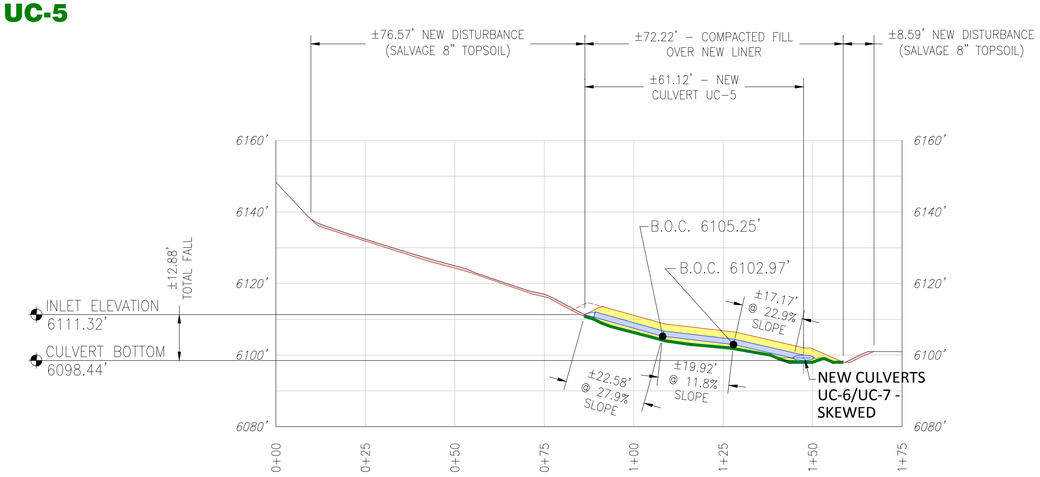

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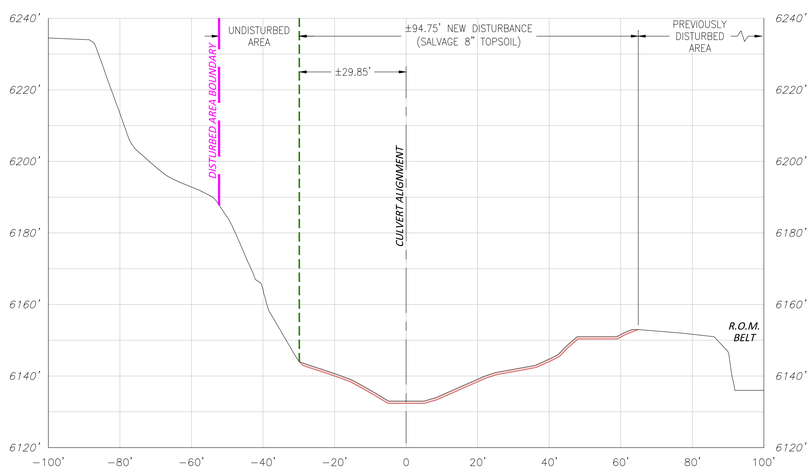
5-7e-5

NEW CULVERT UC-5 LONGITUDINAL SECTION (LOOKING SOUTHERLY)

0 10 20 40 FEET
SCALE: 1" = 20'



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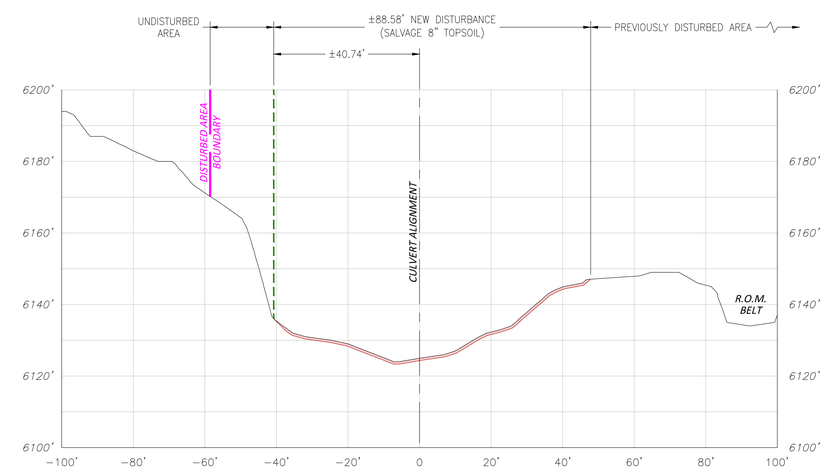


