

October 9, 2018

C/015/0009
Received 10/17/2018
Task #5771

Permit Supervisor, Utah Coal Regulatory Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, UT 84114-5801

Re: Midterm Review Response, Fossil Rock Mine, Fossil Rock Resources, LLC, Canyon Fuel Company, LLC, Permit Number C/015/0009, Task#5599

Dear Sirs:

Please find attached a response to deficiencies regarding the midterm review for the Fossil Rock Mine. The information provided includes proposed changes to the MRP as well as a copy of the letter giving notice of temporary cessation. The original signed letter is currently being sent to the Division.

Due to the temporary cessation of operations an as-built amendment will be turned in within 6 months of the Division being notified of this status (Fossil Rock MRP Vo.4, Section 200, Page 4). As requested by Division personnel, efforts will be made to protect the newly placed soil at the WRS fall of 2018. Further details regarding soil salvage and soil pile protection have been added in the attached amended pages of the MRP.

In addition to this response documents associated with updating the bond and the Reclamation Agreement are in process.

The pagination, redline/strikeout text, and the table of contents will be updated when changes to the MRP are approved and clean copies are sent to the Division.

If you have questions or need additional information, please contact Bryant Bunnell at (435) 286-4490.

Regards,



Bryant Bunnell
Environmental Engineer
CANYON FUEL COMPANY, Fossil Rock Mine

Encl.

cc: DOGM Correspondence File

Fossil Rock Mine
Temporary Cessation Notice



Canyon Fuel
Company, LLC

A Subsidiary of Wolverine Fuels, LLC

Fossil Rock Mine

October 15, 2018

Permit Supervisor, Utah Coal Regulatory Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, UT 84114-5801

Re: Declaration of Cessation at the Fossil Rock Waste Rock Site, Fossil Rock Mine, Fossil Rock Resources, LLC, Canyon Fuel Company, LLC, Permit Number C/015/0009

Dear Sirs,

Mining activities have ceased for the foreseeable future at the Fossil Rock Waste Rock Site. We request that the Fossil Rock Mine and Waste Rock Site are given cessation status for the time being.

If you have questions or need additional information, please contact Bryant Bunnell at (435) 286-4490.

Sincerely,

A handwritten signature in blue ink that reads "Corey Heaps".

Corey Heaps
Vice President of Operations
Wolverine Fuels
9815 South Monroe Street
Suite 203
Sandy, Utah 84070

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: Canyon Fuel Company, LLC

Mine: Fossil Rock Mine, Fossil Rock Resources, LLC.

Permit Number: C/015/0009

Title: Midterm Review Response

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

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- Yes No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
- Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does the 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? NOV # _____
- 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 the 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 calculation?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided?
- Yes No 22. Does the 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?

Please attach one (1) review copy of the application.

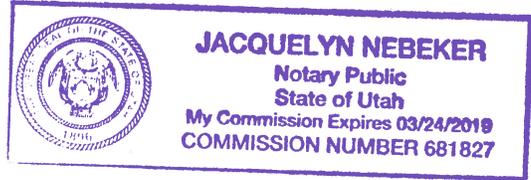
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Jacob O. Smith
Print Name

Jacob O. Smith, Engc. Mgr., 10/16/18
Sign Name, Position, Date

Subscribed and sworn to before me this 16 day of October, 2018

Jacquelyn Nebeker
Notary Public
My commission Expires: _____, 20____ }
Attest: State of _____ } ss:
County of _____



For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining
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Fossil Rock Resources, LLC
M&RP
VOLUME 4 (Waste Rock Site)

Chapter 2

FOSSIL ROCK MINE

FOSSIL ROCK RESOURCES, LLC

CHAPTER 2
SOILS

Within six months of the completion of the mining of the pile an as-built drawing and salvaged soil quantities will be incorporated into the permit. Section R645-301-526 has a description of the planned process for re-mining the waste rock pile.

Re-mining 2016-2018

Re-mining operations at the WRS officially concluded fall of 2018 for an indefinite period of time. A notice of temporary cessation for the Fossil Rock Minesite and Waste Rock Site was sent to the Division October of 2018. As indicated in this permit an as-built drawing and salvaged soil quantities will be submitted to the Division within 6 months. With the permission and oversight from Division personnel all salvaged soil was considered as subsoil. A soils specialist from the Division visited the site in May of 2017 and approved this action. The salvaged subsoil was placed on the existing subsoil pile on the east side of the site. Soil pile protection methods and interim reclamation will commence fall of 2018 per specifications given in Section 341.200 of this permit. An overview and detailed report of this action will be included in the required as-built information.

R645-301-234 Topsoil Storage

Construction of the Waste Rock Storage Facility commenced as soon as the permit was issued. Sediment control measures were put in place to minimize the effects of the initial construction. Straw bales and silt fences were erected in the natural drainages to treat any runoff during the initial construction period. Interim revegetation was used on the bare slopes of the soil stockpiles and along the roadway to stabilize and prevent erosion. The topsoil stockpiles have been marked as such. Drainage structures have been constructed and will be maintained to ensure that they are in good repair and capable of handling the design flow rates. Silt fences have been constructed at the base of the soil stockpiles outside slopes. These silt fences will also be monitored and repaired as needed to ensure they are in good working order.

R645-301-240 Reclamation Plan

Construction of the refuse pile will incorporate a plan to allow contemporaneous reclamation of the outside slopes of the pile. Refuse material will be used to construct a berm, approximately 10 feet high, to contain the waste material to be deposited.

Prior to contemporaneously reclaiming the slopes, quality sampling shall be conducted as outlined in R645-536 Coal Mine Wastes. Prior to covering the top surface of the waste pile, quality sampling shall be conducted as outlined in R645-541 Reclamation Plan. These sampling procedures shall be conducted to identify any acid-forming and/or toxic-forming materials within the top four (4) feet of the proposed reclaimed surface. The top four (4) feet consists of 1 foot of waste material and 3 feet of soil cover.

R645-301-242 Soil Redistribution

As reclamation commences of the waste pile slopes, 24 inches of subsoil and 12 inches of topsoil will be placed on the outside slope of the berm and revegetation of the slope. Successive berms will

be constructed on top of the previous berms as the level of the waste material rises. There will be a two to three foot offset of the toe of the upper berm to provide a small terrace to reduce runoff velocities. (See Exhibit XXI in Exhibits Section) Once the waste pile construction is complete, the top surface of the pile will be graded for proper drainage and covered with subsoil and topsoil (24 and 12 inches, respectively), then revegetated.

When the final berm is constructed, contemporaneous reclamation will be conducted as explained above on the outside slope. The outside slope will be revegetated with the approved seed mix as outlined in R645-301-341.200.

The remaining subsoil will be stored at the north side of the waste rock pile (refer to Plate 4-7) and seeded. The original subsoil storage will then be covered with approximately 1' of topsoil, pocked and seeded. The remaining topsoil will then be relocated next to the subsoil pile on the north end of the site as shown on Plate 4-7. The original topsoil storage will be pocked and seeded for final reclamation.

The access road to the waste rock pile will be re-routed for a north access to an east access from the pond access road. At this time, the two year time clock (as required by R645-301-763.100 of the Utah Coal Regulations) for sediment pond removal will commence as the remaining waste rock site is filled to the top level of the berm.

When the waste rock pile has been filled to capacity, the subsoil and topsoil stored at the north side of the waste rock pile shall be used to cover the top surface of the pile. The volumes of these piles are 5,050 cubic for subsoil, and 2,525 cubic yards for topsoil. This volume will cover the top of the pile with two feet of subsoil and one foot of topsoil. Pocks will be constructed as a means for alternative sediment control for this area. This surface shall be seeded utilizing the seed mix found in R645-301-341.200.

At the end of the two year time clock (mentioned above), the sediment pond and remaining access roads shall be removed to the lines and grades as shown on Plates 4-8 and 4-10. The areas will be pocked and seeded according to the plan in R645-301-700 and R645-301-300. Topsoil stored along the main access road shall be used to cover this regraded area.

R645-301-243 Soil Nutrients and Amendments

The procedure for seed bed preparation for all reclaimed slopes of the Waste Rock Storage Facility site is given in R645-301-300 Biology. All reclaimed areas have been or will be fertilized, mulched and seeded to establish a successful vegetative cover.

Additional nutrients may be needed to improve the physical, chemical, and water holding capacity of the soils. Determining nutritional requirements of the replaced soils shall require sampling of the topsoil material. Sampling shall occur prior to roughening of the surface. Analytical methods for nutrient characterization shall follow the parameters and recommended methods as outlined in Table 3 of the Division's *Guidelines for Management of Topsoil and Overburden (Jan. 2008)*. Soil

nutrient application rates shall follow the laboratory recommendations or the stated application rates outlined in R645-301-341.200 Description of Seeding Methods. Samples shall be collected at a rate of two samples per acre to a depth of 1 foot.

R645-301-244 Soil Stabilization

Various sized rocks and boulders (litter) will be randomly placed on slopes of reclaimed areas to control slope slippage, promote microhabitats, and provide a natural aesthetic appearance. Where it is deemed necessary, especially on slopes greater than 20%, a soil tackifier (refer to R645-301-300: Biology, Seeding Techniques) will be used during the reclamation process to stabilize soil material.

Rills and gullies which develop in areas that have been regraded and topsoiled and which either; 1) disrupt the approved post mining land use or the reestablishment of the vegetative cover, or 2) cause or contribute to the violation of water quality standards for receiving streams will be filled, regraded, or otherwise stabilized.

R645-301-250 Performance Standards

Topsoil and subsoil will be removed, maintained and redistributed according to the plan given under R645-301-230 and R645-301-240.

Stockpiled topsoil and subsoil will be located, maintained and redistributed according to plans given under R645-301-230 and R645-301-240.

FOSSIL ROCK RESOURCES, LLC
M&RP

Chapter 3

It should be noted that during a spoils survey, it was pointed out that there was no evidence of toxic materials at this mine site (Mr. George Cook, SCS). Prior to reclamation, all spoil material will be re-sampled in a comprehensive random method and retested in accordance to UDOGM guidelines for acid and/or toxic forming potential. Sampling will be conducted per Appendix 8-3 9-1, Attachment C.

Sediment pond waste is removed from the site and disposed of in the Cottonwood/Wilberg Waste Rock Site in accordance with the Division's "Sediment Pond Clean out Procedural Guidelines". The Division will be notified and procedures will be approved prior to the start of pond cleaning activities. Previous analyses of this material have shown it to be non-toxic and non-acid forming. The sediment material will be sampled and tested according to Division "Title V Coal, Program Policy for Disposal of Sediment Pond Waste".

Underground development waste is kept underground as allowed by MSHA regulations. In the event this material must be brought out of the mine, it will be hauled to the Cottonwood/Wilberg Waste Rock Site and disposed of in an approved manner.

There are no coal washing facilities at this mine site; therefore, there are no refuse or other permanent waste piles located at the Mine. The waste rock temporary storage area is shown on Plate 3-1.

3.5 RECLAMATION PLAN

Reclamation of the Mine site will be accomplished in an efficient and environmentally sound manner. This section addresses the reclamation plans for the site. Seven areas are addressed: contemporaneous reclamation, soil removal and storage, final abandonment, backfilling and grading, revegetation, reclamation schedule, and reclamation cost estimate.

Melilotus officinalis--Yellow Sweetclover-- This species is an introduced forb that establishes readily on severe disturbed sites. It is also a nitrogen fixing plant that has high affinity for salt tolerance.

No shrub or tree species are included in the seed mix for contemporaneous reclamation.

