Ames Construction, Inc.
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Task ID#3570

June 8, 2010

By: *Hand Delivery*

Paul Baker, Minerals Program Manager
Utah Department of Natural Resources
Division of Oil, Gas & Mining
1594 West Temple Suite 1210
Salt Lake City, Utah 84114-5801

Re: Permit # M/049/0076 - Lake Point Quarry – REV 1
Response to DOGM Comments Regarding LMO NOI First Review

Dear Mr. Baker:

Ames Construction, Inc. (Ames) hereby submits Revision 1, thereby completing Permit #M/049/0076 application. Please consider this revision as formal correspondence to the Division's May 25, 2010 first draft review.

Our response corresponds with your review format for ease of comparison. The Division's Form MR-REV was utilized as a base. We have provided the applicable redline strikeout sections of Form-MR-LMO. Changes to Appendix H (surety calculations) are indicated by green cells. Most of the other changes are replacement figures. We are providing two sets of replacement pages for the Division's review and incorporation into the existing documents on file. We are confident that these revisions will allow the Division to have a final document available to start with the public notice process as soon as possible.

A cultural resource survey has commenced. Ames will forward the results to the Division for SHPO consultation as it becomes available during the public comment period.

Ames respectfully requests the Division to consider this NOI substantially complete at this time and to expeditiously initiate the public noticing.

Please contact me with any questions or concerns with this submittal and thank you for your cooperation on this important matter.

Sincerely

Christopher Ennes
Western Region Environmental Manager
Enclosures

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Application for Mineral Mine Plan Revision or Amendment

Operator: Ames Construction Inc.

Mine Name: Lake Point Quarry **File Number: M/049/0076**

DETAILED SCHEDULE OF CHANGES TO THE MINING AND RECLAMATION PLAN

Comment #	Rule				DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
1	R647-4-105; 105.1	ADD	**REPLACE**	REMOVE	Figure 1. Base Map/Location Map
2	R647-4-105; 105.3	ADD	**REPLACE**	REMOVE	Figure 7a. Cross Sections
3	R647-4-106; 106.8	ADD	**REPLACE**	REMOVE	Figure 11. Geologic Formation Map
4	R647-4-109; 109.1	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
4	R647-4-109; 109.1	ADD	**REPLACE**	REMOVE	Figure 5. Mine Excavation Plan
4	R647-4-109; 109.1	**ADD**	REPLACE	REMOVE	Appendix I – Hydrologic Analysis Report
5	R647-4-110; 110.2	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
6	R647-4-110; 110.2	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
7	R647-4-110; 110.5	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
8	R647-4-110; 110.5	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
9	R647-4-113	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
9	R647-4-113	**ADD**	REPLACE	REMOVE	Table 110.3.1: Surface Facilities to be Reclaimed
9	R647-4-113	ADD	**REPLACE**	REMOVE	Figure 5. Mine Excavation Plan
10	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Summary Sheet
11	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 3 of 9: Process Facilities
12	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H
13	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 4 of 9: Petroleum Storage - Operations
14	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H
15	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 6 of 9: Lay Down Yard; please note that this sheet cannot be more detailed at this time as the materials are hypothetical the volume of which was based on experience
16	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 7 of 9: Earthwork
17	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 8 of 9: Revegetation
N/A		ADD	REPLACE	**REMOVE**	Appendix I: Surety Vendor Quote
N/A		ADD	**REPLACE**	REMOVE	Table of Contents last page – Redline Strike Out
N/A		ADD	**REPLACE**	REMOVE	Index – Redline Strike Out

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Figures

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3. Existing Contours and Features map
4. Mine Phasing Plan
5. Mine Excavation Plan
6. Crushing Configuration Plan
7. Final Reclamation Plan
   a. Cross Sections
8. Existing Storm water Runoff Plan
   a. Ephemeral Drainage Watershed Boundary
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9. Well Location Map
10. Soil Map Unit Designation
11. Geologic Formation Map

Appendices

A. Ecological Baseline Report/NRCS Supplemental Information
B. Vegetation Inventory Report
C. Landowner Permission
D. Air Quality Permit
E. Groundwater Well Log Information
F. Surface Water Rights
G. Storm Water Runoff Information
H. Surety Calculation Work Sheets
~~I. Surety Vendor Quote~~ Hydrologic Analysis Report

Tables: Listed in Index

To maximize production and maintain a "No-discharge" operation, the ephemeral drainage will be relocated along the northwestern property boundary and will tie into its existing channel at the northeastern boundary during later periods of mining. It will continue to perpetuate offsite flows and receive stormwater discharge from the newly relocated Utah County Long Ridge Road (Figure's 4 & 5). ~~The new channel section will be constructed to mimic the approximate depth and width hydraulic geometric profiles of the existing channel.~~ The channel will be reconstructed as a "V-Ditch" 15' wide and 3.75' deep on average with a 3% gradient and 2H:1V side slopes. These dimensions were determined by a hydrologic model and is sized to pass the 100 year 24 hour storm event (see Appendix I: Hydrologic Analysis Report). At the channel bend locations, the channel will need an additional 0.5 feet for a total depth of 4.25 feet and total width of 17'. Armoring with 4-6" rip rap may be required for the two tie in points where the material is anticipated to be unconsolidated alluvium. However, most of the new channel will be constructed in bedrock; therefore, no further armoring will be required.

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During the early period of operations the existing ephemeral drainage splits the permit area. Therefore, stormwater runoff from the stockpile/crusher plant area northwest of the drainage will be contained by the earthen berm and stormwater runoff from the quarry will sheet flow and be contained along the quarry face (Figure 8b). As mining operations advance and the existing channel is relocated, stormwater runoff from the mining operation, processing and stockpiles will be contained within the quarry(Figure 8b). Stormwater runoff from the entire site will directly sheet flow or be collected and diverted via a ditch network.

To ensure that the site can adequately contain the 100-year 24-hour storm event, the Rational Method was utilized to calculate a conservative run-off volume and resultant required for the following three areas: 1. Early phase stockpile/crusher; 2. Early phase mine area; and 3. Later phase entire site. Point Precipitation Frequency Estimates from NOAA Atlas 14 at 40.26 N and -111.87 W, 4,606' elevation was utilized. Refer to Appendix G for the backup calculations with resultant containment volumes and Figure 8b for the containment areas shown in relation to the mining operation.

Once inside the quarry, water disperses across the quarry floor. The crusher plant staging area and stockpile area will be graded to be higher than the surrounding areas to prevent contamination of stormwater within the quarry. This approximate 16.7 acre area has the capacity to contain much more water than would ever accumulate in a 100-year 24-hour storm event.

The project will not adversely impact surface water resources

Ground Water

It is anticipated that the mine operation excavation necessary for material product and resultant quarry floor bottom elevation of 4,732' will not intercept groundwater. Utah Division of Water Rights Well Log Database was searched to ascertain depths to water below the ground surface (bgs). Analysis of the project vicinity indicates that depth to groundwater is approximately 220 feet below original ground surface. Based on elevations of wellheads and depth to water data from the two closest wells, groundwater elevation is anticipated to range from 4,661' down to 4,499'.

The project will not adversely impact groundwater resources.

109.2 - Wildlife habitat and endangered species

Threatened and Endangered Species

Background information pertaining to state and federally listed threatened and endangered species and species of special concern was obtained through online resources at the U.S Fish and Wildlife Service and the Utah Division of Wildlife Resources (DWR). An information request letter was submitted to DWR on March 12, 2010 in order to obtain additional information regarding the possible presences of threatened or endangered species and/or the potential for their habitats to exist within or near the Lake Point Quarry site.

Seven federally protected species were identified for Utah County (UDWR 2009a). A list of threatened and endangered species is contained in Appendix A. There are 35 State Listed Species in Utah County (UDWR 2009b). Seven of these species may occur in or near the site. A list of these seven species is contained in Appendix A. URS Corporation conducted a site survey for presence of the aforementioned March 16 and 17, 2010.

No individuals or potential habitats of any of the listed species were identified during fieldwork.

Wildlife

Eleven species of wildlife were identified during field surveys (Appendix A). Most were visual observations of individuals, but identifications were also made by verifying and identifying scat and tracks or burrows. The species identified were typical of arid areas that have limited resources due to low precipitation. One major resource is the permanent source of water afforded by the Utah Lake which is only about one mile east of the site.

The project area appears to support a mule deer population. No visual observations were made of mule deer utilizing the area, but tracks and scat were seen in numerous areas within the project site. The diversity of bird species appeared to be limited. The majority of the bird species identified appeared to be traveling through the area and were not hunting or nesting. There were no visual observations of any reptiles on the site, but they were likely still hibernating.

Due to a highly altered site from fire, grazing, and historic mining, wildlife habitat is poor at best.