0+50

10 0 20 40 FEET

GENERAL NOTES
1. MAXIMUM SLOPE FOR ALL NEW FILL AREAS TO BE 2 UNITS HORIZONTAL TO 1 UNIT VERTICAL.
2. MAXIMUM SLOPE FOR ALL NEW CUT SLOPES SHALL BE 1 UNIT HORIZONTAL TO 1 UNIT VERTICAL.
3. NEW DITCHES SHALL SLOPE A MINIMUM OF 2% TO DRAIN.
4. SEDIMENT CONTROL STRUCTURES (SILT FENCES) SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK, AND SHALL REMAIN INTACT AND SHALL BE MAINTAINED AFTER THE PROJECT IS COMPLETED.
5. ALL NEW SLOPES SHALL RECEIVE INTERIM SEEDING PER THE APPROVED INTERIM SEED MIX.

LEGEND

EXISTING GRADE / RECLAIMED GRADE LINE
NEW WORKING PROFILE LINE
NEW LINER BELOW COMP. FILL
NEW CULVERT – SEE CHAPTER 7
NEW COMPACTED FILL AREA
CUT AREA – NEW DISTURBANCE

REVISION DATE:

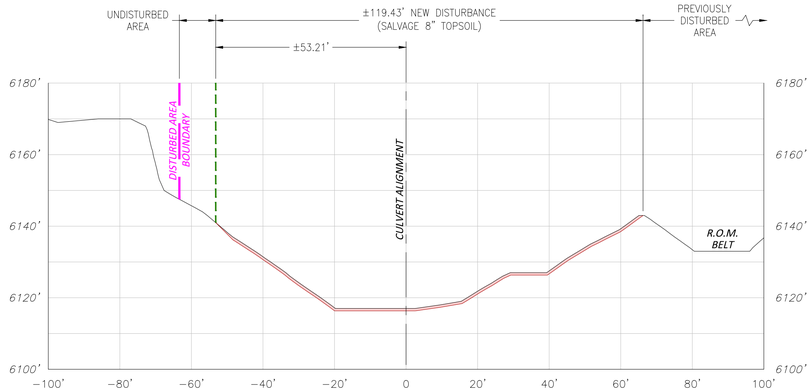
DATE:	BY:	DATE:	BY:

LILA CANYON MINE

Culverts UC-6 and UC-7 Sections and UC-5 Profile and Sections

DATE: AUGUST 2020 | DRAWN BY: PW
SCALE: 1" = 20'-0" | PLATE #: Plate 5-7E-5

G:\Current Drawings\HBP Magnolia Canyon\Expand Pads\Plate 5-7E Near Real Cross Sections.dwg, 5-7E-5, 8/11/2020 9:09:40 AM



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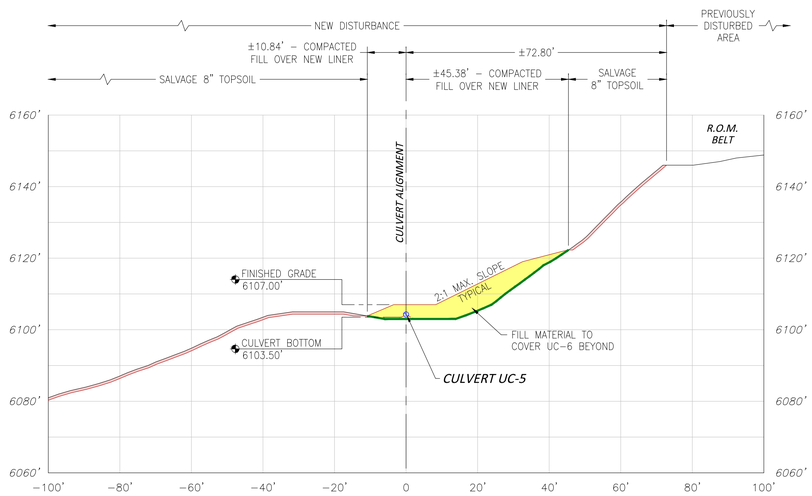