SEEDING METHODS - Slopes less than 20% will be drill seeded, or seeded by hydro seeder or hand broadcast methods. Slopes greater than 20 % will be seeded by hydro seeder or hand broadcasting.

MULCH - Hydro seeded areas will be sprayed with a wood fiber mulch. Since this is temporary reclamation the application of mulch will be optional on areas of drill seeding or seeded by hand broadcasting.

FERTILIZATION - Contemporaneous reclaimed areas will be visually checked on a yearly basis to determine success. Qualitative observations of interim or contemporaneous revegetation will be submitted in the annual report. An appropriate fertilizer will be applied if it appears necessary to increase plant vigor or to obtain the desired cover.

FUTURE CONTEMPORANEOUS RECLAMATION - If additional areas are disturbed or, if current disturbed areas become idle, contemporaneous reclamation procedures (as described above) will be implemented pursuant to R645-301-352.

*Note: seeding rates of species will be in equal proportions totaling 52 PLS per square foot, with not more than 20 PLS per square foot of any one species.

sections will also be removed, and the remaining disturbed area will be reseeded. Additional sediment controls, such as straw bales, silt fences, berms, etc., will be placed as needed to ensure protection for the stream during this final phase of reclamation (Phase II).

3.5.4 Backfilling and Grading Plan

The surface of this area was originally disturbed in the 1940's by a previous owner. The surface is all privately owned. Since no major effort was made at that time to save or store any topsoil or other material, restoration to approximately original contour is highly impractical. However, it is the intent of the permittee is to restore the area to a topography acceptable to the Division and compatible with the post-mining land use, using such materials that are available at the site.

In general, the backfilling and regrading will proceed as follows:

- a) After sealing of the portals and removal of all structures, a backhoe will be brought to the upper (portal road) terrace.
- b) The backhoe will begin by reaching down over the fill bank and retrieving as much material as can be reached. This material will be placed on the terrace.
- c) A Cat will work with the backhoe where possible, taking the retrieved material and spreading and compacting it from the cut outward to reach a configuration as shown on Plate 3-5, Post-Mining Topography.
- d) The mine yard will then be re-sloped to drain as shown. A rock-lined natural drainage will be restored in the main and side channels as previously described.
- e) The reclaimed area will be left in a roughened condition by placement of material with the backhoe and subsequent ripping and/or tracking with the dozer. **One ton per acre of noxious weed free straw will be incorporated into the soil during surface roughening.** This will promote moisture retention on the site to enhance vegetation.

- f) Available topsoil, from the storage pile, will be redistributed to a depth of 6", starting at the north end of the storage area, and continuing down as far as material is available.
- g) Upon final shaping and preparation of an area, it will be reseeded as per the plan.
- h) Soil sampling of the regraded surface will be conducted as per the program described in Appendix 8-3 9-4, Attachment C.

3.5.4.1 Contouring

Plate 3-5 shows the post mining contours of the Mine. Upon abandonment, the post mining land use will not require extensive backfilling or returning the land to the original contours, however, all areas which are compacted through the reclamation activities or during mining will be "deep-ripped" utilizing a dozer ripper to a depth of 12" to 24" prior to seeding.

The drainage channels will be graded to reestablish the streams, following removal of the bypass culverts. Attempts will be made to restore the channels to the pre-mining slopes and conditions.

3.5.4.2 Removal or Reduction of Highwalls

Highwalls will be reclaimed as is practicable for the site and for the post mining land use. A static factor of a least 1.3 will be developed in the reclaimed highwall.

It should be noted that highwalls, by definition, are only those cut areas associated with portals. Other cut areas exist on this site; however, these are

3.5.5.1 Soil Preparation

With special handling, the disturbed land fill should provide a suitable seed bed for revegetation. Soil sampling will be conducted per Appendix 8-3 9-4, Attachment C. Special handling will include removal of contaminated material and large coarse rock fragments (greater than 18 inches). The large rock fragments will be used as rip-rap in channel restoration, buried with the fill, or randomly placed on the reclaimed surface. The mine coal pad areas will be removed and all coal/refuse associated with the pads will be hauled to the Cottonwood Waste Rock Site for disposal.

Contaminated soil material which contains greater than 50 percent coal fines, will be disposed of at the Cottonwood Waste Rock Site. Soil contaminated with oil and grease will be disposed of at an approved site. This will be determined by visual inspection, and any material with visible oil or grease contamination will be removed. The volume of such material cannot be accurately estimated; however, it will likely be less than two percent of total volume. Material with less than 50 percent coal fines will be buried against the cut banks and covered with a minimum of four feet of incombustible material. There are no acid-or toxic-forming materials known to exist at this site. Any of these materials discovered will be disposed of on-site and covered with 4' of material or removed to the Cottonwood Waste Rock Site. Salt contamination may also be a problem in soils used for reclamation.

If visible salty areas or analyzed salty areas are found, the soils will be buried along the cut banks or other available sites to a minimum depth of 48".

Non-coal waste will be separated from the soils, loaded into trucks and hauled to an approved landfill for final disposal. All pad areas will be ripped for 12 to 24

inches to loosen the fill profile using the rippers on the dozer, and pulverized if a cloddy surface exists. Once backfilled and graded, the surface will be scarified with the teeth on the backhoe, or using the tracks of the dozer to create "pockets" for water retention and root penetration. Soil samples will be taken to identify the need for replenishment of various soil nutrients, as described in Appendix 8-3 9-1, Attachment C.

3.5.5.2 Seeding and Transplanting

Information from the soil revegetation test plots has been utilized together with proven reclamation results in order to arrive at the best treatment and seeding methods. After regrading and top soiling, the disturbed area will be mulched, fertilized and seeded. The steeper areas (slopes greater than 2.5:1) will be hydroseeded, and areas flat enough to safely allow operation of a drill seeder will be drill seeded. Regraded areas will not be smooth, but will have numerous depressions that will hold moisture and provide a micro-climate for vegetation establishment.

Riparian Community - During reclamation, the culverts will be removed, and the stream channels will be restored. The main channel will be rip-rapped with a 1.4 foot median rock size at least 4 feet above the stream. The flatter, reclaimed area is expected to be 60-70 feet west of the stream bank, and 20-40 feet east to where the public road will remain. Most of this area will consist of a slope of 5-10 degrees; therefore, drill-seeding will be used.

The riparian seed mix (see Table A9-3, Appendix 9-1) will be used approximately 20-40 feet on each side of the rip-rap, leaving a total floodplain area of 50-60 feet.

Grassland - Shrub Community - The seed mix for the grassland - shrub community will be used on the entire mine site, with the exception of the riparian

APPENDIX 1 - RECLAMATION BOND

Direct Costs

Subtotal Demolition and Removal	\$393,872.49
Subtotal Demolition and Removal - WRDS	\$10,885.16
Subtotal Backfilling and Grading	\$114,170.57
Subtotal Backfilling and Grading - WRDS	\$180,218.10
Subtotal Revegetation	\$91,033.80
Subtotal Revegetation - WRDS	\$131,262.69
Subtotal Direct Costs	\$921,442.81

Indirect Costs

Mob/Demob	\$92,144.28	10.0%
Contingency	\$46,072.14	5.0%
Engineering Redesign	\$23,036.07	2.5%
Main Office Expense	\$62,658.11	6.8%
Project Mainagement Fee	\$23,036.07	2.5%
Subtotal Indirect Costs	\$246,946.67	26.8%

Total Cost **\$1,168,389.48**

Number of years		5
Escalation for 2017		0
Escalation Dollars	\$0.00	

Reclamation Cost Escalated (2021 Dollars) **\$1,168,389.48**
Bond Amount (rounded to nearest \$1,000) (2021 Dollars) **\$1,168,000.00**

Posted Bond 8/21/2018	\$1,168,000.00
Difference Between Cost Estimate and Bond	\$0.00
Percent Over Bonded or (Under Bonded)	0.00%

Description	Means Reference Number (2017 Heavy Construction Cost Data)	01 - Substation, Powerline, & Poles				Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
		Equipment	Labor									
Steel Demolition Cost												
	01 54 33 20 0300	Excavator - 2.0 CY			1		15				\$ 140.38	\$ 561.52
	01 54 33 20 0342	Bucket Thumb			1			4.0 hr			\$ 21.75	\$ 87.00
		Equipment Operator, Medium Equipment			1			4.0 hr			\$ 81.00	\$ 324.00
		Foreman Average, Outside			1			4.0 hr			\$ 82.25	\$ 329.00
		Common Building Labor			2			4.0 hr			\$ 60.00	\$ 480.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose			1			4.0 hr			\$ 21.30	\$ 85.20
Concrete Demolition Cost (Ref. 2.3)												
	01 54 33 20 0300	Excavator - 2.0 CY			1	98.8					\$ 140.38	\$ 280.76
		Hydraulic Hammer			1			2.0 hr			\$ 47.03	\$ 94.06
		Equipment Operator, Medium Equipment			1			2.0 hr			\$ 81.00	\$ 162.00
		Foreman Average, Outside			1			2.0 hr			\$ 82.25	\$ 164.50
		Common Building Labor			2			2.0 hr			\$ 60.00	\$ 240.00
	01 54 33 40 0700	Compressor - 600 CFM			1			2.0 hr			\$ 61.00	\$ 122.00
	01 54 33 40 0830	Air tools, breaker, pavement, 60 lb.			1			ea			\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia			1			ea			\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose			1			2.0 hr			\$ 21.30	\$ 42.60
Transportation Costs												
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY			1						\$ 80.33	\$ 321.32
		Truck Driver, Heavy			1						\$ 68.70	\$ 274.80
Miscellaneous												
		Disposal Fee - Metal					15					
	02 41 19 18 0200	12 tons = 8 CY							ton			
		Demolished Concrete Handling (Ref. 6)							cy		\$ 14.00	\$ 140.00
	01 54 33 20 4810	Loader - 8 CY			1	128.44					\$ 245.88	\$ 491.76
		Equipment Operator, Medium Equipment			1			2.0 hr			\$ 81.00	\$ 162.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4			1			6.0 hr			\$ 12.00	\$ 72.00
	01 54 33 40 6410	Toilet, portable chemical			1			6.0 hr			\$ 1.76	\$ 10.56
Total											\$	4,458.33

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 01)
(Concrete Ref - 01)