109.3 - Existing soil and plant resources

The only effective mitigation practice for plant and soil measures is to salvage, store and outplace topsoil upon final reclamation as previously described in section 106.5 – 106.6. Approximately 30 acres of surface will be impacted including the vegetation growing at the site. As previously mentioned, the plant community that currently exists has been highly disturbed from fire, grazing, and past mining activity. No impacts will occur to riparian or wetland areas, as they do not exist on the site no impacts will occur to threatened or endangered plant species (refer to Section 109.2).

109.4 - Slope stability, erosion control, air quality, public health & safety

Describe the impacts this mining operation will have on slope stability, erosion, air quality, public health and safety. Include descriptions of highwall and slope configurations and their stability. Air quality permits from the Utah Division of Air Quality may be required for mining operations. Please reference any such permits. Describe measures to be taken to minimize or mitigate impacts to slope stability, erosion, air quality, or public health and safety.

Slope Stability

There are no slope stability impacts anticipated because they are mitigated by the open pit design. The open pit plan establishes an overall 1h:1v high wall slope (including catch benches) and flatter final slopes on non-high wall areas. The limestone being mined is a very stable competent material, which will yield a stable high wall finished surface.

Erosion Control

Erosion impacts will be limited as the grading directs runoff from the mined areas into the mining area. Topsoil storage piles will be stabilized with track walking and seeding. Initial stockpile areas will have berms placed along the stockpile pad perimeters to capture runoff until such time the stockpiles are within the open pit mine area.

Air Quality

Dust will have a limited impact. Each blast will generate dust. Fugitive dust generated from operations are mitigated and controlled with water. In addition, the site access road will be watered and or chemically stabilized with magnesium chloride or recycled asphalt grindings. Processing operations will use water for stockpile materials, loading areas and water spray bars at drop point and conveyors. All processing/crushing equipment to be used on this project is currently permitted with the State of Utah Division of Air Quality. See Appendix D

Public Health and Safety

Public health and safety will be mitigated with the installation of signs posted around the perimeter of the permit boundary and earthen berms at key locations. The signs will provide warnings: No Trespassing, Danger - Blasting & Mining Operations and contact information. Earthen berms will be placed around the perimeter of the high wall and along the Class D road. Fencing will be placed along the southern high wall.

VII. Rule R647-4-110 - RECLAMATION PLAN
110.1 - Current land use and postmining land use

Current or premining land use(s) [other than mining]: Mining and Grazing

List future post-mine land-use(s) proposed): Mining and Grazing

(Develop the reclamation plan to meet proposed post-mine land use.)

110.2 - Reclamation of roads, highwalls, slopes, leach pads, dumps, etc.

Describe how the following features will be reclaimed: roads, highwalls, slopes, impoundments, drainages and natural drainage patterns, pits, ponds, dumps, shafts, adits,8 drill holes and leach

pads. Describe the configuration of these features after final reclamation. Describe the rinsing and neutralization of leach pads associated with final decommissioning.

Reclaimed Features

Describe how roads will be reclaimed. Road reclamation may include: regrading cut and fill sections, ripping the road surface with a dozer, topsoil replacement, construction of water bars, construction of traffic control berms or ditches, and reseeding.

Roads
Temporary roads will be mined away as the open pit advances downward and gets smaller. One road, about fifteen feet wide, will remain at the end on mine life to access the bottom of the open pit.

Describe how highwalls will be reclaimed. Highwall reclamation may include: drilling and blasting, backfilling, regrading, topsoil replacement, and reseeding.

Highwalls
Highwalls and catch benches will remain at the end of mine life. The wall and catch bench configuration will be constructed as mining advances. No additional grading is anticipated at the end of mining.

Describe how slopes will be reclaimed. Slope reclamation may include: regrading to a 3 horizontal : 1 vertical (3h:1v) configuration, topsoil replacement, contour ripping, pitting, and reseeding.

Slopes
The site will be mined leaving 45 degree or 1H:1V slopes; whereas, highwalls and safety benches will not be recontoured. In the event that unconsolidated material remains, the area will be shaped to a slope of 3H:1V and roughened by deep ripping (18" min.) on contour, Slope flatter than a 2.5H:1V will have topsoil applied and reseeded. Contour scarification will be conducted on the top soil surface. ~~Water bars may be placed on contour where long continuous slopes occur at approximately 100 foot intervals.~~

Describe how impoundments, pits and ponds will be reclaimed. Include the final elevations and final disposition of the drainage in and around the impoundment. If the impoundment, pit, or pond is intended to be left as part of the post-mining land use, then an agreement with the land managing agency/owner is required. Structures to remain must be left in a stable condition.

Impoundments & Ponds
There are no impoundments planned for this project. The water storage pond and wash water pond will be mined out or regarded during final contouring.

Include the final size of the impoundment, pit, pond in acre-feet of storage and the capacity of the spillway to safely pass storm events.

Open Pit
An open pit will remain at the end of mine life. The floor of the pit will be top soiled and re-seeded. The open pit will not impound water.

Impoundments, pits, and ponds, which are not approved as part of the post mining land use shall be reclaimed, free draining, and the natural drainage patterns restored.

Describe how drainages will be reclaimed. Drainage reclamation would include: the reestablishment of a natural drainage pattern which fits in with the upstream and downstream cross-section of existing drainage in the vicinity of the disturbance; the reestablishment of a stable channel in the reclaimed reach of channel, using the necessary armoring to prevent excessive erosion and downstream sedimentation.

Drainages
A new permanent ephemeral drainage will be constructed to replace the existing natural ephemeral drainage prior to completion of mining. This new drainage will maintain a natural drainage pattern to transport storm water from the pre-existing drainage upstream and a point downstream of the property which enters the same down-gradient ephemeral drainage system.

Include cross-sections and profiles of reestablished channels to demonstrate compatibility with existing drainage characteristics.

See Figure 7a

Describe how waste dumps will be reclaimed. Waste dump reclamation may include regrading to a 3h:1v configuration, topsoil replacement, mulch or biosolids applications, contour ripping or pitting, and reseeding. Characterization of the physical and chemical nature of the waste dump materials should be provided.

Waste Dumps
No waste dumps will be constructed.
Describe how shafts and adits will be reclaimed. Reclamation of shafts may include: backfilling, installation of a metal grate, installation of a reinforced concrete cap, topsoil replacement and reseeding. Reclamation of adits may include: backfilling, installation of a block wall, installation of a metal grate, topsoil replacement and reseeding.

Shafts, Adits
None of these items are associated features with this project

Describe how drill holes will be reclaimed. Drill hole reclamation must be consistent with the rules for plugging drill holes (R647-4-108). Reclamation of plugged drill holes may include topsoil replacement and reseeding.

Drill Holes
Drill holes are not associated features with this project.

Describe how tailings areas will be reclaimed. Tailings reclamation may include: dewatering, neutralization, placement of cap materials, placement of subsoil materials, topsoil replacement and reseeding. Characterization of the physical and chemical makeup of the tailings material should be provided.

Tailings
There are no Tailings associated with this project.

Describe how leach pads will be reclaimed. Reclamation of leached materials may include: neutralization or leached materials, rinsing of leached materials, dewatering leached materials, regrading slopes of leached materials to 3h:1v, extending pad liners, placement of capping materials, placement of subsoil materials, mulch or biosolids application, topsoil replacement and reseeding. Characterization of the physical and chemical makeup of the leached materials should be provided. Post closure monitoring and collection of drain down fluids should also be addressed.

Leach Pads
There are not leach pads associated with this project.

NOTE: The Minerals Rules require overall highwall angles of no more than 45° at final reclamation unless a variance is granted. All dump or fill slopes should be left at an angle of 3h:1v or less. Any slopes steeper than 3h:1v must be reclaimed using state-of-the-art surface stabilization technology. Pit benches exceeding 35 feet in width should be topsoiled, or covered with fines, and revegetated.

Describe the final disposition of any stockpiled materials on site at the time of final reclamation.

Stockpiles
No stockpile will remain at the time of final reclamation.

110.3 - Surface facilities to be left

Describe any surface facilities which are proposed to remain on-site after reclamation (buildings, utilities, roads, drainage structures, impoundments, etc.). Describe their post-mine application. Justification for not reclaiming these facilities must be included in the variance request section.
No facilities will remain on site after reclamation.

Table 110.3.1: Surface Facilities to be Reclaimed

Structure	Dimensions
2 QTY Jaw Crusher	40' x 12' x 12'
2 QTY Feed Belt	60' x 4' x 5'
4 QTY 7'x20' Screens	35' x 10' x 12'
2 QTY Cone Crusher	40' x 12' x 12'
2 QTY Cone Feed	60' x 5' x 5'
10 QTY Field Conveyors	60' x 4' x 4'
2 QTY Return Belt	50' x 4' x 4'
4 QTY Stacker	80' x 4' x 12'
1 QTY Scale House	50' x 35' x 10'
3QTY Control House/Tower/Tool Shed	45' x 10' x 12'
1 QTY Aboveground Fuel Tank (Diesel)	10,000 Gallon Capacity

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110.4 - Treatment, location and disposition of deleterious materials

Describe the nature and extent of any deleterious or acid forming materials located on-site. Describe how these materials will be neutralized, removed, or disposed of on site. Describe how buildings, foundations, trash and other waste materials will be disposed of.