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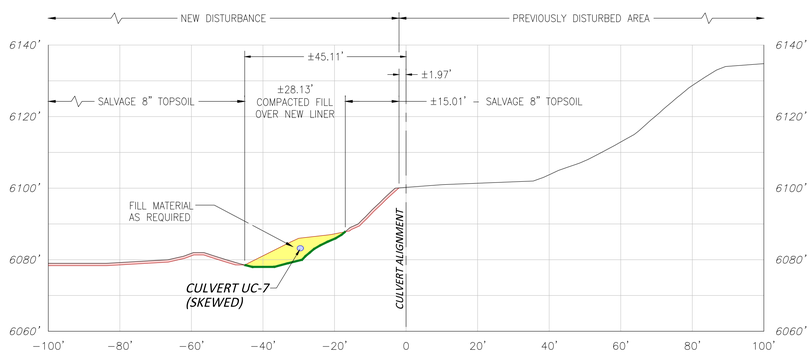

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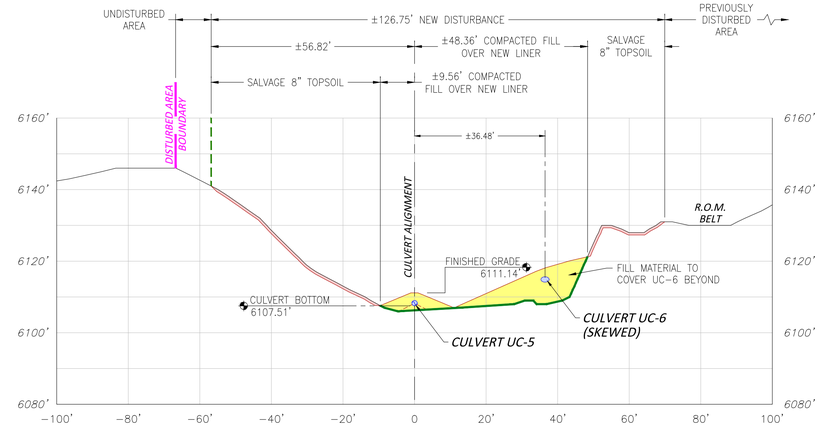

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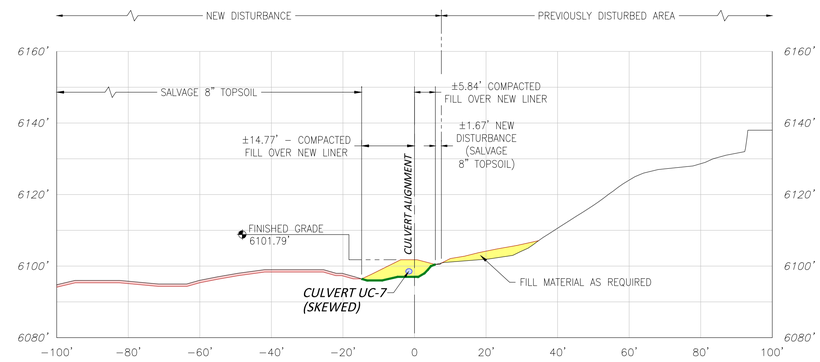