Description		Mains Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost											
	01 54 33 20 0300		Excavator - 2.0 CY		1		30	16.0	hr	\$ 140.38	\$ 2,246.08
	01 54 33 20 0342		Bucket Thumb		1			16.0	hr	\$ 21.75	\$ 348.00
			Foreman Average, Outside	Foreman				16.0	hr	\$ 82.25	\$ 1,316.00
			Common Building Labor	CLAB	3			16.0	hr	\$ 60.00	\$ 2,880.00
			Equipment Operator, Medium Equipment	Eqmd	1			16.0	hr	\$ 81.00	\$ 1,296.00
	01 54 33 40 6360		Torch, cutting, acetylene-oxygen 150' hose		1			16.0	hr	\$ 21.30	\$ 340.80
Concrete Demolition Cost											
	01 54 33 20 0300		Excavator - 2.0 CY		1	265		10.0	hr	\$ 140.38	\$ 1,403.80
			Foreman Average, Outside	Foreman				10.0	hr	\$ 82.25	\$ 822.50
			Common Building Labor	CLAB	2			10.0	hr	\$ 60.00	\$ 1,200.00
			Equipment Operator, Medium Equipment	Eqmd	1			10.0	hr	\$ 81.00	\$ 810.00
	01 54 33 20 0347		Hydraulic Hammer		1			10.0	hr	\$ 47.03	\$ 470.30
	01 54 33 20 0342		Bucket Thumb		1			10.0	hr	\$ 21.75	\$ 217.50
			Equipment Operator, Medium Equipment	Eqmd	1			10.0	hr	\$ 81.00	\$ 810.00
	01 54 33 40 0700		Compressor - 600 CFM		1			10.0	hr	\$ 10.20	\$ 10.20
	01 54 33 40 0930		Air tools, breaker, pavement, 60 lb.		1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 1100		Hose w/couplings 50 ft., 1" dia		4			ea		\$ 16.40	\$ 65.60
	01 54 33 40 6360		Torch, cutting, acetylene-oxygen 150' hose		1			10.0	hr	\$ 21.30	\$ 213.00
Transportation Costs (Ref. 5)											
	01 54 33 20 5300		Dump Truck - 3 axle, 12 CY		2			16.0	hr	\$ 80.33	\$ 2,570.56
			Truck Driver, Heavy	Driv	2			16.0	hr	\$ 68.70	\$ 2,198.40
Miscellaneous											
			Disposal Fee - Metal				30		ton		
	02 41 19 18 200		12 bins = 8 CY			20.0			cy	\$ 14.00	\$ 280.00
Demolished Concrete Handling (Ref. 3)											
	01 54 33 20 4810		Loader - 8 CY		1	336.7		4.0	hr	\$ 245.88	\$ 883.52
			Equipment Operator, Medium Equipment	Eqmd	1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 7200		Pickup Truck - 3/4 ton 4x4		1			16.0	hr	\$ 12.00	\$ 192.00
	01 54 33 40 6410		Toilet, portable chemical		1			16.0	hr	\$ 1.76	\$ 28.16
Total										\$	\$ 21,687.22

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 02)
(Concrete Ref - 02)

Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
03 - Water Treatment Plant, Water Storage Tanks and Fuel Storage Facility										
Steel Demolition Cost										
Water Treatment Plant, Tanks, Fuel	01 54 33 20 0300	Aerial Lift, 60 feet		1		10	4.0	hr	\$ 140.38	\$ 561.52
	01 54 33 60 2500	Crane - 25 ton		1			4.0	hr	\$ 84.23	\$ 336.92
		Equipment Operator, Crane or Shovel	Echv	1			4.0	hr	\$ 84.25	\$ 337.00
	01 54 33 20 0300	Excavator - 2.0 CY		1			4.0	hr	\$ 140.38	\$ 561.52
	01 54 33 20 0342	Bucket Thumb		1			4.0	hr	\$ 21.75	\$ 87.00
		Equipment Operator, Medium Equipment	Eqcmd	1			4.0	hr	\$ 81.00	\$ 324.00
		Foreman Average, Outside	Foreman	1			4.0	hr	\$ 82.25	\$ 329.00
		Common Building Labor	CLAB	2			4.0	hr	\$ 60.00	\$ 480.00
	01 54 33 40 5360	Torch, cutting, acetylene-oxygen, 150' hose		1			4.0	hr	\$ 21.30	\$ 86.20
		(Refer to Sheet 05 - Concrete Pads)								
Concrete Demolition Cost										
Transportation Costs (Ref. 5)	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			2.0	hr	\$ 80.33	\$ 160.66
		Truck Driver, Heavy	Drhv	2			2.0	hr	\$ 68.70	\$ 274.80
	01 54 33 40 7300	Tractor, 4x2, 220hp		1			4.0	hr	\$ 44.78	\$ 179.12
	01 54 33 40 6500	Trailer, platform, flush deck, 2 axle, 25 ton		1			4.0	hr	\$ 15.12	\$ 60.48
		Disposal Fee - Metal						ton		
	02 41 19 18 0200	12 tons = 8 CY			6.84			cy	\$ 14.00	\$ 92.96
	01 54 33 20 4810	Loader - 8 CY		1			4.0	hr	\$ 245.88	\$ 983.52
		Equipment Operator, Medium Equipment	Eqcmd	1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton, 4x4		1			4.0	hr	\$ 12.00	\$ 48.00
	01 54 33 40 5410	Toilet, portable chemical		1			4.0	hr	\$ 1.76	\$ 7.04
Total										\$ 5,232.74

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 03)
(Concrete Ref - 05)

04 - Sewer Collection and Pumping System										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
	01 54 33 60 2500	Crane - 25 ton		1		15	4.0	hr	\$ 84.23	\$ 336.92
		Equipment Operator, Crane or Shovel	Echv	1			4.0	hr	\$ 84.25	\$ 337.00
		Foreman Average, Outside	Foreman	1			4.0	hr	\$ 82.25	\$ 329.00
		Common Building Labor	CLAB	2			4.0	hr	\$ 60.00	\$ 480.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150 hose		1			4.0	hr	\$ 21.30	\$ 85.20
Concrete Demolition Cost (Ref. 2, 3)										
	01 54 33 20 0300	Excavator - 2.0 CY		1	30.4		2.0	hr	\$ 140.38	\$ 280.76
	01 54 33 20 0347	Hydraulic Hammer		1			2.0	hr	\$ 47.03	\$ 94.06
		Equipment Operator, Medium Equipment	Ecmd	1			2.0	hr	\$ 81.00	\$ 162.00
		Foreman Average, Outside	Foreman	1			2.0	hr	\$ 82.25	\$ 164.50
		Common Building Labor	CLAB	2			2.0	hr	\$ 60.00	\$ 240.00
	01 54 33 40 0700	Compressor - 600 CFM		1			2.0	hr	\$ 61.00	\$ 122.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb.		1			lea		\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia		1			lea		\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150 hose		1			2.0	hr	\$ 21.30	\$ 21.30
Transportation Costs (Ref. 5)										
	01 54 33 40 6500	Dump Truck - 3 axle, 12 CY		1			4.0	hr	\$ 80.33	\$ 321.32
		Truck Driver, Heavy	Drv	1			4.0	hr	\$ 68.70	\$ 274.80
Miscellaneous										
	02 41 19 16 0200	12 tons = 8 YD		1	39.52			ton		
	01 54 33 20 4810	Loader - 8 CY		1			4.0	hr	\$ 245.88	\$ 983.52
		Equipment Operator, Medium Equipment	Ecmd	1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			6.0	hr	\$ 12.00	\$ 72.00
	01 54 33 40 6410	Toilet, portable chemical		1			6.0	hr	\$ 1.76	\$ 10.56
Total										\$ 4,653.24

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition on production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 04)
(Concrete Ref - 04)

05 - Miscellaneous Concrete										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Miscellaneous Concrete										
Steel Demolition Cost:										
Concrete Demolition Cost (Ref. 2.3)					598.3					
	01 54 33 20 0300	Excavator - 2.0 CY		1			40.0	hr	\$ 140.38	\$ 5,615.20
	01 54 33 20 0342	Bucket Thumb		1			40.0	hr	\$ 21.75	\$ 870.00
		Equipment Operator, Medium Equipment	Eqmd	1			40.0	hr	\$ 81.00	\$ 3,240.00
		Foreman Average, Outside	Foreman	1			40.0	hr	\$ 82.25	\$ 3,290.00
		Common Building Labor	CLAB	1			40.0	hr	\$ 60.00	\$ 2,400.00
	01 54 33 40 0700	Compressor - 600 CFM		1			40.0	hr	\$ 61.00	\$ 2,440.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb.		1			ea		\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia		1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			40.0	hr	\$ 21.30	\$ 852.00
Transportation Costs (Ref. 5)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			40.0	hr	\$ 80.33	\$ 3,213.20
		Truck Driver, Heavy	Drhv	1			40.0	hr	\$ 68.70	\$ 2,748.00
Miscellaneous										
		Disposal Fee - Metal						ton		
	02 41 19 18 0200				775.19	0				
		Demolished Concrete Handling (Ref 6)								
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			40.0	hr	\$ 12.00	\$ 480.00
	01 54 33 40 6410	Toilet, portable chemical		1			40.0	hr	\$ 1.76	\$ 70.40
Total										\$ 25,233.10

Reference Information

- Concrete rubble disposed of as fill or permanently backfilled inside portals
- Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- For haul of steel demolition material to Nilsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet

06 - Pumphouse, Tanks, and Concrete Pads										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
Concrete Pads	01 54 33 40 0190	Aerial Lift, 60 feet.		1		55	40	hr	\$ 60.71	\$ 2,428.40
	01 54 33 60 2500	Crane - 25 ton		1			40	hr	\$ 84.23	\$ 3,369.20
		Equipment Operator, Crane or Shovel		1			40	hr	\$ 84.25	\$ 3,370.00
	01 54 33 20 0300	Excavator - 2.0 CY		1			4	hr	\$ 140.38	\$ 561.52
	01 54 33 20 0342	Bucket Thumb		1			4	hr	\$ 21.75	\$ 87.00
		Equipment Operator, Medium Equipment		1			4	hr	\$ 81.00	\$ 324.00
		Foreman Average, Outside		1			40	hr	\$ 82.25	\$ 3,290.00
	01 54 33 40 6360	Common Building Labor		3			40	hr	\$ 60.00	\$ 7,200.00
		Torch, cutting, acetylene-oxygen 150' hose		1			40	hr	\$ 21.30	\$ 852.00
Concrete Demolition Cost (Ref. 2.3)										
	01 54 33 20 0300	Excavator - 2.0 CY		1	151.3		8.0	hr	\$ 140.38	\$ 1,123.04
	01 54 33 20 0347	Hydraulic Hammer		1			8.0	hr	\$ 47.03	\$ 376.24
		Equipment Operator, Medium Equipment		1			8.0	hr	\$ 81.00	\$ 648.00
		Foreman Average, Outside		1			8.0	hr	\$ 82.25	\$ 658.00
		Common Building Labor		2			8.0	hr	\$ 60.00	\$ 960.00
	01 54 33 40 0700	Compressor - 600 CFM		1			8.0	hr	\$ 61.00	\$ 488.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb		1			10.20	ea	\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft, 1" dia		1			4.10	ea	\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			8.0	hr	\$ 21.30	\$ 170.40
Transportation Costs (Ref. 5)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			6.0	hr	\$ 80.33	\$ 481.98
		Truck Driver, Heavy		2			15.0	hr	\$ 68.70	\$ 2,081.00
	01 54 33 40 7300	Tractor, 4x2, 220hp		1			24.0	hr	\$ 44.78	\$ 1,074.72
	01 54 33 40 6500	Trailer, platform, flush deck, 2 axle, 25 ton		1			24.0	hr	\$ 15.12	\$ 362.88
Miscellaneous										
	02 41 19 18 0200	Disposal Fee - Metal		36.67		55		ton	\$ 14.00	\$ 513.38
Demolished Concrete Handling (ref. 6)										
	01 54 33 20 4810	Loader - 8 CY		1	195.69		6.0	hr	\$ 245.88	\$ 1,475.28
		Equipment Operator, Medium Equipment		1			6.0	hr	\$ 81.00	\$ 486.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton, 4x4		1			40.0	hr	\$ 12.00	\$ 480.00
	01 54 33 40 6410	Toilet, portable chemical		1			40.0	hr	\$ 1.76	\$ 70.40
Total										\$ 32,925.74

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 06)
(Concrete Ref - 06)