No deleterious materials will remain on site during or after reclamation. No buildings are planned to support the operations, therefore there are none to dispose of. All trash and other wastes generated from the operations will be disposed off site in a licensed landfill.

110.5 - Revegetation planting program and topsoil redistribution

Highly compacted areas (i.e. processing/laydown) will be ripped to a minimum of 18 inches depth on contour ~~thereby reducing compaction~~after topsoil placement. The quarry bottom will be comprised of bedrock substrate so this area is not included. Final shaping and grading will then occur ~~followed by topsoil placement~~.

Soil Material Replacement

Topsoil will be spread throughout the site (excluding highwall benches) using scrapers to place soil after being loaded from the stockpile. A grader will spread the soil to a depth of 6 inches. Because of the highwalls, there will be a surplus of topsoil material to adequately cover any remaining areas that will facilitate site revegetation success.

Seed Bed Preparation

Finally, the grader will scarify the topsoil media alleviating compaction created by the scrapers. The resultant roughened surface will then be considered prepped for seed catchment and precipitation retention/infiltration.

Seed Mixture

Table 110.5.1 below provides the seed mixture that will be used in reclamation at the Lake Point Quarry (see Appendix H for cost).

Table 110.5.1: Reclamation Seed Mix for Lake Point Quarry

Scientific Name	Common Name	Pure Live Seed lbs/acre
~~*Pseudoroegneria spicata ssp. Spicata*~~*Agropyron intermedium*	~~Bluebunch Wheatgrass~~Intermediate Wheatgrass	2.~~8~~0
~~*Elymus elymoides*~~*Agropyron dasystachum*	~~Bottlebrush Squirreltail~~Thickspike Wheatgrass	2.0
~~*Triticum aestivum x Secale cereale*~~*Dactylis glomerata*	~~Quickguard Sterile Triticale~~Piute Ochard Grass	~~10.1~~0.5
~~*Poa secunda ssp. sandbergii*~~*Elymus cinereus*	~~Sandberg Bluegrass~~Great Basin	~~0~~2.5

	Wildrye	
Artemisia frigida *Oryzopsis Hymenoides*	Fringed Sagebrush *IndianRrice Grass*	0.122.0
Sanguisorba minor	Small Burnet	5.3
Penstemon palmeri	Palmer Penstemon	0.60.5
Aster chilensis	Pacific Aster	0.1
Melilotus officinalis	Yellow Sweetclover	0.5
Artemisia tridentata vaseyana	Mountain Big Sagebrush	0.1
Atripliex canescens	4-Wing Saltbush	1.0
Chrysothamnus nauseosus	Rubber Rabbitbrush	0.3
Kochia prostrate	Forage Kochia	0.5
	TOTAL	**21.512.0**

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Seeding Method

The sSeed will be broadcasted by a tractor with wire harrow drag for tillage utilizing a conventional applicator during late autumn. Seeding will occur immediately following surface roughening. .

Fertilization and Soil Amendments

Approximately 1,200 pounds per acre of Biosol organic fertilizer will be applied at the time of seedingtopsoil placement. Seedbed preparation will then follow (see above). It will be mixed with the seed and applied through the broadcast spreader and tilled in slightly by the wire harrow drag method.

Other Revegetation Procedures

None.

VIII. Rule R647-4-112 VARIANCE

There are no variances being requested from Rules R647-4-107 (Operation Practices), R647-4-108 (Hole Plugging), and R647-4-111 (Reclamation Practices).

IX. Rule R647-4-113 – SURETY

Please refer to Appendix H for Surety Calculations.

A Reclamation cost estimate based upon RS MEANS, or third party costs has been developed.

X. PERMIT FEE [Mined Land Reclamation Act 40-8-7(i)]

The Utah Mined Land Reclamation Act of 1975 [40-8-7 (I)] provides the authority for the assessment of permitting fees. Commencing with the 1998 fiscal year (July 1 - June 30), **and revised July 1, 2002,** annual permit fees are assessed to new and existing notices of intention and annually thereafter until the project disturbances are successfully reclaimed by the Permittee / Operator and released by the Division.

Large mining permits require an initial submission fee and annual fee of $500.00 for surface disturbance of 50 or less acres, or a $1,000.00 fee for surface disturbance greater

than 50 acres (see page six Section III, Rule R647-4-106.3 for estimated disturbance calculation). The appropriate fee MUST accompany this application or it cannot be processed by the Division.

PLEASE NOTE: If you are expanding from a small mining operation to a large mining operation, the appropriate large mine permit fee, less the annual $150.00 small mine fee (if already paid) MUST accompany this application.

REFERENCES

Bullock, K.C., 1951. Geology of Lake Mountain, Utah. Bulletin 41, Utah Geological and Mineralogical Survey.

Crawford, A.L. and A.M. Buranek, 1948. A Reconnaissance of the Geology and Mineral Deposits of the Lake Mountains, Utah County, Utah. Circular No. 35, Utah Geological and Mineralogical Survey.

Davis, F.D., 1983. Geologic Map of the Southern Wasatch Front, Utah. Map 55-A, Utah Geological and Mineral Survey.

Okerlund, M.D., 1951. A Study of the Calcite-Aragonite Deposits of Lake Mountain, Utah. M.S. Thesis, Brigham Young University.

Solomon, B. J., R. F. Biek, and S. M. Ritter, 2009, Geologic map of the Pelican Point Quadrangle, Utah County, Utah, Utah Geological and Mineral Survey.

XI. SIGNATURE REQUIREMENT

I hereby certify that the foregoing is true and correct. **(Note: This form must be signed by the owner or officer of the company/corporation who is authorized to bind the company/corporation).**

Signature of Permittee / Operator/Applicant:_____

Name (typed or print): _____

Title/Position (if applicable): _____

Date: _____

PLEASE NOTE:

Section 40-8-13(2) of the Mined Land Reclamation Act provides for maintenance of confidentiality concerning certain portions of this report. Please check to see that any information desired to be held confidential is so labeled and included on separate sheets or maps.

Only information relating to the location, size or nature of the deposit may be protected as confidential.

Confidential Information Enclosed: ( ) Yes ( ) No

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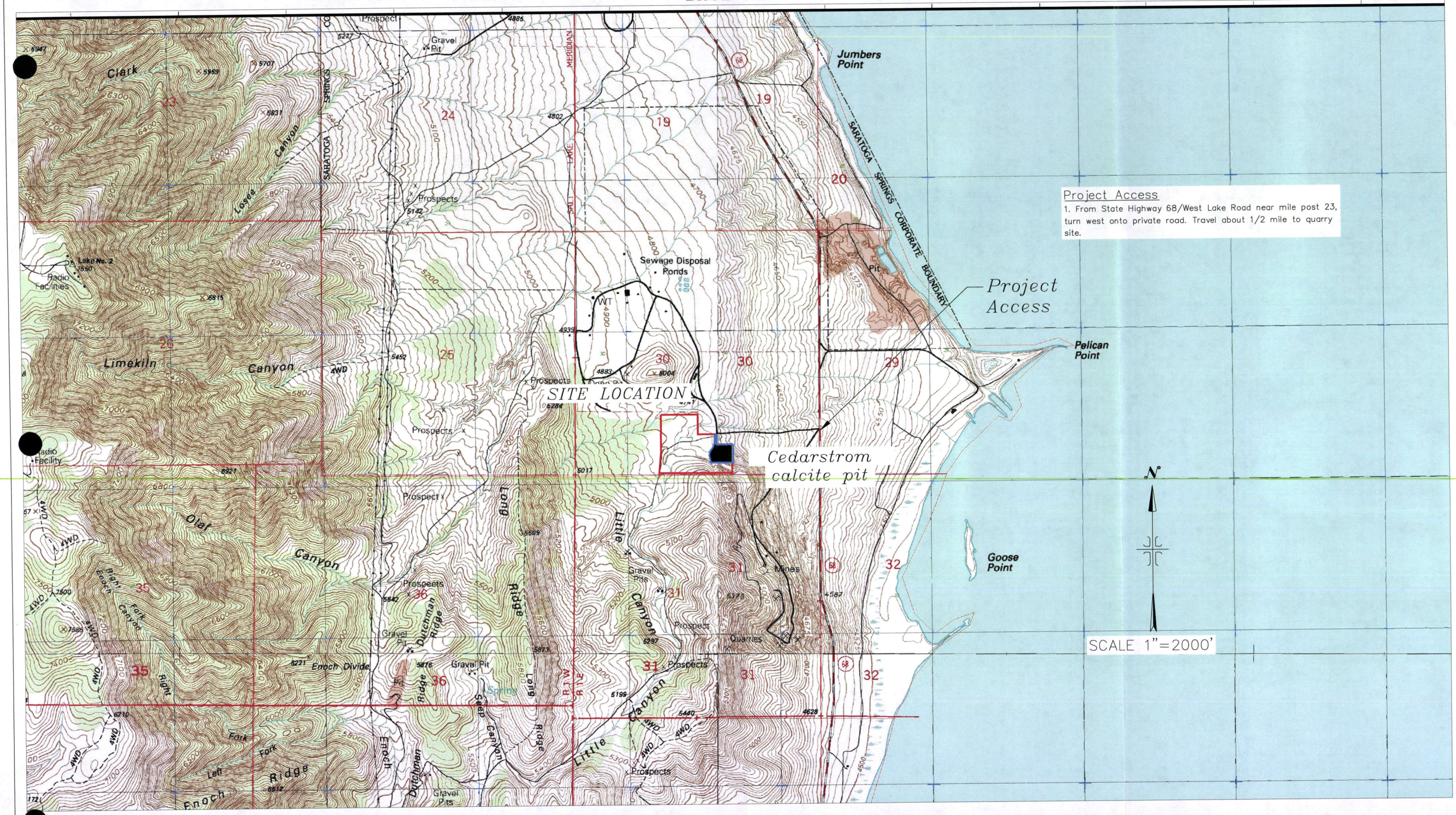
BASE MAP