1+50

CULVERTS UC-6 AND UC-7 INSTALLATION MATERICAL CUT / FILL CALCULATIONS (AFTER TOPSOIL REMOVAL)									
BUILT-UP FILL MATERIAL CALCULATION					CUT SUBGRADE MATERIAL CALCULATION				
Station	Area of Fill (square feet)	Distance Between Stations	Total Fill Cubic Feet	Total Fill Cubic Yards	Station	Area of Cut (square feet)	Distance Between Stations	Total Cut Cubic Feet	Total Cut Cubic Yards
0+00	0.00	25	0.00	0.00	0+00	0	25	0.00	0.00
0+25	0.00	25	0.00	0.00	0+25	0	25	0.00	0.00
0+50	250.21	25	6,255.25	231.68	0+50	0	25	0.00	0.00
0+75	212.75	25	5,318.77	196.99	0+75	0	25	0.00	0.00
1+00	54.49	25	1,362.17	50.45	1+00	0	25	0.00	0.00
1+25	64.71	25	1,617.78	59.92	1+25	0	25	0.00	0.00
1+50	78.05	25	1,951.36	72.27	1+50	0	25	0.00	0.00
1+75	312.78	25	7,819.56	289.61	1+75	0	25	0.00	0.00
2+00	84.04	25	2,101.05	77.82	2+00	0	25	0.00	0.00
2+25	125.70	25	3,142.56	116.39	2+25	0	25	0.00	0.00
2+50	73.22	25	1,830.48	67.80	2+50	0	25	0.00	0.00
2+75	39.58	25	989.58	36.65	2+75	0	25	0.00	0.00
3+00	31.36	25	784.02	29.04	3+00	0	25	0.00	0.00
3+25	19.50	25	487.50	18.06	3+25	0	25	0.00	0.00
3+50	40.48	25	1,011.88	37.48	3+50	0	25	0.00	0.00
3+75	30.24	25	756.02	28.00	3+75	0	25	0.00	0.00
4+00	61.54	25	1,538.62	56.99	4+00	0	25	0.00	0.00
4+25	126.60	25	3,165.11	117.23	4+25	71.7012	25	1,792.53	66.39
4+50	57.23	25	1,430.83	52.99	4+50	80.4719	25	2,011.80	74.51
4+75	0.00	25	0.00	0.00	4+75	49.1644	25	1,229.11	45.52
5+00	0.00	25	0.00	0.00	5+00	63.462	25	1,586.55	58.76
5+15	0.00	15	0.00	0.00	5+15	32.5872	15	488.81	18.10
Total Required Fill Material			**41,562.53**	**1,539.35**	**Total Subgrade Cut Material**			**7,108.80**	**263.29**

CULVERT UC-5 INSTALLATION MATERIAL CUT / FILL CALCULATIONS (AFTER TOPSOIL REMOVAL)									
BUILT-UP FILL MATERIAL CALCULATION					CUT SUBGRADE MATERIAL CALCULATION				
Station	Area of Fill (square feet)	Distance Between Stations	Total Fill Cubic Feet	Total Fill Cubic Yards	Station	Area of Cut (square feet)	Distance Between Stations	Total Cut Cubic Feet	Total Cut Cubic Yards
0+00	0.00	25	0.00	0.00	0+00	0	25	0.00	0.00
0+25	0.00	25	0.00	0.00	0+25	0	25	0.00	0.00
0+50	0.00	25	0.00	0.00	0+50	0	25	0.00	0.00
0+75	0.00	25	0.00	0.00	0+75	0	25	0.00	0.00
1+00	273.28	25	6,831.95	253.04	1+00	0	25	0.00	0.00
1+25	254.73	25	6,368.35	235.86	1+25	0	25	0.00	0.00
1+50	108.66	25	2,716.60	100.61	1+50	0	25	0.00	0.00
1+75	93.24	25	2,330.90	86.33	1+75	0	25	0.00	0.00
Total Required Fill Material			**18,247.79**	**675.84**	**Total Subgrade Cut Material**			**0.00**	**0.00**

NOTE:
CUT/FILL TABULATION NUMBERS DENOTED IN SQUARE FEET WITHIN THE CALCULATION TABLES ABOVE ARE ACTUAL SQUARE FOOT AREAS OF COLORED ZONES WITHIN EACH SECTION DENOTING CUT OR FILL REGIONS WITHIN EACH RESPECTIVE SECTION CUT AT EACH STATION. SQUARE FOOT AREA NUMBERS LISTED ARE DERIVED UTILIZING THE ABILITY OF THE DRAFTING PROGRAM (AUTOCAD MAP 3D 2017 BY AUTODESK) TO CALCULATE THE SQUARE FOOT AREA OF A HATCHED AREA.

CUT / FILL COMPARISON		
TOTAL REQUIRED FILL MATERIAL	2,215.20	cubic yards
TOTAL AVAILABLE PROJECT CUT MATERIAL	263.29	cubic yards
REQUIRED BORROW MATERIAL	1,951.91	cubic yards

NOTE:
BORROW AREA TABULATION ABOVE INCLUDES APPROXIMATELY 54.15 CUBIC YARDS OF SAND BEDDING MATERIAL FOR THE INSTALLATION OF THE NEW CULVERTS. BORROW AREA IS LOCATED AT THE MINE SITE, WITHIN THE EXISTING DISTURBED AREA BOUNDARY.