07 - Non Coal Waste and Salt Bunkers										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
Waste and Salt Bunkers	01 54 33 60 2500	Crane - 25 ton		1		30	2.0	hr	\$ 84.23	\$ 84.23
	01 54 33 20 0347	Equipment Operator, Crane or Shovel	Eqm	1			2.0	hr	\$ 84.25	\$ 84.25
	01 54 33 40 6360	Foreman Average, Outside	Foreman	1			2.0	hr	\$ 82.25	\$ 82.25
	01 54 33 40 6360	Common Building Labor	CLAB	2			2.0	hr	\$ 60.00	\$ 120.00
	01 54 33 20 0300	Torch, cutting, acetylene-oxygen 150" hose		1			2.0	hr	\$ 21.30	\$ 21.30
Concrete Demolition Cost (Ref. 2.3)										
	01 54 33 20 0300	Excavator - 2.0 CY		1	19.7		2.0	hr	\$ 140.38	\$ 140.38
	01 54 33 20 0347	Hydraulic Hammer		1			2.0	hr	\$ 47.03	\$ 47.03
	01 54 33 40 6360	Foreman Average, Outside	Eqm	1			2.0	hr	\$ 81.00	\$ 81.00
	01 54 33 40 6360	Common Building Labor	Foreman	1			2.0	hr	\$ 82.25	\$ 82.25
	01 54 33 40 0700	Compressor - 600 CFM	CLAB	2			2.0	hr	\$ 60.00	\$ 120.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb		1			2.0	hr	\$ 61.00	\$ 61.00
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia		1			ea	ea	\$ 10.20	\$ 10.20
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150" hose		1			ea	ea	\$ 4.10	\$ 4.10
Transportation Costs (Ref. 5)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			4.0	hr	\$ 80.33	\$ 80.33
	02 41 19 18 0200	Truck Driver, Heavy	Drmv	1			4.0	hr	\$ 68.70	\$ 68.70
Miscellaneous										
	02 41 19 18 0200	12 ton = 8 CY		20		30		ton	\$ 14.00	\$ 280.00
Demolished Concrete Handling (Ref. 6)										
	01 54 33 20 4810	Loader - 5 CY		1	21.71		2.0	hr	\$ 245.88	\$ 245.88
	01 54 33 40 7200	Equipment Operator, Medium Equipment	Eqm	1			2.0	hr	\$ 81.00	\$ 81.00
	01 54 33 40 6410	Pickup Truck - 3/4 ton, 4x4		1			2.0	hr	\$ 12.00	\$ 12.00
	01 54 33 40 6410	Toilet, portable chemical		1			2.0	hr	\$ 1.76	\$ 1.76
Total										\$ 3,487.68

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 07)
(Concrete Ref - 07)

Description		Means Reference Number (2017 Heavy Construction Cost Data)		Equipment		Labor		Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost														
	01 54 33 60 2500			Crane - 25 ton				1		30	40.0	hr	\$ 84.23	\$ 3,369.20
				Equipment Operator, Crane or Shovel			Echv	1			40.0	hr	\$ 84.25	\$ 3,370.00
				Foreman Average, Outside			Foreman	1			40.0	hr	\$ 82.25	\$ 3,290.00
				Common Building Labor			CLAB	3			40.0	hr	\$ 60.00	\$ 7,200.00
	01 54 33 40 6360			Torch, cutting, acetylene-oxygen 150' hose				2			40.0	hr	\$ 21.30	\$ 1,704.00
Concrete Demolition Cost (Ref. 2.3)														
	01 54 33 20 0300			Excavator - 2.0 CY				1	22.8		4.0	hr	\$ 140.38	\$ 561.52
	01 54 33 20 0847			Hydraulic Hammer				1			4.0	hr	\$ 47.03	\$ 188.12
				Equipment Operator, Medium Equipment			Eqmd	1			4.0	hr	\$ 81.00	\$ 324.00
				Foreman Average, Outside			Foreman	1			4.0	hr	\$ 82.25	\$ 329.00
				Common Building Labor			CLAB	2			4.0	hr	\$ 60.00	\$ 480.00
	01 54 33 40 0700			Compressor - 600 CFM				1			4.0	hr	\$ 61.00	\$ 244.00
	01 54 33 40 0930			Air tools, breaker, pavement, 60 lb.				1			ea		\$ 10.20	\$ 10.20
	01 54 33 40 1100			Hose w/couplings 50 ft., 1" dia				1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 6360			Torch, cutting, acetylene-oxygen 150' hose				1			4.0	hr	\$ 21.30	\$ 85.20
Transportation Costs (Ref. 5)														
	01 54 33 40 6500			Dump Truck - 3 axle, 12 CY				1			8.0	hr	\$ 80.33	\$ 642.64
	01 54 33 40 7300			Tractor, 4x2, 220hp				1			8.0	hr	\$ 44.78	\$ 358.24
	01 54 33 40 6500			Trailer, platform, flush deck, 2 axle, 25 ton				1			16.0	hr	\$ 15.12	\$ 241.92
				Truck Driver, Heavy			Drvr	2			16.0	hr	\$ 68.70	\$ 2,188.40
Miscellaneous														
				Disposal Fee - Metal						30		ton	\$ 14.00	\$ 280.00
Demolished Concrete Handling (Ref. 6)														
	01 54 33 20 4810			Loader - 8 CY				1	29.64		4.0	hr	\$ 245.98	\$ 983.52
				Equipment Operator, Medium Equipment			Eqmd	1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 7200			Pickup Truck - 3/4 ton 4x4				1			40.0	hr	\$ 12.00	\$ 480.00
	01 54 33 40 6410			Toilet, portable chemical				1			40.0	hr	\$ 1.76	\$ 70.40
Total													\$	26,736.46

Reference information
 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
 (Steel Ref - 06)
 (Concrete Ref - 08)

Description Chutes and Trusses	Means Reference Number (2017 Heavy Construction Cost Data)	09 - Chutes and Trusses from Crusher		Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
		Equipment	Labor							
Steel Demolition Cost										
	01 54 33 60 2500	Crane - 25 ton		1		30	40.0	hr	\$ 84.23	\$ 3,369.20
		Equipment Operator, Crane or Shovel		1			40.0	hr	\$ 84.25	\$ 3,370.00
		Foreman - Average, Outside		1			40.0	hr	\$ 82.25	\$ 3,290.00
		Common Building Labor		3			40.0	hr	\$ 60.00	\$ 7,200.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		2			40.0	hr	\$ 21.30	\$ 1,704.00
Transportation Costs (Ref. 5)										
	01 54 33 40 7300	Tractor, 4x2, 220hp		1			16.0	hr	\$ 44.78	\$ 716.48
	01 54 33 40 6500	Trailer, platform, flush deck, 2 axle, 25 ton		1			16.0	hr	\$ 15.12	\$ 241.92
		Truck Driver - Heavy		2			16.0	hr	\$ 68.70	\$ 2,198.40
Miscellaneous										
	Disposal Fee - Metal 02 41 19 18 0200	12 ton = 8 CY				30		ton		
	01 54 33 20 4810	Loader - 8 CY		1		20	4.0	hr	\$ 14.00	\$ 280.00
		Equipment Operator, Medium Equipment		1			4.0	hr	\$ 245.68	\$ 983.52
	01 54 33 40 7200	Pickup Truck - 3/4 ton, 4x4		1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 6410	Toilet, portable chemical		1			40.0	hr	\$ 12.00	\$ 480.00
Total									\$ 1.78	\$ 24,227.92

Reference information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet (Steel Ref - 03)

10 - Mine Fan										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
	01 54 33 60 2500	Crane - 25 ton		1		30	40.0	hr	\$ 84.23	\$ 3,969.20
		Equipment Operator, Crane or Shovel	Echv	1			40.0	hr	\$ 84.25	\$ 3,970.00
		Foreman Average, Outside	Foreman	1			40.0	hr	\$ 82.25	\$ 3,290.00
		Common Building Labor	CLAB	3			40.0	hr	\$ 60.00	\$ 7,200.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		2			40.0	hr	\$ 21.30	\$ 1,704.00
Concrete Demolition Cost (Ref. 2,3)					158.7					
	01 54 33 20 0300	Excavator - 2.0 CY		1			16.0	hr	\$ 140.38	\$ 2,246.08
	01 54 33 20 0347	Hydraulic Hammer		1			16.0	hr	\$ 47.03	\$ 752.48
		Equipment Operator, Medium Equipment	Ecmd	1			16.0	hr	\$ 81.00	\$ 1,296.00
		Foreman Average, Outside	Foreman	1			16.0	hr	\$ 82.25	\$ 1,316.00
		Common Building Labor	CLAB	2			16.0	hr	\$ 60.00	\$ 1,920.00
	01 54 33 40 0700	Compressor - 600 CFM		1			16.0	hr	\$ 61.00	\$ 976.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb.		1			ea	\$ 10.20	\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft. 1" dia		1			ea	\$ 4.10	\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch cutting, acetylene-oxygen 150' hose		1			16.0	hr	\$ 21.30	\$ 340.80
Transportation Costs (Ref. 5)										
	01 54 33 40 6500	Dump Truck - 3 axle, 12 CY		1			8.0	hr	\$ 80.33	\$ 80.33
	01 54 33 40 7300	Tractor, 4x2, 220hp		1			8.0	hr	\$ 44.78	\$ 44.78
	01 54 33 40 6500	Trailer, platform, flush deck, 2 axle, 25 ton		1			16.0	hr	\$ 15.12	\$ 15.12
		Truck Driver, Heavy	Drhv	2			16.0	hr	\$ 68.70	\$ 2,198.40
Miscellaneous										
	02 41 19 16 0200	Disposal Fee - Metal				30		ton		
		Demolished Concrete Handling (Ref. 6)			20			cy	\$ 14.00	\$ 280.00
	01 54 33 20 4810	Loader - 8 CY		1			4.0	hr	\$ 245.88	\$ 983.52
		Equipment Operator, Medium Equipment	Ecmd	1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			40.0	hr	\$ 12.00	\$ 480.00
	01 54 33 40 6410	Toilet, portable chemical		1			40.0	hr	\$ 1.78	\$ 70.40
Total										\$ 33,373.388

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 4 - Added 5% for larger size compressor
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet (Steel Ref - 10) (Concrete Ref - 10)

11 - Storage Shed										
Description	Mains Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
	01 54 33 20 0300	Excavator - 2.0 CY		1		15	4.0	hr	\$ 140.38	\$ 561.52
	01 54 33 20 0342	Bucket Thumb		1			4.0	hr	\$ 21.75	\$ 87.00
		Equipment Operator, Medium Equipment	Eqmd	1			4.0	hr	\$ 81.00	\$ 324.00
		Foreman Average Outside	Foreman	1			4.0	hr	\$ 82.25	\$ 329.00
		Common Building Labor	CLAB	2			4.0	hr	\$ 60.00	\$ 480.00
	01 54 33 40 6360	Torch cutting, acetylene-oxygen 150' hose		1			4.0	hr	\$ 21.30	\$ 85.20
Transportation Costs (Ref. 5)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			4.0	hr	\$ 80.33	\$ 321.32
		Truck Driver, Heavy	Drv	1			4.0	hr	\$ 68.70	\$ 274.80
Miscellaneous										
		Disposal Fee - Metal				15		ton	\$14.00	\$ 140.00
	01 54 33 20 4810	Loader - 8 CY		1	10		4.0	hr	\$ 245.88	\$ 983.52
		Equipment Operator, Medium Equipment	Eqmd	1			4.0	hr	\$ 81.00	\$ 324.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			4.0	hr	\$ 12.00	\$ 48.00
	01 54 33 40 6410	Toilet, portable chemical		1			4.0	hr	\$ 1.76	\$ 7.04
Total									\$	\$ 3,865.40

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nilsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 11)