NO.	REVISIONS	BY	DATE
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2			
1	Initial review comments from DOGM		6-1-10

DESIGNED BY:	DATE:
DRAWN BY:	DATE: 4-5-2010
CHECKED BY:	DATE:
APPROVED:	DATE:
COGO FILE:	DATE:
REV. COGO FILE:	DATE:

LAKE POINT QUARRY
UTAH COUNTY DOGM
PERMIT APPLICATION

BASE MAP/LOCATION MAP
FIGURE 1

UTAH COUNTY, UTAH

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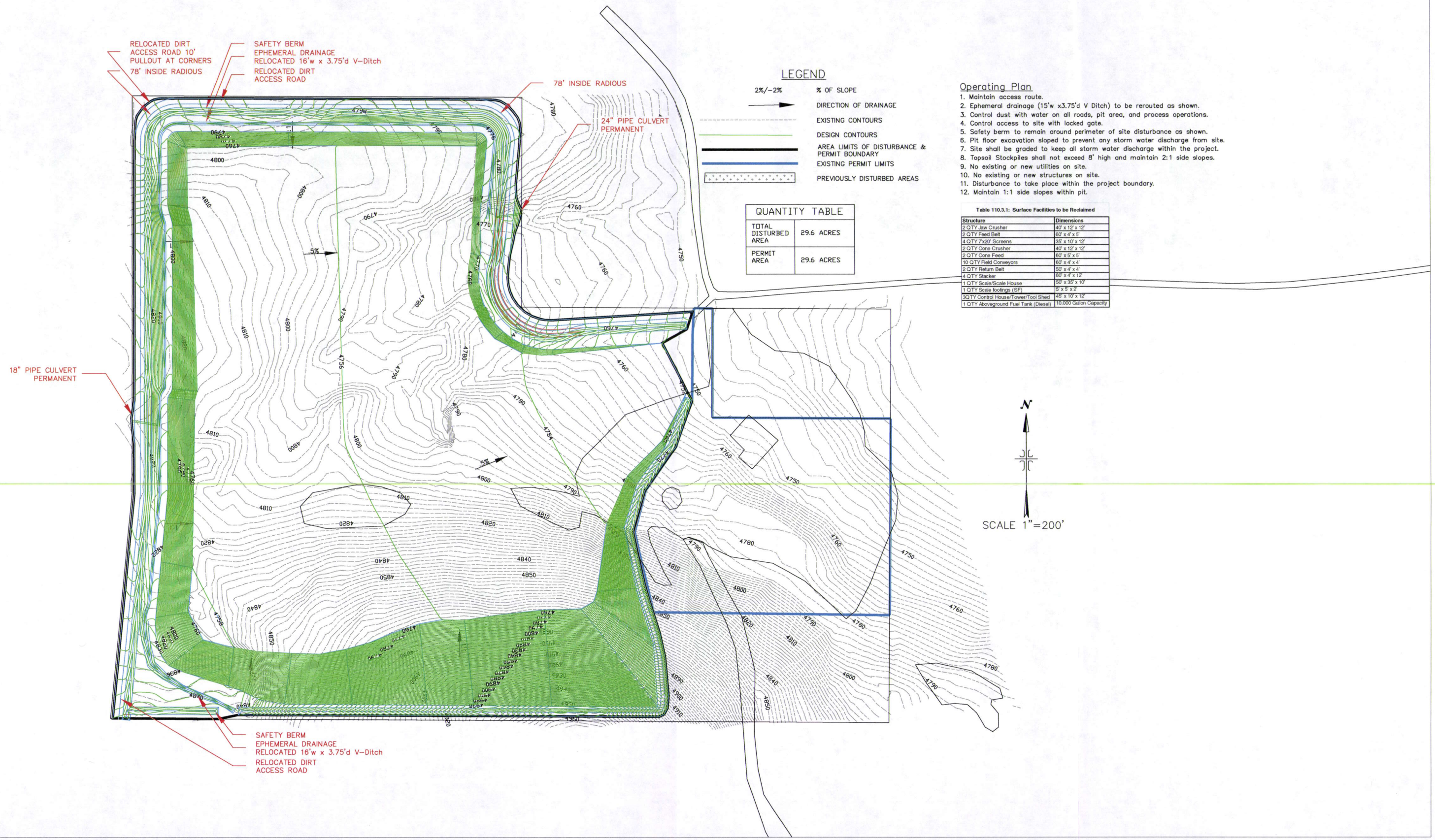
WEST VALLEY CITY,
UTAH 84120
801-977-8012

JOB NO.

FIGURE 1

MINE EXCAVATION PLAN



LEGEND

2%/-2%	% OF SLOPE
→	DIRECTION OF DRAINAGE
	EXISTING CONTOURS
	DESIGN CONTOURS
	AREA LIMITS OF DISTURBANCE & PERMIT BOUNDARY
	EXISTING PERMIT LIMITS
	PREVIOUSLY DISTURBED AREAS

QUANTITY TABLE

TOTAL DISTURBED AREA	29.6 ACRES
PERMIT AREA	29.6 ACRES

Operating Plan

1. Maintain access route.
2. Ephemeral drainage (15'w x3.75'd V Ditch) to be rerouted as shown.
3. Control dust with water on all roads, pit area, and process operations.
4. Control access to site with locked gate.
5. Safety berm to remain around perimeter of site disturbance as shown.
6. Pit floor excavation sloped to prevent any storm water discharge from site.
7. Site shall be graded to keep all storm water discharge within the project.
8. Topsoil Stockpiles shall not exceed 8' high and maintain 2:1 side slopes.
9. No existing or new structures on site.
10. No existing or new utilities on site.
11. Disturbance to take place within the project boundary.
12. Maintain 1:1 side slopes within pit.

Table 110.3.1: Surface Facilities to be Reclaimed

Structure	Dimensions
2 QTY Jaw Crusher	40' x 12' x 12'
2 QTY Feed Belt	60' x 4' x 5'
4 QTY 7'x20' Screens	35' x 10' x 12'
2 QTY Cone Crusher	40' x 12' x 12'
2 QTY Cone Feed	60' x 5' x 5'
10 QTY Field Conveyors	60' x 4' x 4'
2 QTY Return Belt	50' x 4' x 4'
4 QTY Stacker	80' x 4' x 12'
1 QTY Scale/Scale House	50' x 35' x 10'
1 QTY Scale footings (SF)	5' x 5' x 2'
3QTY Control House/Tower/Tool Shed	45' x 10' x 12'
1 QTY Aboveground Fuel Tank (Diesel)	10,000 Gallon Capacity

NO.	REVISIONS	BY	DATE
5			
4			
3			
2			
1	Initial review comments from DOGM		6-1-10

DESIGNED BY:	DATE:		
DRAWN BY:	DATE:	4-5-2010	
CHECKED BY:	DATE:		
APPROVED:	DATE:		
COGO FILE:	DATE:		
REV. COGO FILE:	DATE:		