TOTAL REQUIRED BUILT-UP FILL MATERIAL			TOTAL CUT SUBGRADE MATERIAL		
	Total Fill Cubic Feet	Total Fill Cubic Yards		Total Cut Cubic Feet	Total Cut Cubic Yards
Culverts UC-6 and UC-7	41,562.53	1,539.35	Culverts UC-6 and UC-7	7,108.80	263.29
Culvert UC-5	18,247.79	675.84	Culvert UC-5	0.00	0.00
TOTAL	**59,810.32**	**2,215.20**	**TOTAL**	**7,108.80**	**263.29**

LILA CANYON MINE

New UC-5 Culvert Sections and Cut / Fill Tabulations

DRAWN BY: pu
DATE: AUGUST 2020
PLATE #: Plate 5-7E-6
SCALE: 1" = 20'-0"

REVISION DATE:

BY:							
DATE:							
BY:							
DATE:							

10 0 20 40 FEET

GENERAL NOTES:
1. MAXIMUM SLOPE FOR ALL NEW FILL AREAS TO BE 2 UNITS HORIZONTAL TO 1 UNIT VERTICAL.
2. MAXIMUM SLOPE FOR ALL NEW CUT SLOPES SHALL BE 1 UNIT HORIZONTAL TO 1 UNIT VERTICAL.
3. NEW DITCHES SHALL SLOPE A MINIMUM OF 2% TO DRAIN.
4. SEDIMENT CONTROL STRUCTURES (SILT FENCES) SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK, AND SHALL REMAIN INTACT AND SHALL BE MAINTAINED AFTER THE PROJECT IS COMPLETED.
5. ALL NEW SLOPES SHALL RECEIVE INTERIM SEEDING PER THE APPROVED INTERIM SEED MIX.

LEGEND

EXISTING GRADE / RECLAIMED GRADE LINE
NEW WORKING PROFILE LINE
NEW LINER BELOW COMP. FILL
NEW CULVERT – SEE CHAPTER 7
NEW COMPACTED FILL AREA
CUT AREA – NEW DISTURBANCE

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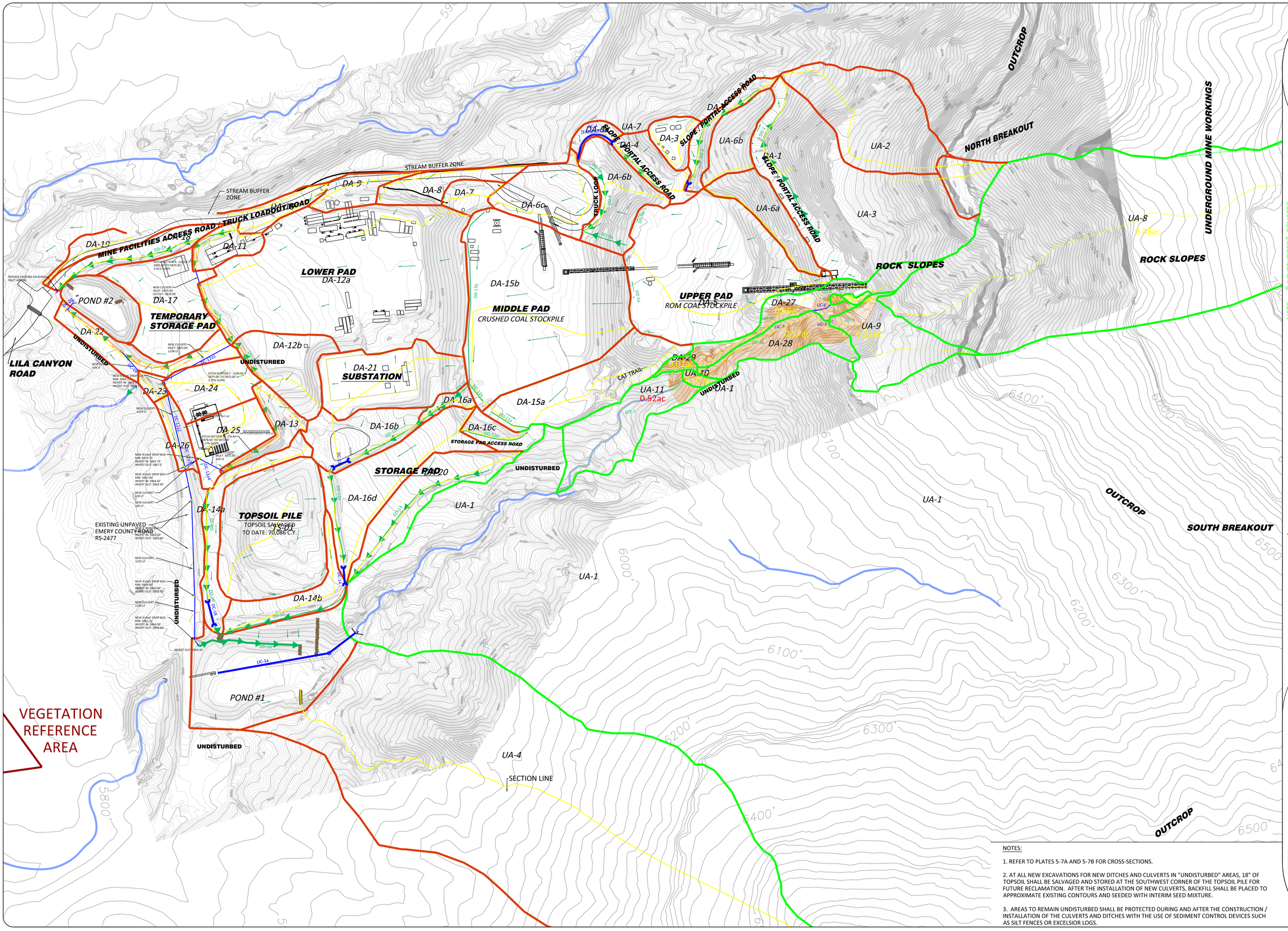