12 - ROM Transfer Building										
Description	Manna Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
	01 54 33 60 2200	Crane, 115 ton		1		50	40.0	hr	\$ 228.30	\$ 9,132.00
		Equipment Operator, Crane or Shovel	Echv	3			40.0	hr	\$ 84.25	\$ 10,110.00
		Foreman, Average, Outside	Foreman	1			40.0	hr	\$ 82.25	\$ 3,280.00
		Common Building Labor	CLAB	1			40.0	hr	\$ 60.00	\$ 2,400.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		2			40.0	hr	\$ 21.30	\$ 1,704.00
Transportation Costs (Ref. 5)										
	01 54 33 40 7300	Tractor, 4x2, 220hp		1			16.0	hr	\$ 44.78	\$ 716.48
	01 54 33 40 6500	Trailer, platform flush deck, 2 axle, 25 ton		1			16.0	hr	\$ 15.12	\$ 241.92
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			8.0	hr	\$ 80.33	\$ 642.64
		Truck Driver, Heavy	Dmrv	2			16.0	hr	\$ 58.70	\$ 2,188.40
Miscellaneous										
		Disposal Fee - Metal				50		ton		
	02 41 19 18 0200	12 ton = 8 CY						cv	\$ 14.00	\$ 462.00
	01 54 33 20 4810	Loader - 8 CY		1	33		8.0	hr	\$ 245.88	\$ 1,967.04
		Equipment Operator, Medium Equipment	Eqmnd	1			8.0	hr	\$ 81.00	\$ 648.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton, 4x4		1			40.0	hr	\$ 12.00	\$ 480.00
	01 54 33 40 5410	Toilet, portable chemical		1			40.0	hr	\$ 1.76	\$ 70.40
Total										\$ 34,062.88

Reference information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet (Steel Ref - 12)

Description	Main Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
13 - ROM Overland Tube Conveyor										
Steel Demolition Cost										
	01 54 33 20 0200	Crane, 115 ton		1		30	28.0	hr	\$ 228.25	\$ 6,391.00
		Equipment Operator, Crane or Shovel	Echv	1			28.0	hr	\$ 84.25	\$ 2,359.00
		Foreman Average, Outside	Foreman	1			28.0	hr	\$ 82.25	\$ 2,303.00
		Common Building Labor	CLAB	1			28.0	hr	\$ 60.00	\$ 1,680.00
	01 54 33 40 8360	Torch, cutting, acetylene-oxygen 150' hose		2			28.0	hr	\$ 21.30	\$ 1,192.60
Concrete Demolition Cost (Ref. 2.3)										
	01 54 33 20 0300	Excavator - 2.0 CY		1	88.5		8.0	hr	\$ 140.38	\$ 1,233.04
		Hydraulic Hammer		1			8.0	hr	\$ 47.03	\$ 376.24
	01 54 33 20 0347	Equipment Operator, Medium Equipment	Eqmnd	1			8.0	hr	\$ 81.00	\$ 648.00
		Foreman Average, Outside	Foreman	1			8.0	hr	\$ 82.25	\$ 658.00
		Common Building Labor	CLAB	2			8.0	hr	\$ 60.00	\$ 960.00
	01 54 33 40 0700	Compressor - 600 CFM		1			16.0	hr	\$ 81.00	\$ 976.00
		Air tools, breaker, pavement, 60 lb		1			ea		\$ 10.20	\$ 10.20
	01 54 33 40 0930	hose w/couplings 50 ft., 1" dia		1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 1100	Torch, cutting, acetylene-oxygen 150' hose		1			16.0	hr	\$ 21.30	\$ 340.80
	01 54 33 40 7300	Tractor, 4x2, 220hp		1			8.0	hr	\$ 44.78	\$ 358.24
		Trailer platform, flush deck, 2 axle, 25 ton		1			8.0	hr	\$ 15.12	\$ 120.96
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			8.0	hr	\$ 80.33	\$ 642.64
		Truck Driver, Heavy	Drhv	2			8.0	hr	\$ 68.70	\$ 1,999.20
Miscellaneous										
	02 41 19 18 0200	Disposal Fee - Metal		1		30		ton		
		12 ton = 8 CY			20			cy	\$ 14.00	\$ 280.00
Demolished Concrete Handling (Ref. 6)										
	01 54 33 20 4810	Loader - 8 CY		1	115.05		8.0	hr	\$ 245.88	\$ 1,967.04
		Equipment Operator, Medium Equipment	Eqmnd	1			8.0	hr	\$ 81.00	\$ 648.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			28.0	hr	\$ 12.00	\$ 336.00
	01 54 33 40 6410	Toilet, portable chemical		1			28.0	hr	\$ 1.76	\$ 49.28
Total										\$ 24,523.54

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>) Time increases depending on complexity of job
- 4 - Added 5% for larger size compressor
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 13)
(Concrete Ref - 13)

Description	Moana Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
	01 54 33 20 0300	Excavator - 2.0 CY		1			5		\$ 140.38	\$ 280.76
	01 54 33 20 0342	Bucket, Thumb		1			2.0	hr	\$ 21.75	\$ 43.50
		Equipment Operator, Medium Equipment	Eqmnd	1			2.0	hr	\$ 81.00	\$ 162.00
		Foreman Average, Outside	Foreman	1			2.0	hr	\$ 82.25	\$ 164.50
		Common Building Labor	CLAB	1			2.0	hr	\$ 60.00	\$ 120.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			2.0	hr	\$ 21.30	\$ 42.60
Concrete Demolition Cost (Ref. 2.3)										
	01 54 33 20 0300	Excavator - 2.0 CY		1	48.3				\$ 140.38	\$ 1,123.04
	01 54 33 20 0347	Hydraulic Hammer		1			8.0	hr	\$ 47.03	\$ 376.24
		Equipment Operator, Medium Equipment	Eqmnd	1			8.0	hr	\$ 81.00	\$ 648.00
		Foreman Average, Outside	Foreman	1			8.0	hr	\$ 82.25	\$ 658.00
		Common Building Labor	CLAB	2			8.0	hr	\$ 60.00	\$ 960.00
	01 54 33 40 0700	Compressor - 600 CFM		1			8.0	hr	\$ 61.00	\$ 488.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb.		1			ea		\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia		1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			8.0	hr	\$ 21.30	\$ 170.40
Transportation Costs (Ref. 5)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			8.0	hr	\$ 80.33	\$ 642.64
		Truck Driver, Heavy	Drivr	1			8.0	hr	\$ 69.70	\$ 549.60
Miscellaneous										
		Disposal Fee - Metal		1						
	02 41 19 18 0200	1:2 ton = 8 CY		1			5	ton	\$ 14.00	\$ 46.62
Demolished Concrete Handling (Ref. 6)										
	01 54 33 20 4810	Loader - 9 CY		1	3.33				\$ 245.88	\$ 1,967.04
		Equipment Operator, Medium Equipment	Eqmnd	1			8.0	hr	\$ 81.00	\$ 648.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			8.0	hr	\$ 12.00	\$ 96.00
	01 54 33 40 6410	Toilet, portable chemical		1			8.0	hr	\$ 1.76	\$ 14.08
Total										\$ 9,216.32

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>) Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 14)
(Concrete Ref - 14)

Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
15 - Coal Pile Retaining Wall										
Steel Demolition Cost										
Concrete Demolition Cost (Ref. 23)					29.6	5				
	01 54 33 20 0300	Excavator - 2.0 CY		1			4.0 hr		\$ 140.38	\$ 561.52
	01 54 33 20 0347	Hydraulic Hammer		1			4.0 hr		\$ 47.03	\$ 188.12
		Equipment Operator, Medium Equipment	Emnd	1			4.0 hr		\$ 81.00	\$ 324.00
		Foreman Average, Outside	Foreman	1			4.0 hr		\$ 82.25	\$ 329.00
		Common Building Labor	CLAB	2			4.0 hr		\$ 60.00	\$ 480.00
	01 54 33 40 0700	Compressor - 600 CFM		1			4.0 hr		\$ 61.00	\$ 244.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb.		1			ea		\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia		1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			4.0 hr		\$ 21.30	\$ 85.20
Transportation Costs (Ref. 5)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			4.0 hr		\$ 80.33	\$ 321.32
		Truck Driver, Heavy	Drhv	1			4.0 hr		\$ 68.70	\$ 274.80
Miscellaneous										
Disposal Fee - Metal	02 41 19 18 0200	12 ton = 6 CY		3.33		5		ton	\$ 14.00	\$ 46.62
Demolished Concrete Handling (Ref. 6)					38.48					
	01 54 33 20 4810	Loader - 8 CY		1			4.0 hr		\$ 245.88	\$ 983.52
		Equipment Operator, Medium Equipment	Emnd	1			4.0 hr		\$ 81.00	\$ 324.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			4.0 hr		\$ 12.00	\$ 48.00
	01 54 33 40 6410	Tonk, portable chemical		1			4.0 hr		\$ 1.75	\$ 7.04
Total										\$ 4,251.44

Reference information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
 (Steel Ref - 15)
 (Concrete Ref - 15)

16 - Sediment Pond										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost										
	01 54 33 20 0300	Excavator - 2.0 CY		1		5	2.0	hr	\$ 140.38	\$ 280.76
	01 54 33 20 0342	Bucket Thumb		1			2.0	hr	\$ 21.75	\$ 43.50
		Equipment Operator, Medium Equipment	Eqmnd	1			2.0	hr	\$ 81.00	\$ 162.00
		Foreman Average, Outside	Foreman	1			2.0	hr	\$ 82.25	\$ 164.50
		Common Building Labor	CLAB	1			2.0	hr	\$ 60.00	\$ 120.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			2.0	hr	\$ 21.30	\$ 42.60
Transportation Costs (Ref. 6)										
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			2.0	hr	\$ 80.33	\$ 160.66
		Truck Driver, Heavy	Drhv	1			2.0	hr	\$ 68.70	\$ 137.40
Miscellaneous										
		Disposal Fee - Metal								
	02 41 19 18 0200	12 ton = 8 CY								
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1	3.33			ton	\$ 14.00	\$ 46.62
	01 54 33 40 6410	Toilet, portable chemical		1			2.0	hr	\$ 12.00	\$ 24.00
							2.0	hr	\$ 1.76	\$ 3.52
Total										\$ 1,185.68

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights refer to Concrete and Steel Estimations sheet
(Steel Ref. - 16)

17 - Portal

Replaced with Demolition Sheet 19 - Portal Liners and Earthwork Sheet Dozer/Track-Hoe Work

Description		Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
18 - Culvert Removal											
Steel Demolitions Cost											
		01 54 33 20 0300	Excavator - 2.0 CY		1		104.5	40.0	hr	\$ 140.38	\$ 5,615.20
		01 54 33 20 0342	Bucket, Thumb		1			40.0	hr	\$ 21.75	\$ 870.00
			Equipment Operator, Medium Equipment		1			40.0	hr	\$ 81.00	\$ 3,240.00
			Foreman Average, Outside		1			40.0	hr	\$ 82.25	\$ 3,290.00
			Common Building Labor		2			40.0	hr	\$ 60.00	\$ 4,800.00
		01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			40.0	hr	\$ 21.30	\$ 852.00
Transportation Costs (Ref. 5)											
		01 54 33 40 7300	Tractor, 4x2, 220hp		1			8.0	hr	\$ 44.78	\$ 358.24
		01 54 33 40 6500	Trailer, platform, flush deck, 2 axle, 25 ton		1			8.0	hr	\$ 15.12	\$ 120.96
			Truck Driver, Heavy		1			8.0	hr	\$ 68.70	\$ 549.60
Miscellaneous											
		Disposal Fee - Metal	12 ton = 5 CY				104.5		ton		
			Loader - 8 CY			69.66			cy	\$ 14.00	\$ 975.24
		01 54 33 20 4810	Equipment Operator, Medium Equipment		1			40.0	hr	\$ 245.88	\$ 9,835.20
		01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			40.0	hr	\$ 81.00	\$ 3,240.00
		01 54 33 40 6410	Toilet, portable chemical		1			40.0	hr	\$ 12.00	\$ 480.00
Total										\$	\$ 34,296.84