LAKE POINT QUARRY
UTAH COUNTY DOGM
PERMIT APPLICATION

MINE EXCAVATION PLAN
FIGURE 5

UTAH COUNTY, UTAH

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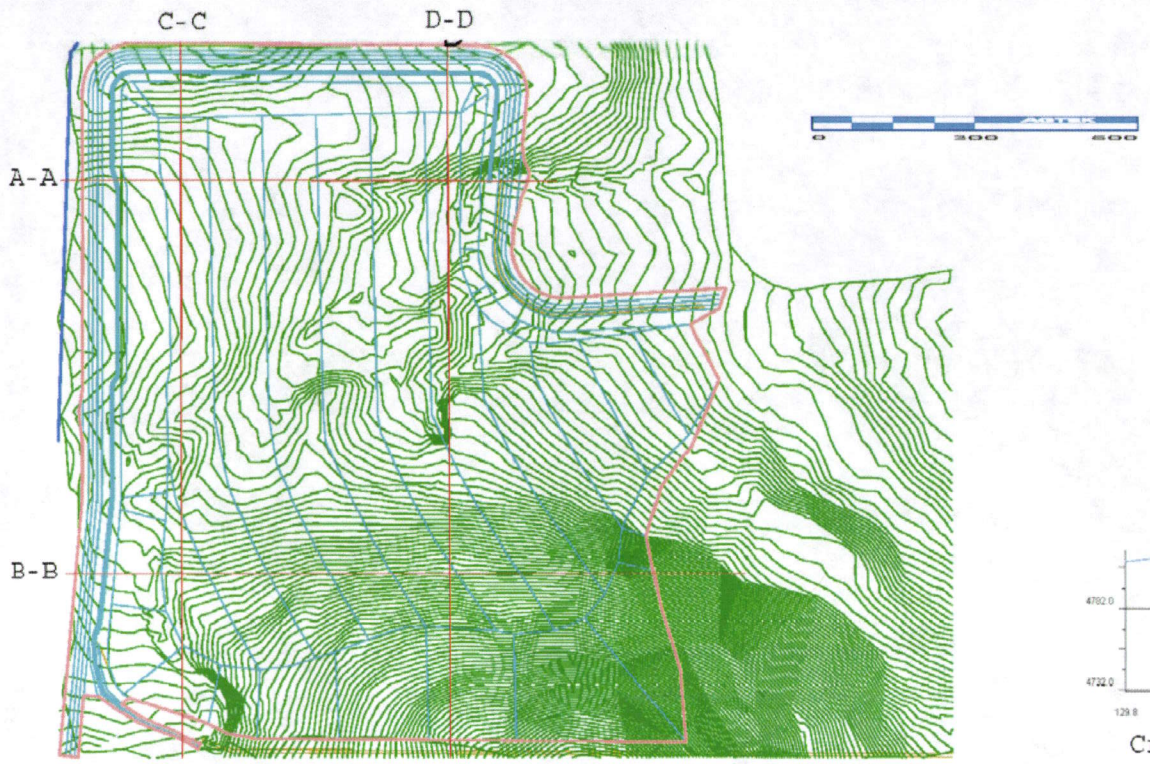
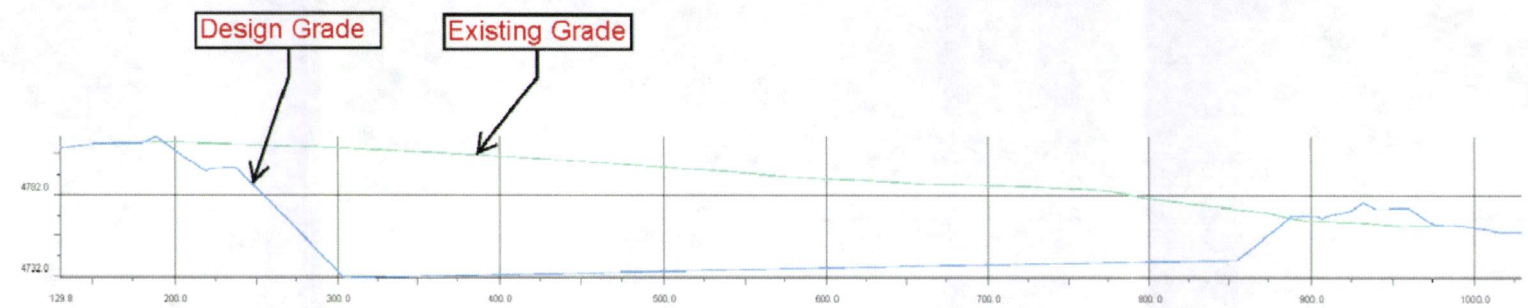
UTAH 84120
801-977-8012

JOB NO.

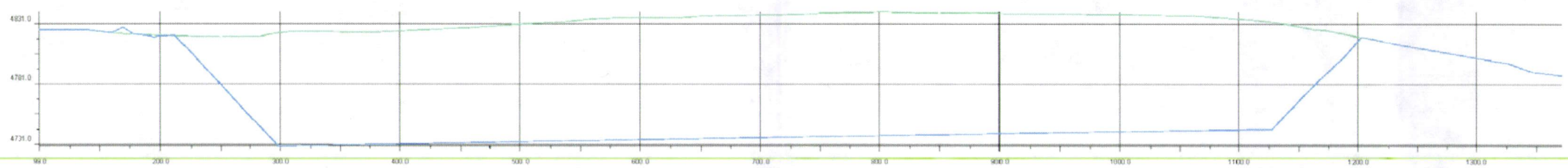
FIGURE 5

CROSS SECTIONS





Cross Section A-A



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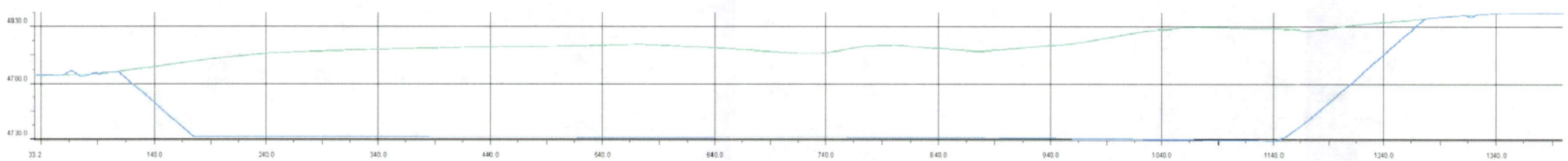
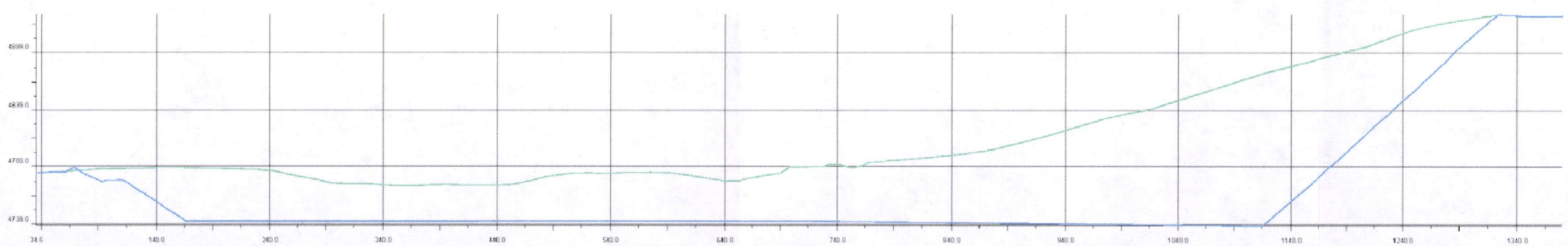


Cross Section C-C



Cross Section D-D

NO.	REVISIONS	BY	DATE		
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4				DRAWN BY:	DATE: 4-5-2010
3				CHECKED BY:	DATE:
2				APPROVED:	DATE:
1	Initial review comments from DOGM		6-1-10	COGO FILE:	DATE:
				REV. COGO FILE:	DATE:

LAKE POINT QUARRY
UTAH COUNTY DOGM
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CROSS SECTIONS
FIGURE 7a

UTAH COUNTY, UTAH

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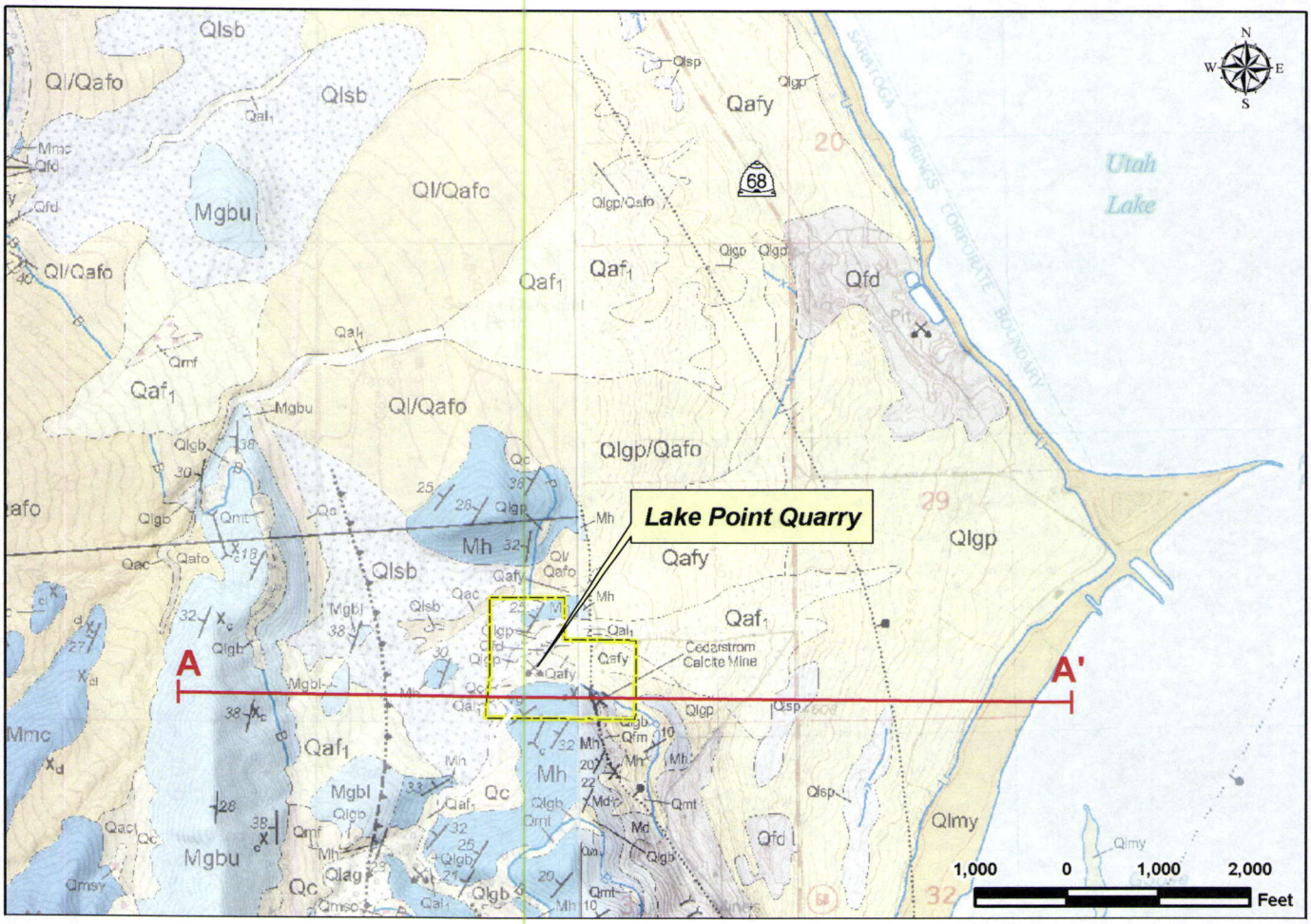
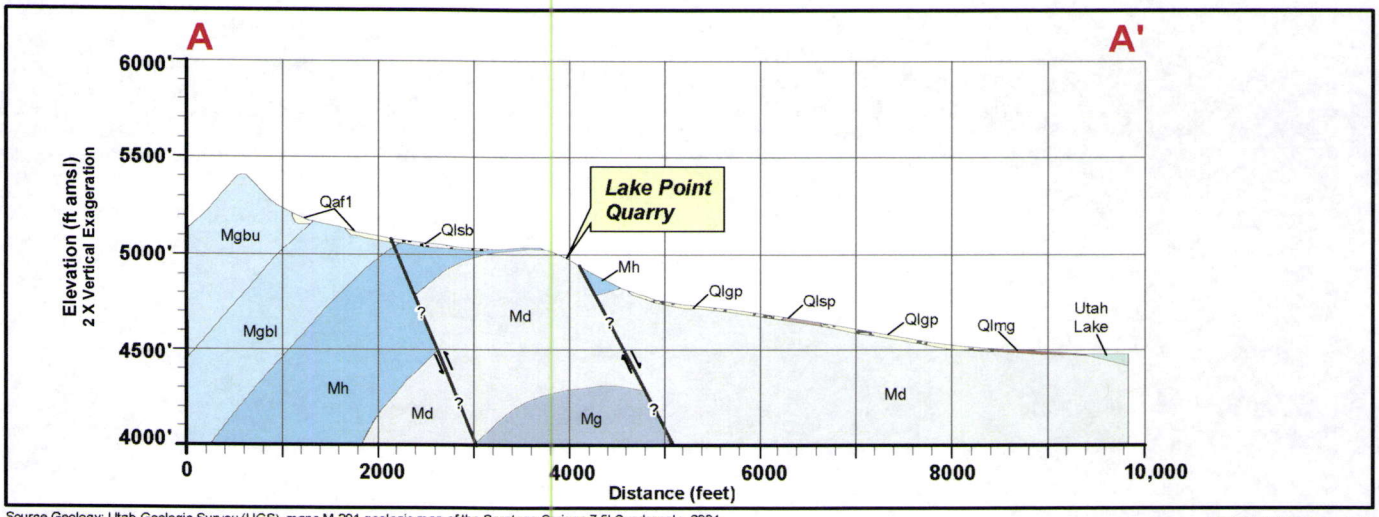
FIGURE 7a





Source Geology: Utah Geologic Survey (UGS), maps M-201 geologic map of the Saratoga Springs 7.5' Quadrangle, 2004 and M-244 geologic map of the Pelican Point 7.5' Quadrangle, 2009
Cross Section modified from R.F. Biek, 2004

	Approximate strike and dip of inclined bedding	Qlgp	Lacustrine gravel and sand Provo (upper Pleistocene)
	Normal fault, dashed were inferred, bar and ball on down-dropped side	Qlsb	Lacustrine sand and silt Bonneville (upper Pleistocene)
	Thrust or reverse fault, saw teeth on upper plate	Qlsp	Lacustrine sand and silt Provo (upper Pleistocene)
Qal1	Level-1 stream deposits (upper Holocene)	Mgbu	Great Blue Limestone (Upper Mississippian)
Qaf1	Level-1 alluvial-fan deposits (upper Holocene)	Mgbl	Great Blue Limestone Long Trail Member (Upper Mississippian)
Qafy	Young alluvial-fan deposits, undivided (Holocene to upper Pleistocene	Mh	Humbug Formation (Upper Mississippian)
Qfd	Disturbed land (Historical)	Md	Deseret Limestone (Upper to Lower Mississippian)
Qfm	Mine-dump deposits (Historical)	Mg	Gardison Limestone (Lower Mississippian)
Qc	Colluvial deposits (Holocene to upper Pleistocene)		Lake Point Quarry

FIGURE 11
Lake Point Quarry
Geologic Formation Map
June, 2010
Township 6 South, Range 1 East,
Section 30
Utah County, Utah

URS

APPENDIX I – HYDROLOGIC ANALYSIS REPORT

URS

Memorandum

Date: June 4, 2010

To: Ames Construction, Inc.
3737 West 2100 South
West Valley City, UT 84120

From: Amber Fortner, Project Manager, Lizel Spencer, P.E.
URS Corporation
756 East Winchester Street, Suite 400
Salt Lake City, UT 84107

Subject: **Lake Point – Response to Comment #4**
Utah County, Utah

INTRODUCTION

This memorandum presents the supporting documentation for the hydrology and hydraulics for the diversion channel that circles Lake Point Quarry.

Watershed Hydrology

The hydrologic analysis was completed using the Hydraulic Engineering Center's Hydrologic Modeling System (HEC-HMS) Version 3.4 developed by the U.S. Army Corps of Engineers (U.S. Army, 2009). The National Resource Conservation (NRCS) method was used to estimate the 100-year, 24-hour peak discharge for the site (NRCS,1986). The watershed area for the Lake Point Quarry site includes 1.27 square miles of Little Canyon (see Attachment 1, Hydrologic Model Inputs for Figure 8a Ephemeral Drainage Watershed Boundary Map).

Precipitation information was obtained from the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 online database, located at http://dipper.nws.noaa.gov/hdsc/pfds/sa /ut/pfds.html. See Attachment 1 for the NOAA precipitation estimate. Based on information from the NOAA atlas, the 100-year, 24-hour storm event produces 2.24 inches of precipitation. NRCS Type II 24-hour synthetic rainfall distribution was used for this analysis.

The NRCS TR-55 method was chosen to calculate the time of concentration. The HEC-HMS model requires the input of lag time. The lag time is 0.6 times the time of concentration (see Attachment 1, Time of Concentration Calculations.)