NOTES:

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

DATE:	January 2008
DESIGN BY:	Jay Marshall
SCALE:	AS SHOWN
PAGE #:	7-2

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:

DATE:	BY:	DATE:	BY:
JAN 2008	RJM	Aug. 2014	PJJ
APR 2008	TJS	Dec. 2015	PJJ
JUL 2008	TJS	Feb. 2016	PJJ
JUN 2009	TJS	March 2016	PJJ
JAN 2010	TJS	Sept 2016	PJJ
Dec 2010	RJM	Dec 2018	PJJ
Nov. 2013	PJJ	Feb 2019	PJJ

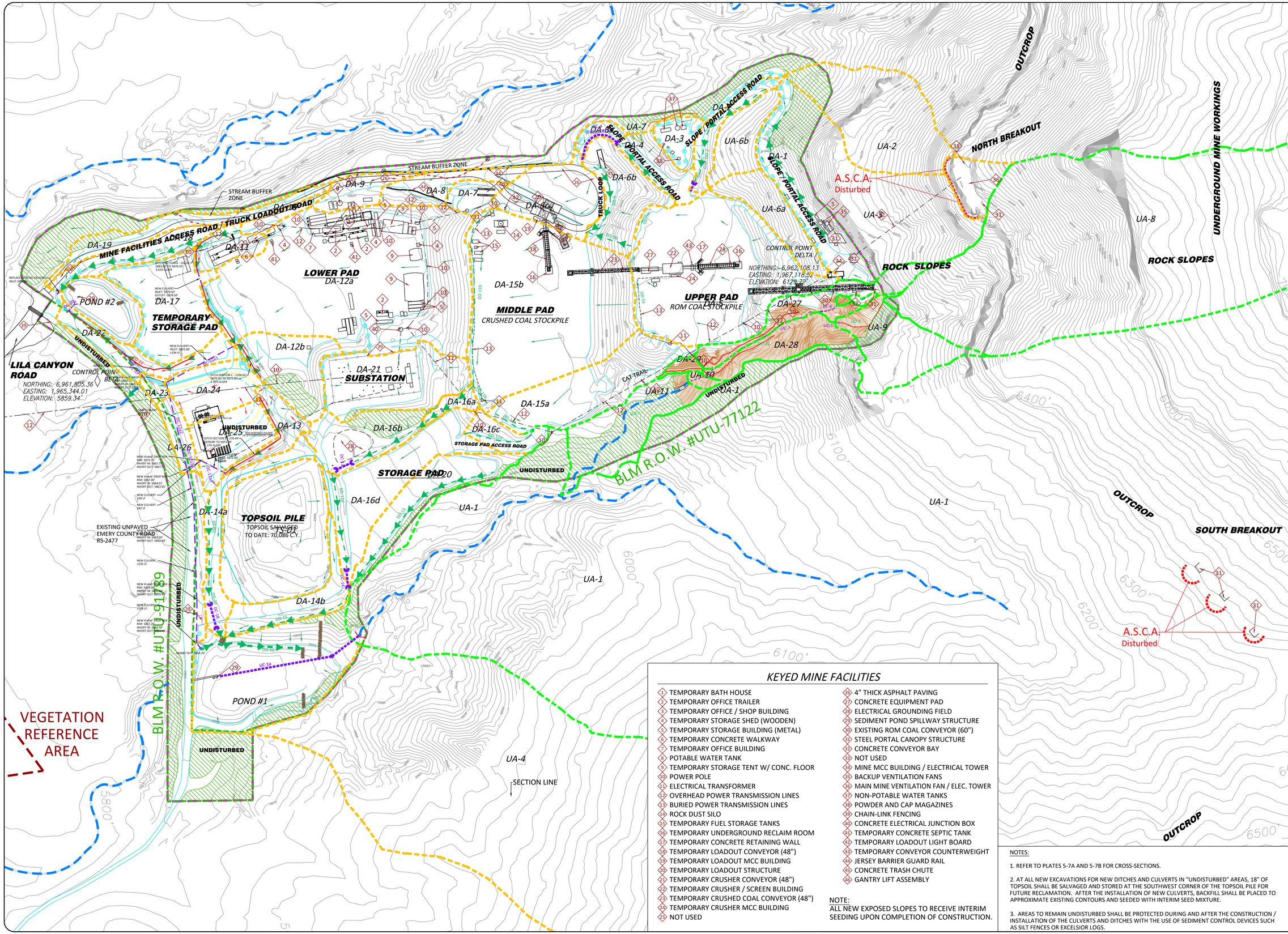
R 14 E, T 16 S

OFF-SITE FOOTPRINT:

1" = 2000'

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



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 CONVEYOR (48")
19. TEMPORARY LOADOUT MCC BUILDING
20. TEMPORARY LOADOUT STRUCTURE
21. TEMPORARY CRUSHER CONVEYOR (48")
22. TEMPORARY CRUSHER / SCREEN BUILDING
23. TEMPORARY CRUSHED COAL CONVEYOR (48")
24. TEMPORARY CRUSHER MCC BUILDING
25. NOT USED
26. 4" THICK ASPHALT PAVING
27. 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. NOT USED