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 18)

19 - Portal Liners										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Concrete Demolition Cost (Ref. 2.3)										
Portal Framework and Liners	18 - Portals									
	01 54 33 20 0300	Excavator - 2.0 CY		1	82		48.0	hr	\$ 140.38	\$ 6,738.24
	01 54 33 20 0347	Hydraulic Hammer		1			48.0	hr	\$ 47.03	\$ 2,257.44
		Foreman Average Outside	Foreman	1			48.0	hr	\$ 82.25	\$ 3,948.00
		Common Building Labor	CLAB	2			48.0	hr	\$ 60.00	\$ 5,760.00
		Equipment Operator, Medium Equipment	Eqmrd	1			48.0	hr	\$ 81.00	\$ 3,888.00
	01 54 33 40 0700	Compressor - 600 CFM		1			48.0	hr	\$ 61.00	\$ 2,928.00
	01 54 33 40 0930	Air tools, breaker, pavement, 60 lb.		1			ea		\$ 10.20	\$ 10.20
	01 54 33 40 1100	Hose w/couplings 50 ft., 1" dia.		1			ea		\$ 4.10	\$ 4.10
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen, 150' hose		1			48.0	hr	\$ 21.30	\$ 1,022.40
Miscellaneous										
Portals Sealing -Wall construction	04 27 10 30 0860	216 sf each x 8 portals		1728				sf	\$ 15.05	\$ 26,006.40
	01 54 33 40 7200	Pickup Truck - 3/4 ton, 4x4		1			48.0	hr	\$ 12.00	\$ 576.00
	01 54 33 40 6410	Toilet, portable chemical		1			48.0	hr	\$ 1.76	\$ 84.48
Total									\$	\$ 55,223.26

Reference information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip
- 6 - A swell factor of 1.3 is used for crushed concrete

Notes: Portal liner is based on (2) wing walls 8'x12'x8", either side portal opening and 1 header 2'x28'x12" across the top of the wing wall (3 portals).

Bond sheet adjusted in 2017 to include 5 additional portals for 8 total

For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet

Description		Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
20 - Gunite/Shotcrete Removal											
Steel Demolition Cost											
		01 54 33 20 0300	Excavator - 2.0 CY		1			8.0	hr	\$ 140.38	\$ 1,123.04
		01 54 33 20 0342	Bucket Thumb		1			8.0	hr	\$ 21.75	\$ 174.00
		Foreman Average, Outside		Foreman	1			8.0	hr	\$ 81.00	\$ 648.00
		Common Building Labor		CLAB	1			8.0	hr	\$ 82.25	\$ 658.00
		Equipment Operator, Medium Equipment		Echv	1			8.0	hr	\$ 60.00	\$ 480.00
		01 54 33 40 0190	Aerial Lift, 60 feet		1			8.0	hr	\$ 60.71	\$ 485.68
		01 54 33 40 6360	Torch, cutting, acetylene-oxygen 160' hose		1			8.0	hr	\$ 21.30	\$ 170.40
Transportation Costs (Ref. 5)											
		01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		1			4.0	hr	\$ 80.33	\$ 321.32
		Truck Driver, Heavy		Driv	2			4.0	hr	\$ 68.70	\$ 549.60
Miscellaneous											
		Disposal Fee - Metal	02 41 19 18 0200						ton		
			12 ton = 8 CY		3.33		5				
		01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			8.0	hr	\$ 14.00	\$ 46.82
		01 54 33 40 6410	Toilet, portable chemical		1			8.0	hr	\$ 12.00	\$ 96.00
Total										\$ 1.76	\$ 14.08
										\$	\$ 4,766.74

Reference Information:
 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job.
 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
 (Steel Ref - 20)

Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
21 - Rock Dust Tank										
Steel Demolition Cost						15				
	01 54 33 60 2200	Crane, 115 ton		1			2.0 hr		\$ 228.30	\$ 456.60
		Equipment Operator, Crane or Shovel	Echv	1			2.0 hr		\$ 84.25	\$ 168.50
		Foreman Average, Outside	Foreman	1			2.0 hr		\$ 82.25	\$ 164.50
		Common Building Labor	CLAB	1			2.0 hr		\$ 60.00	\$ 120.00
	01 54 33 40 6360	Torch, cutting, acetylene-oxygen 150' hose		1			2.0 hr		\$ 21.30	\$ 42.60
Transportation Costs (Ref. 5)										
	01 54 33 40 7300	Tractor 4x2, 220hp		1			2.0 hr		\$ 44.78	\$ 89.56
	01 54 33 40 6500	Trailer, platform, flush deck, 2 axle, 25 ton		1			2.0 hr		\$ 15.12	\$ 30.24
		Truck Driver, Heavy	Drhv	1			2.0 hr		\$ 68.70	\$ 137.40
Miscellaneous										
		Disposal Fee - Metal				15		ton		
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1	10			cy	\$ 14.00	\$ 140.00
	01 54 33 40 6410	Toilet, portable chemical		1			2.0 hr		\$ 12.00	\$ 24.00
Total									\$ 1.378.92	\$ 1,378.92

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>) Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 21)

Description		Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
22 - Fence Removal											
Steel Demolition Cost											
	01 54 33 40 0470		Back-hoe 11.2hp		1		10	8.0	hr	\$ 86.08	\$ 86.08
			Equipment Operator, Medium Equipment	Eqmnd	1			8.0	hr	\$ 84.25	\$ 84.25
			Foreman Average, Outside	Foreman	1			8.0	hr	\$ 82.25	\$ 82.25
			Common Building Labor	CLAB	2			8.0	hr	\$ 60.00	\$ 120.00
	01 54 33 40 6360		Torch, cutting, acetylene-oxygen 150' hose		1			8.0	hr	\$ 21.30	\$ 21.30
Transportation Costs (Ref. 5)											
	01 54 33 20 5300		Dump Truck - 3 axle, 12 CY		1			4.0	hr	\$ 80.33	\$ 80.33
			Truck Driver, Heavy	Driv	1			4.0	hr	\$ 68.70	\$ 68.70
Miscellaneous											
			12 ton = 8 CY						ton		
	01 54 33 40 7200		Pickup Truck - 3/4 ton 4x4		1	8.67		8.0	hr	\$ 14.00	\$ 14.00
	01 54 33 40 6410		Toilet, portable chemical		1			8.0	hr	\$ 12.00	\$ 12.00
										\$ 1.76	\$ 1.76
Total										\$	\$ 3,960.62

Reference Information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals.
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip.
- 6 - A swell factor of 1.3 is used for crushed concrete.

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 22)

23 - Asphalt Removal										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Transportation Costs (Ref. 5, 6)					838.37					
	01 54 33 20 5300	Dump Truck - 3 axle, 12 CY		3			36.0	hr	\$ 80.33	\$ 8,675.64
	Truck Driver, Heavy		Driv	3			36.0	hr	\$ 68.70	\$ 7,419.60
Miscellaneous										
	01 54 33 20 4810	Loader - 8 CY		1			36.0	hr	\$ 245.88	\$ 8,851.68
	Equipment Operator, Medium Equipment		Eqmd	1			36.0	hr	\$ 81.00	\$ 2,916.00
Disposal Fee - Asphalt (Ref. 7)	02 41 19 18 0400				644.9	1131.8		cy	\$ 13.68	\$ 8,822.23
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4		1			36.0	hr	\$ 12.00	\$ 432.00
	01 54 33 40 6410	Toilet, portable chemical		1			36.0	hr	\$ 1.76	\$ 63.36
Total										\$ 37,780.51

Reference information

- 2 - Concrete rubble disposed of as fill or permanently backfilled inside portals
- 3 - Base on a concrete demolition production of 200 cubic yards per 8 hour shift. (Reference: <http://www.indeco-breakers.com>). Time increases depending on complexity of job
- 5 - For haul of asphalt demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way. Time estimate is 1.5 hours for one round trip. Transportation dictates all machinery and labor times
- 6 - A swell factor of 1.3 is used for asphalt
- 7 - Assume weight of crushed asphalt is approximately 3510 lbs/cy (Ref. US Federal Highway Administration, Publication Number: FHWA-RD-97-148). Original quantity is 644.9 cy
Asphalt will be hauled to Nielsen Construction landfill and permanently disposed (Ref. personal communication with Nielson Construction). This landfill is a class 1 landfill.

Earthwork Cost Summary	
Description	Cost
Earthwork	\$ 95,958.88
Riprap	\$ 18,211.69
Total	\$ 114,170.57

Earthwork - RipRap Work																	
Reference Number	Station Location/Type Equipment	Source	Hourly Equipment Cost	Hourly O & P Cost	Operator's Hourly Wage Rate	Material	Hourly Cost	Number of Men or Eq.	Total Est. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. Labor Time/Dis.	Units	Cost
9-61	924G EROPS - Loader	2H 2017 Rental Rate Blue Book	\$38.00	\$23.70	\$81.00	\$0.10	\$148.87	1	\$148.87	\$/HR	1,989.0	CY	50	LF/HR	39.78	HR	\$4,611.25
10-33	CAT 325CL Excavator	2H 2017 Rental Rate Blue Book	\$120.00	\$58.60	\$81.00	\$0.10	\$277.46	1	\$277.46	\$/HR					39.78	HR	\$11,459.10
Miscellaneous																	
31.37	13.10.0100	Riprap & Rock Lining (incl. CMP)	\$ 11.93	\$ 11.00	\$ 12.40	\$ 31.42	\$ 65.75				1,989.0	CY	62.0	LFCT/HR	32.08	HR	\$ 2,141.34
Total Earthwork																\$	16,076.35

Fossil Rock Mine Revegetation

Packing	Reference Number	Equipment Rental (hr) (Includes O & P)	Operator's Hourly Wage	Material Cost	Labor Hourly Cost	Unit	Number	Area (AC)	Quantity	Units	Production Rate	Units	Time	Units	Cost
Excavator, 2 CY	01.54.33.20.0300 (RSM 2017)	\$140.38	\$81.00					10.4	AC						
Volume							1		3532.6 CY		340 CY/AC		19.6 HR		\$4,345
Subtotal		\$140.38	\$81.00								180 CY/HR				\$4,345
Seeding/Planting															
Seed Mix - Riparian	Stevenson Intermountain Seed			\$ 479.18		\$/AC	2	0.78	26.5 LBS						\$ 747.52
Seed Mix - Grassland/Shrub	Stevenson Intermountain Seed			\$ 730.06		\$/AC	2	9.61	403.6 LBS						\$ 14,031.75
Container plants**				\$ 2.17			4		1006 Containers						\$ 2,183.02
CLAB					\$ 60.00						48 Cont/HR		20.96		\$ 5,030.00
Intermediate Total															\$ 21,992.29
Add 25% Re seeding Cost															\$ 5,498.07
Subtotal															\$ 27,490.37
Mulching															
Hay, Large Power Mulcher*****	32.91.13.16.0350	\$ 7.00	\$ 1.50	\$ 57.00		msf			10.39 AC						\$ 29,643.99
Flatbed Truck & Driver ****									452.58 EA						
CLAB****															
Hydromulcher, 3000 gpm*****		\$ 19.93	\$ 13.09	\$ 29.28		msf			452.58 EA						\$ 28,195.73
Flatbed Truck & Driver ****															
Additional Fertilizer				\$ 3.00		msf			453 EA						\$ 1,359.00
Wood Fiber Mulch****															
CLAB****															
Subtotal															\$ 58,198.72
Total															\$ 91,035.80