The weighted runoff curve number (CN value) is estimated to be 66, based on observation of the watershed and classifying the vegetated cover as sagebrush with grass understory with fair ground cover. Hydrologic soil types for the site were determined using published NRCS Web Soil Survey information; the watershed includes hydrologic soil groups B and D (see Attachment 1, Hydrologic Model Inputs for Soil Data and Weighted CN Values).

The peak flows for the 100-year, 24-hour storm event was computed based on the information presented above. The HEC-HMS model determined that the 100-year, 24-hour peak discharge is 101 cubic feet per second (cfs) (see Attachment 2 Hydrologic Model Output for HEC-HMS Report).

URS Corporation
756 East Winchester Street
Suite 400
Salt Lake City, UT 84107
Tel: 801.904.4000
Fax: 801.904.4100

Conveyance Hydraulics

Visual Urban (HY-22) Urban Drainage Design Program was used to size the ditch to adequately convey the 100-year, 24-hour peak flow around the Lake Point Quarry. The ditch was designed to have one foot of freeboard during the 100-yr 24-hr event. The required ditch geometry is as follows:

Channel Slope = 3.0%

Channel Side Slope = 2:1

Channel Depth = 3.75 feet

The channel has several bends with a radius of approximately 35 feet. The increase in water surface elevation at the outside of the bend caused by the superelevation of the water surface was determined using equation 3.9 in the Design of Roadside Channels, Hydraulic Engineering Circular Number 15, Third Edition. The channel will need an additional 0.5 feet around all bends, for a total channel depth of 4.25 feet around bends.

References

U.S. Army Corps Of Engineers August 2009. HEC-HMS Hydrologic Modeling System. User Manual Version 3.4.

U.S. Department of Agriculture, National Resources Conservation Service (NRCS). *Urban Hydrology for Small Watersheds,* Technical Release 55. June 1986.

U.S. Department of Transportation Federal Highway Administration, August 2001. *Urban Drainage Design Manual*, Hydraulic Engineering Circular No. 22, Second Edition.

U.S. Department of Transportation Federal Highway Administration, August 2005. *Design of Roadside Channels with Flexible Linings*, Hydraulic Engineering Circular No. 15, Third Edition.

List of Attachments

Attachment 1 – Hydrologic Model Inputs
- Ephemeral Drainage Watershed Boundary Map
- NOAA Precipitation Estimate
- Hydrologic Soil Group
- Weighted CN Calculation
- Time of Concentration Calculation

Attachment 2 – Hydrologic Model Output
- HEC-HMS Model Report

Attachment 3 – Hydraulic Model
- HY-22 Summary
- Increase in Water Surface Elevation around a Bend

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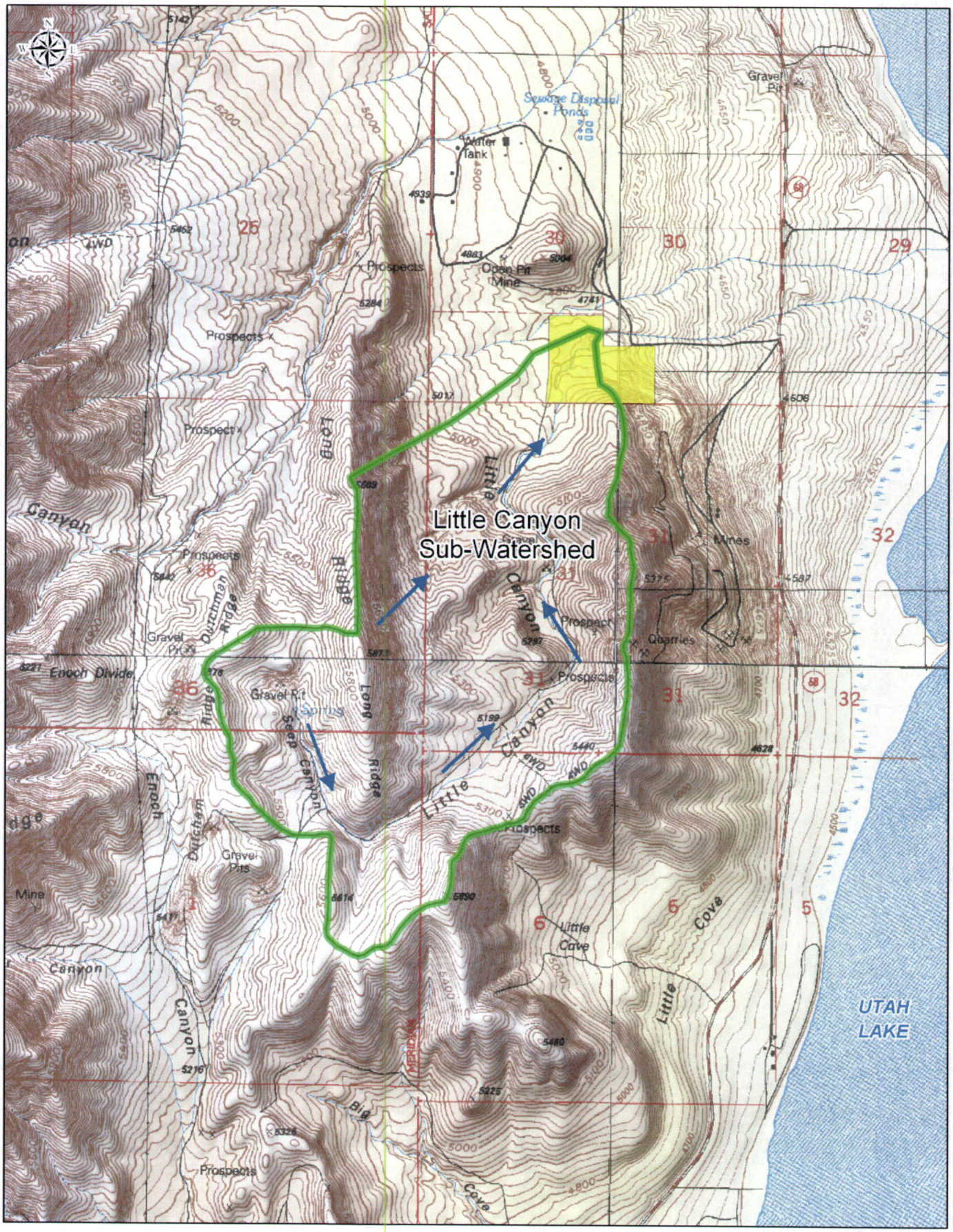
ATTACHMENT 1 – HYDROLOGIC MODEL INPUTS



Drainage Flow Direction

Lake Point Quarry

Little Canyon Sub-Watershed
782 Acres

1,000 0 1,000 2,000
Feet

FIGURE 8a

Ephemeral Drainage Watershed Boundary Map
April, 2010
Township 6 South, Range 1 East, Section 30
Utah County, Utah

URS

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Utah 40.26 N 111.87 W 4606 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Thu Jun 3 2010

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.12	0.18	0.22	0.30	0.37	0.45	0.52	0.65	0.81	0.96	1.10	1.28	1.48	1.65	2.13	2.53	3.10	3.63
2	0.15	0.23	0.28	0.38	0.47	0.57	0.64	0.81	0.99	1.18	1.35	1.56	1.81	2.01	2.61	3.09	3.78	4.43
5	0.21	0.32	0.39	0.53	0.65	0.75	0.82	0.99	1.20	1.41	1.61	1.86	2.15	2.38	3.08	3.64	4.42	5.16
10	0.26	0.40	0.49	0.66	0.82	0.92	0.98	1.15	1.38	1.60	1.82	2.12	2.43	2.67	3.44	4.06	4.91	5.72
25	0.34	0.52	0.65	0.87	1.08	1.19	1.24	1.39	1.63	1.85	2.10	2.46	2.80	3.06	3.89	4.61	5.51	6.42
50	0.42	0.64	0.79	1.06	1.32	1.43	1.46	1.59	1.83	2.04	2.32	2.74	3.08	3.34	4.21	5.01	5.93	6.90
100	0.51	0.77	0.96	1.29	1.59	1.71	1.73	1.84	2.04	2.24	2.54	3.02	3.36	3.61	4.52	5.39	6.32	7.34
200	0.61	0.93	1.15	1.55	1.92	2.04	2.05	2.12	2.29	2.43	2.76	3.30	3.64	3.87	4.80	5.75	6.67	7.73
500	0.77	1.18	1.46	1.96	2.43	2.57	2.60	2.63	2.71	2.73	3.04	3.69	3.99	4.20	5.14	6.19	7.05	8.17
1000	0.92	1.40	1.73	2.33	2.88	3.04	3.07	3.10	3.13	3.17	3.26	3.98	4.26	4.43	5.36	6.50	7.27	8.43