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 COUNTERWEIGHT
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

PROPOSED SEDIMENT CONTROL

DATE:	DESIGNED BY:	PAGE #:
JUNE 1998	BLACKHAWK ENG.	7-5
SCALE: AS SHOWN		

NOTE:
CONTROL POINT COORDINATE SYSTEM IS U.S. STATE PLANE 1983 – UTAH CENTRAL (4302) ADJUSTED TO SEA LEVEL.

REVISION DATE:

DATE:	BY:	DATE:	BY:	DATE:	BY:	DATE:	BY:
OCT 1998	WJ	NOV 2003	RJM	JAN. 2012	PJJ	DEC. 2018	PJJ
JAN 1999	WJ	JAN 2005	RJM	NOV. 2013	PJJ	FEB. 2019	PJJ
MAR 2000	BHE	APR 2008	TJS	OCT. 2014	TJS		
SEP 2000	BHE	JUL 2008	TJS	DEC. 2015	TJS		
JAN 2001	BHE	JUN 2009	TJS	JUNE 2016	PJJ		
MAR 2001	BJ	JAN 2010	TJS	NOV. 2016	PJJ		
NOV 2002	RJM	Dec 2010	RJM	JUNE 2017	PJJ		

NOTE:
UNDISTURBED DENOTES DRAINAGE AND IS NOT APPLICABLE TO SOILS.

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:
Earthen Berm:
TEMPORARY ROADWAYS:
NEW CONTOURS (5' INTERVALS)
NEW CONTOURS (1' INTERVALS)
EXISTING CONTOURS (5' INTERVALS)
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