* Seedmix prices based on Stevenson Intermountain Seed Prices quoted in November 2017. See attached.
 ** Seeding tree prices based on Lawler and Montanta Conservation Nurserys Prices in November 2017. See attached.
 *** Included
 ***** 10.39 acres = 4,525,884 sf RS Means Units M.S.F. or 1,000 sf (4,525,884 /1000 = 452.58)
 Hay Quantity (4000 LBS/AC)
 \$ Water Soluable Fertilizer, included in hydro mulch solution
 \$\$ Addition of Fertilizer to Fertilizer included with hydro mulch solution (per Jeachel DOGM 2018)

Rock Dust Tank and Fence Removal										
Description	Means Reference Number (2017 Heavy Construction Cost Data)	Equipment	Labor	Quantity (number)	Volume (cy)	Weight (tons)	Time (hr)	Unit	Cost	Total Cost
Steel Demolition Cost							6			
	01 54 33 20 0300	Excavator		1				8.0 hr	\$ 140.38	\$ 1,123.04
		Equipment Operator, Medium	Eqmnd	1				8.0 hr	\$ 81.00	\$ 648.00
		Foreman Average, Outside	Foreman	1				8.0 hr	\$ 82.25	\$ 658.00
		Common Building Labor	CLAB	1				8.0 hr	\$ 60.00	\$ 480.00
Transportation Costs (Ref. 5)										
	01 54 33 40 7300	Tractor 4x2 220hp		1				1.0 hr	\$ 44.78	\$ 44.78
	01 54 33 40 6500	Trailer, platform, flush deck, 2 axle 25 tpb		1				1.0 hr	\$ 15.12	\$ 15.12
		Truck Driver, Heavy	Drmv	1				1.0 hr	\$ 68.70	\$ 68.70
Miscellaneous										
		Disposal Fee - Metal				5		ton		
		12 ton = 8 CY								
					10			cy	\$ 14.00	\$ 140.00
Net Fence Removal (Ref. 4)	02 41 13 60 1600			2				64.0 HR	\$ 60.00	\$ 7,680.00
	01 54 33 40 7200	Pickup Truck - 3/4 ton 4x4	CLAB	1				2.0 hr	\$ 12.00	\$ 24.00
	01 54 33 40 6410	Toilet, portable chemical		1				2.0 hr	\$ 1.76	\$ 3.52
Total										\$ 10,885.16

Reference Information

4 - Net Fence, 3500 linear feet Demolition production rate is 430 lf/day

5 - For haul of steel demolition material to Nielsen's landfill. Distance is approximately 16.0 miles one-way Time estimate is 1.5 hours for one round trip

Note: For concrete volumes and steel weights, refer to Concrete and Steel Estimations sheet
(Steel Ref - 21)

Fossil Rock Mine Revegetation

Packing	Reference Number	Equipment Rental (hr) (Includes O & P)	Operator's Hourly Wage	Material Cost	Labor Hourly Cost	Unit	Number	Area (AC)	Quantity	Units	Production Rate	Time	Units	Cost
Excavator, 2 CY	01 54 33 20 0300 (RSM 2017)	\$140.38	\$81.00					18.0		AC				
Volume		\$140.38	\$81.00				1		6120.0	CY	340	CY/AC		
Soil Testing (2 per acre)	Inter-Mountain Labs &			\$ 137.00		ea			36		180	CY/HR	34.0	HR
Subtotal														\$12,279
Seeding/Planting														
Seed Mix - Grassland/Shrub	Stevenson Intermountain Seed			\$ 730.06		S/AC	1	18	378.0	LBS				\$ 13,141.08
Intermediate Total														\$ 13,141.08
Add 25% Reseeding Cost														\$ 3,285.27
Subtotal														\$ 16,426.35
Mulching														
Hay, Large Power Mulcher*****	32 91 13 16 0950	\$ 7.00	\$ 1.50	\$ 57.00		msf			18	AC				\$ 51,357.24
Flatbed Truck & Driver ****									784.08	EA				
CLAB****														
Hydromulcher, 3000 gal*****		\$ 19.93	\$ 13.09	\$ 29.28		msf			784.08	EA				\$ 48,848.18
Flatbed Truck & Driver ****														
Additional Fertilizer	\$\$			\$ 3.00		msf			784	EA				\$ 2,352.00
Wood Fiber Mulch****														
CLAB****														
Subtotal														\$ 102,557.42
Total														\$ 131,252.69

* Seed mix prices based on Stevenson Intermountain Seed Prices quoted in November 2017. See attached.

*** Included

***** 18 acres = 784080 sf RS Means Units M.S.F. or 1,000 sf (784080 /1000 =784.08)

Hay Quantity (4000 LBS/AC)

\$ Water Soluble Fertilizer, included in hydro mulch solution

\$\$ Addition of Fertilizer to Fertilizer included with hydro mulch solution (per Jeatchel DOGM 2018)

& Inter-Mountain Labs (Sheridan, Wyoming) Analytical Invoice 2017

Concrete Volume Estimation / Steel Demolition²

Ref Sheet	Facility Description	Length	Width	Height	Area	Radius	CF	CY	Tons	Notes
01	Substation								15	
	Retaining Wall	275	0.67	5	920		921.25	34.1		Estimated and average height of 5'
	Pads		1		920		920	34.1		
	Foundation	275	3	1	825		825	30.6		
	Total							98.8	15	
02	Office/Shop/Bathhouse/Warehouse								30	considers metal in office, bathhouse, and shop plus includes demo of wood framed office
	Pads	0.5	0.5		4904		2452	90.8		
	Retaining Wall	25	0.67	5			83.75	3.1		
	Foundation	362	2	1	724		724	26.8		
	Concrete Block Walls	520	0.67	16			5574.4	198.3		CY multiplied by .67 to account for air space of blocks
	Total							259.1	30	
03	Water Treatment Plant, Water Storage tanks and Fuel Storage Facility								10	misc equipment
04	Sewer System/Collection Pumping								15	
	Walls	90	0.67	8	476		482.4	17.9		
	Pads		0.33				157.08	5.8		Arbitrarily added yardage to cover all miscellaneous concrete
	Foundation	90	2	1			180	6.7		
	Total							30.4	15	
05	Concrete Pads									
	Curb and Gutter	1300	2	1			2600	96.3		
	Miscellaneous Other						500.0	500.0		
	Total							596.3		
06	Pumphouse, Tanks and Concrete Pads								55	Steel demo includes raw water tank, lines, and pumphouse building
	Pumphouse - foundation	140	2	1			280	10.4		
	Pumphouse - stemwall	140	3	0.67			281.4	10.4		
	Pumphouse - pad	45	20	0.5			450	16.7		
	Area Pad	0.5	0.5		5062.1		2531.05	93.7		Includes pads around pumphouse, tanks, and water treatment building perimeter is equal to approx 100'
	Tank - foundation			1	188.5	15	188.5	7.0		pad around water treatment, water tank, and pumphouse
	Tank - pad	0.5	0.5		706.85		353.425	13.1		
	Total							151.3	55	
07	Iron Coal Waste Bunker and Salt Bunkers	84	0.67	8			450.24	16.7	30	misc equipment, rebar, etc.
08	Truck Loadout Silo (pad)					14	615.734	22.8	30	
09	Chute and Trusses from Crusher								30	
10	Main Fan								30	
	Walls	245	0.67	8			1313.2	48.5		
	Pads		0.5		4304		2152.0	79.7		
	Top		0.33		2484		819.7	30.4		
	Total							158.7	30	
11	Storage Shed								15	
12	ROM Transfer Building								50	
13	ROM Overland Tube Conveyor								30	
	Bent Structure Foundation	34.5	15	4			2070.0	76.7		
	Support Platform	20	4	4			320.0	11.9		
	Total							88.5	30	Steel estimates include rebar and steel edge protectors
14	Loading Dock/Tank Farm								5	
	Pads		0.33		1492		492.4	18.2		
	Walls	175	0.67	4			469.0	17.4		weights based on Hanson Corrugated Steel Pipe chart 2 2/3" x 1/2" (avg. of all thicknesses)
	Foundation	175	2	1			350.0	13.0		weights based on Hanson Corrugated Steel Pipe chart 2 2/3" x 1/2" (avg. of all thicknesses)
	Stairs	14	4	0.33			18.5	0.7		weights based on Hanson Corrugated Steel Pipe chart 3" x 1" (avg. of all thicknesses)
	Total							49.3	5	
15	Coal Pile Retaining Wall - includes all	150	0.667	8			800.4	29.6	5	Steel estimates include rebar and steel edge protectors
16	Sediment Pond								5	Not applicable to demolition costs
17	Portals - Sealing									
	Culvert Removal									
	12" - 326' @ 12lbs/ft								2	weights based on Hanson Corrugated Steel Pipe chart 2 2/3" x 1/2" (avg. of all thicknesses)
	18" - 50' @ 18lbs/ft								0.5	weights based on Hanson Corrugated Steel Pipe chart 2 2/3" x 1/2" (avg. of all thicknesses)
	48" - 336' @ 76lbs/ft								5	weights based on Hanson Corrugated Steel Pipe chart 3" x 1" (avg. of all thicknesses)
	66" - 1914' @ 101lbs/ft								97	weights based on Hanson Corrugated Steel Pipe chart 3" x 1" (avg. of all thicknesses)
	Total								104.5	
19	Portal Liners	40	8	1			320.0	11.9	5	fencing
20	Gunite Removal								15	
21	Rock Dust Tank								10	Mobile items. Will be removed from site by others prior to reclamation
N/A	Concrete Barriers								10	Transported to Nelson's Landfill
22	Fence Removal								10	Grand total does not include volume of asphalt
23	Asphalt		0.33		52761		17411.1	644.9	435	
	Grand Total						Total	1513.2	435	

1. Concrete quantity estimates are based on volumes generated from an AutoCAD drawing of the surface facilities at Trail Mountain Mine, or actual field measurements, and not actual pour tickets or contractor invoices.
 2. Steel weights for demolition are estimated.

FOSSIL ROCK MINE

FOSSIL ROCK RESOURCES, LLC

CHAPTER 8

BOND

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LIST OF PLATES

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8-1	Soil Map

LIST OF APPENDICES

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8-1	Borrow Area
8-1(L)	Prime Farmland Investigation
8-2	Soils and Vegetation Test Plot Monitoring
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SOIL RESOURCES

8.1 SCOPE

The Mine is a previously disturbed site, having been in operation since 1948. As such, no pre-mining conservation or reclamation measures were taken and little stockpiling of soil from areas to be disturbed were done. Likewise, no pre-mining studies were conducted in the disturbed area. Accordingly, future reclamation plans will have to rely on existing soil to provide a suitable medium in which to establish new vegetation. The existing disturbed site has been compacted by heavy equipment and automobiles. Some sections have also been subjected to years of oil, gasoline, and diesel fuel spillage. Moreover, coal piles have existed at the site, causing crushed coal and coal dust to be mixed and compacted into the existing soil. Revegetation test plots will be set up to determine whether the existing soil can result in a successful revegetation program or a supplemental soil will be required.

As supplemental soil may be required for future reclamation, and because the mining property to be reclaimed was already disturbed, it was necessary to characterize the soil from adjacent reference areas. These were chosen in two locations; as near as possible to the disturbed area and in areas determined, as well as could be done, to correspond in both soil type and vegetative community type to that of the disturbed area. Future supplemental soils would likely have to equal or exceed the quality of these two reference soils.

8.2 METHODOLOGY

Revegetation test plots have been set up to determine the suitability of the existing disturbed soil as a growth medium. (See Vegetation Test Plots, Appendix 9-1). Soil sample data is also included in Appendices 9-1 and 9-2, along with the vegetation test plot data.

In the event that the soils on site cannot be used for revegetation, supplemental soil will be required. The supplemental soils would likely have to equal or exceed the quality of the existing soil prior to disturbance. An estimate of this quality can be obtained from soil samples taken from two soil pits dug in soil types which have been disturbed previously by the Trail Mountain operations. The soil pits were sampled at each recognizable horizon down to sixty inches or to bedrock, whichever came

first. Each horizon was described in the field according to thickness, color and soil structure.

These soil pits were located in the Riparian (streamside) and Grassland-Shrub plant communities. Only soil types similar to those already disturbed or expected to be disturbed were sampled to serve as a basis for the reclamation plan to be developed.

After collection, the soil samples were air dried and passed through a two millimeter screen (Tyler #10 mesh). Rock percentages were obtained by weighing separately the total soil sample and the rocks separated out by the 2 mm screen.

Soil textural analysis was performed in the lab using the Boyoucos hydrometer method with 50 gram samples. A sample of each soil horizon was sent to the Utah State University's Soil and Water Testing Laboratory in Logan, Utah for selected chemical analyses. These analyses included a standard fertility test (pH, salinity by probe, phosphorus, potassium, texture, and lime); exchangeable cation percentage (CEC, Na, K, Ca, and Mg, extractable ion, saturation percent, and the water soluble ions listed above); and sodium absorption ratios (SAR) where the salinity was found to be high.

8.3 SOIL RESOURCE INFORMATION

8.3.1 Soils Identification and Descriptions.

Four main soil types occur in the mine plan area, plus various thin soils among rocky outcrops and on talus slopes, which are designated as rockland (map symbols RoG and RY, see Plate 8-1). Two of the four developed soil types are dry stony soils of steep mountain slopes. These are designated by the map symbols AbG (Very stony sandy loam complex) and CoG (Stony sandy loam complex). A third soil type, designated SN (shaly colluvial land), is located on the top of Trail Mountain in areas that will not be disturbed by mining activities and therefore will not be considered further. The fourth soil type, here designated by the map symbol R (for Riparian), is the principal soil type found in the disturbed area. In the soil pit located north of the Mine disturbed area, it would be classified as an azonal soil or entisol, and probably an arent (from ar, L., to plow, meaning mixed horizons). However, the soil is also located within a mapping unit called the Kenilworth Series, which is also defined as a Xerollic Calciorthid Ardidisol.

This is the soil of the canyon bottom along the stream. It is characterized by numerous gravelly, silty, and sandy layers; but in the Reference Area it does not exhibit any soil profile development. It is in alluvial soil that has developed from gravelly outwash brought down by the canyon stream during infrequent floods plus collected finer fractions deposited by wind and talus erosion. It is a deep soil, exceeding 5 feet and often attaining 10 or more feet, as may be seen at some eroded banks along Cottonwood Creek. The soil pit dug in the Riparian Community reference area showed eight horizons (but no classic soil profile) including what appeared to be a buried soil profile from an earlier time.

The streamside, or canyon-bottom soils were referred to as the Kenilworth Series in a prior classification (USDA, USDI, and UAES, 1970), specifically to the KeE2 mapping unit. This was called the Kenilworth very stony sandy loam of 0 to 20 percent slopes. This soil is stony, well-drained, and moderately coarse textured. In its broader distribution, this soil type occupies high benches on old dissected outwash plains below very steep mountains. It forms in thick deposits of strongly calcareous (high lime) stony alluvium and supports a vegetative cover mostly of juniper and pinion. The land use is mainly for wildlife, recreation, and limited grazing.

In Cottonwood Canyon, at the site of the Mine plan area, the presence of the canyon stream has led to a well-developed streamside plant community of narrow leaf cottonwood trees and a lush understory of grasses and forbs. This community is narrowly distributed along the stream course. Higher up, it transitions into the Pinion-Juniper Community of the east-facing steep slopes of Trail Mountain. Probably 25% or less of the Mine disturbed area is located on soils of this canyon-bottom type within the Riparian Plant Community and its transition zone away from the stream, but still in the canyon bottom.

Three of the above four soils that were found in the approved Mine Plan were also found on the Tract 2 Mine Plan Area. They were RoG (rocklands), CoG (stony sandy loam complex), and AbG (very stony sandy loam complex).

In addition, five other soil types were found within the boundaries of the Tract 2 Mine Plan Area (data taken from the Soil Conservation Service and U.S. Forest Service, Price, Utah). The map symbols and soil types are: AC1 (Argic Pachic Cryoborolls), TU (Typic Ustorthents), TC (Typic Cryorthents), AC3 (Argic Pachic Cryoborolls), and AC2 (Argic Pachic Cryoborolls). Refer to Soils

Map 8-1 for locations of these soil types. These soils are also located in areas that will be undisturbed by mining, and therefore will not be considered further.

8.3.2 Present and Potential Productivity of Existing Soils

The soils in the disturbed area support a streamside plant community of dominant narrow leaf cottonwood trees plus lesser numbers of Rocky Mountain Juniper, Chokecherry, Elderberry, and numerous understory species of shrubs, grasses, and forbs. The transition zone on the same soil, but away from the stream and not yet on the steep Pinion-Juniper covered canyon slopes, has more juniper and pinion pine and is more open. The understory is mostly grasses and sagebrush.

The area is useful mainly for wildlife, recreation, limited grazing and mining. No cultivation could be established because of the steepness of the canyon.

8.4 PRIME FARMLAND

No farmland exists in the area. The capability unit category in the canyon bottom is VII-SX (non-irrigated), which is soil near steep mountains on recently formed flood plains of streams. These soils are suited for range.

8.5 SOILS: PHYSICAL AND CHEMICAL PROPERTIES

Two soil pits were dug. The results of textural analysis from the Riparian Reference Area soil pit are shown in Table 8 1. Chemical tests are shown in Table 8 2.

This is the soil of mapping unit RI. The top layer, which is not necessarily an A horizon, is 9 to 10 inches thick and is mainly a sandy clay loam texture having only about 5% rock over 2 mm diameter and 95% fine soil particles. The finer soil fraction is 48% sand, 30% silt, and 22% clay. Deeper layers show increasing percentages of rock (mainly gravel) down to layer 5, which suddenly reverts to less than one percent rock. This layer is also thick (7 inches) suggesting an older soil A horizon buried by the present developing soil surface.

Table 8-2 shows pH values ranging from 8.0 to 8.4 and slight salinity at the surface, increasing with depth. It is highly calcareous soil, with an average phosphorus content of $p = 2.0$ ppm and a

potassium content of K = 217 ppm by the standard soil fertility test.

The second soil pit was located in the Grassland Shrub Community on a steep northeast facing slope uphill from the coal loading piles of the disturbed area. This is the mapping unit CoG or RoG. It is a soil type that has been disturbed by the Mine operations, but only slightly. Some of the lower steep hillside has been cut away to provide clean mine entrances and room for a coal pile. Probably only about 75% or more of the disturbed area is represented by this soil type.

The results of textural analysis are shown in Table 8-3 and of chemical analysis in Table 8-4. The Grassland Shrub soil was relatively shallow, bedrock being encountered at only 19 inches. The A horizon was 5 inches deep and consisted of 71.5% fine soil and 28% larger rock fragments by weight. The fine soil fraction was a loam soil of 40% sand, 35% silt, and 25% clay. Deeper layers increased rapidly in rocky material, silt, and clay fractions. The pH ranged from 8.2 to 8.7 and the salinity from .3 to 4 mmho/cm². Phosphorus and potassium levels were much lower than the streamside soil of the canyon bottom.

8.6 USE OF SELECTED OVERBURDEN

Since the site is a previously disturbed site since 1948, and no further disturbance is proposed, no overburden will be handled.

8.7 PLANS FOR REMOVAL, STORAGE AND PROTECTION OF SOILS

Since the site has been previously disturbed no soils were removed, stored, or protected prior to 1982. Compliance work in 1982 - 1983, involved the use of an on site borrow area and resulting topsoil storage pile. Please refer to Appendix 8-1 for details on the borrow area. For any future disturbances, any soils encountered will be removed, stored, and protected.

Topsoil Pile - During the 1990 expansion of the disturbed area (0.471 acres) associated with the extension of a culvert (Appendix 7-13). Topsoil was to be removed and placed on an existing top soil storage pile and salvageable material at vegetation test plot location (at least the top 12") would be removed from and placed on the topsoil pile. It was estimated that an average depth of 16" of topsoil could be salvaged over 50% of the area of the culvert expansion resulting in approximately 200 cubic yards of topsoil. Map A in Appendix 9-1 shows 13 vegetation test plots in the vicinity of

the culvert expansion and subsequent parking lot expansion. The area was estimated to be 100' X 150' and if 12" was salvaged that calculates to 555.5 cubic yards. The new ventilation portal constructed during the same year was in a previously disturbed area (approximately the 1940's, Appendix 3-7) thus no topsoil was salvaged. The borrow area (Appendix 8-1) used in the construction of the culvert expansion, etc. was from a pre-disturbed area, some topsoil was salvaged but the amount is not specified. By researching the existing information in the permit it is estimated that there is 755.5 cubic yards of topsoil in the existing topsoil pile. Surveying and topography for the pre-mined site is inadequate and was not used to estimate the topsoil in the pile. By measuring the stockpile area shown on Plate 3-7 we estimate the topsoil stockpile area to be 2322 square feet, in conjunction with the other information provided above the topsoil is approximately 8.6 feet deep in the stockpile.

8.8 PLANS FOR REDISTRIBUTION OF SOILS

In the event that the existing soil cannot be revegetated, supplemental soil will have to be hauled in for regrading of the disturbed site. Such soil should be tested for similarity to the existing soils and should equal or exceed the quality of the Riparian soil of Tables 8-1 and 8-2. This is the soil type of 25% or less of the disturbed area.

Once the buildings, mine equipment, coal piles and other structures and disturbances are removed, the existing disturbed area must be graded to the final configuration. If the existing soil is unsuitable for revegetation and supplemental soil must be brought in, a depth of not less than six inches should then be applied and graded in preparation for seeding. Existing soil should prove adequate for plant growth.

8.9 NUTRIENTS AND SOIL AMENDMENTS

Existing soil or soils hauled in for the restoration of the disturbed soils will have to be supplemented with commercial fertilizers containing nitrogen, phosphorus, and potassium. The exact mixture will have to be determined following tests on the actual soil used, but a broadcast rate of about 50 pounds of phosphorus, 80 pounds nitrogen and 80 pounds of potassium per acre can be expected. ~~Stabilization will be obtained by the use of an erosion control mat.~~

8.10 EFFECTS OF MINING OPERATIONS ON SOILS

The existing disturbed site has been compacted by heavy equipment and automobiles. Some sections have been subjected to oil, gasoline, and diesel fuel spillage. Crushed coal and coal dust from the coal piles have been mixed and compacted in the existing soil.

8.11 MITIGATION AND CONTROL PLANS

As a previously disturbed site, no soils had originally been saved for protection of the resource. A small amount of topsoil was salvaged during the hydrologic reconstruction on site, and has been stored and protected as shown on Figure 3-1. Should any future disturbance of undisturbed soils of good potential occur, the soils will be removed, stored, and protected.

8.12 BIBLIOGRAPHY

United States Department of Agriculture, U.S. Department of the Interior, and Utah Agricultural Experiment Station, 1970, Soil Survey, Carbon-Emery Area, Utah.