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.14	0.21	0.26	0.35	0.44	0.52	0.58	0.72	0.89	1.04	1.18	1.39	1.61	1.78	2.31	2.73	3.34	3.89
2	0.18	0.27	0.33	0.45	0.56	0.66	0.72	0.89	1.09	1.28	1.45	1.69	1.96	2.17	2.83	3.33	4.07	4.75
5	0.24	0.37	0.46	0.62	0.77	0.87	0.93	1.09	1.32	1.52	1.72	2.01	2.32	2.56	3.32	3.91	4.74	5.51
10	0.31	0.47	0.58	0.78	0.97	1.06	1.11	1.27	1.51	1.72	1.94	2.28	2.61	2.87	3.70	4.36	5.25	6.10
25	0.41	0.62	0.77	1.03	1.28	1.38	1.41	1.54	1.79	1.99	2.24	2.66	3.00	3.27	4.18	4.94	5.88	6.83
50	0.50	0.76	0.94	1.27	1.57	1.67	1.67	1.78	2.03	2.19	2.47	2.96	3.31	3.57	4.53	5.36	6.33	7.34
100	0.61	0.93	1.15	1.55	1.92	2.02	2.04	2.07	2.29	2.40	2.71	3.26	3.60	3.87	4.86	5.78	6.73	7.80
200	0.74	1.13	1.40	1.89	2.34	2.45	2.47	2.50	2.60	2.61	2.95	3.57	3.90	4.16	5.17	6.17	7.09	8.22
500	0.96	1.46	1.81	2.44	3.02	3.14	3.17	3.20	3.23	3.26	3.30	4.00	4.30	4.52	5.54	6.67	7.49	8.68
1000	1.16	1.76	2.19	2.94	3.65	3.79	3.83	3.87	3.91	3.95	3.98	4.34	4.60	4.78	5.79	7.01	7.73	8.96

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

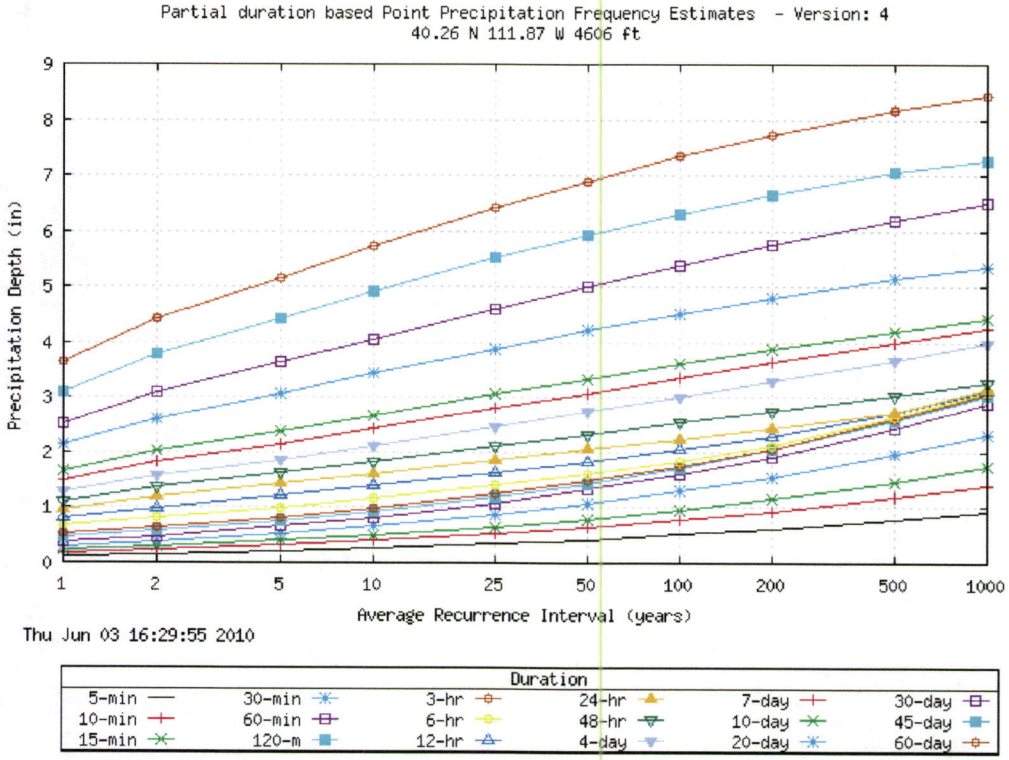
*** Lower bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

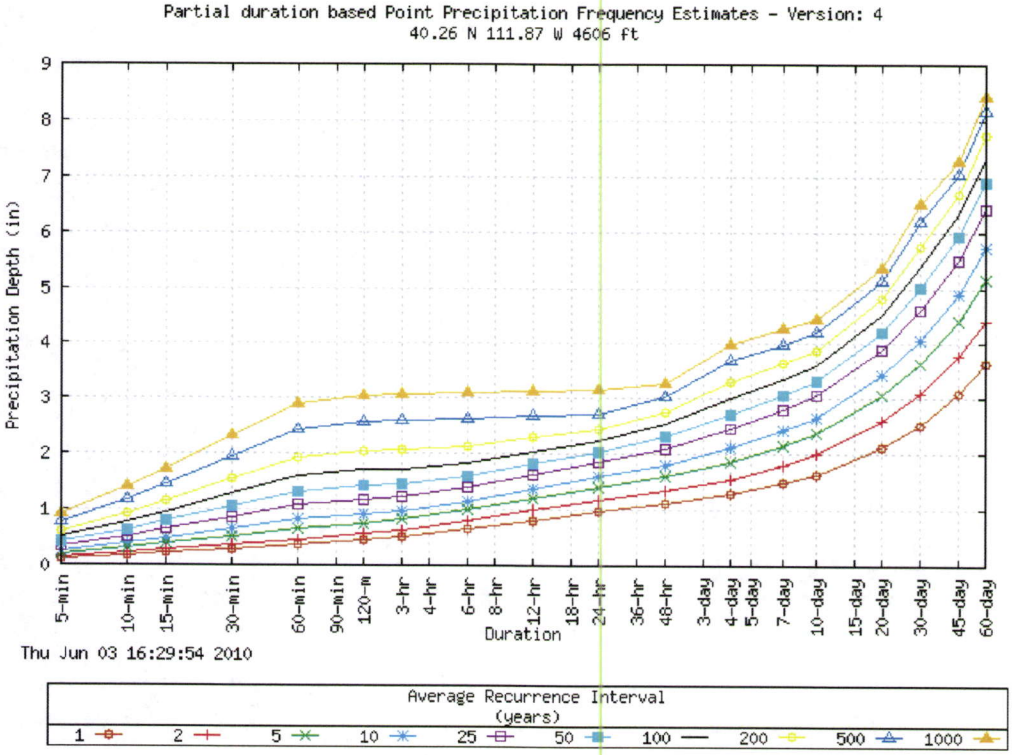
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.10	0.15	0.19	0.26	0.32	0.40	0.47	0.60	0.74	0.90	1.03	1.18	1.37	1.52	1.97	2.34	2.88	3.38
2	0.13	0.20	0.24	0.33	0.41	0.50	0.58	0.74	0.91	1.10	1.26	1.45	1.68	1.86	2.41	2.86	3.52	4.12
5	0.18	0.27	0.34	0.45	0.56	0.66	0.73	0.91	1.11	1.32	1.50	1.73	1.99	2.21	2.85	3.38	4.12	4.81
10	0.22	0.34	0.42	0.56	0.70	0.80	0.87	1.05	1.26	1.49	1.70	1.96	2.25	2.48	3.18	3.77	4.58	5.34
25	0.28	0.43	0.54	0.72	0.90	1.01	1.08	1.25	1.48	1.72	1.96	2.28	2.59	2.83	3.60	4.28	5.14	5.99
50	0.34	0.52	0.64	0.86	1.07	1.19	1.25	1.41	1.64	1.89	2.15	2.52	2.85	3.09	3.90	4.64	5.54	6.44
100	0.40	0.61	0.76	1.02	1.26	1.39	1.44	1.59	1.80	2.06	2.35	2.77	3.10	3.34	4.18	4.99	5.91	6.85
200	0.47	0.71	0.88	1.18	1.46	1.60	1.66	1.80	1.99	2.23	2.54	3.02	3.35	3.57	4.44	5.31	6.23	7.21
500	0.56	0.85	1.06	1.43	1.77	1.91	1.99	2.16	2.29	2.44	2.78	3.33	3.65	3.86	4.75	5.70	6.59	7.63
1000	0.64	0.98	1.21	1.63	2.02	2.18	2.27	2.46	2.53	2.60	2.96	3.58	3.88	4.06	4.95	5.96	6.82	7.89

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables





Maps -

overview map

These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

detailed map

Please read disclaimer for more information.

map legend

Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (40.26/-111.87). Digital ASCII data can be obtained directly from **NCDC**.

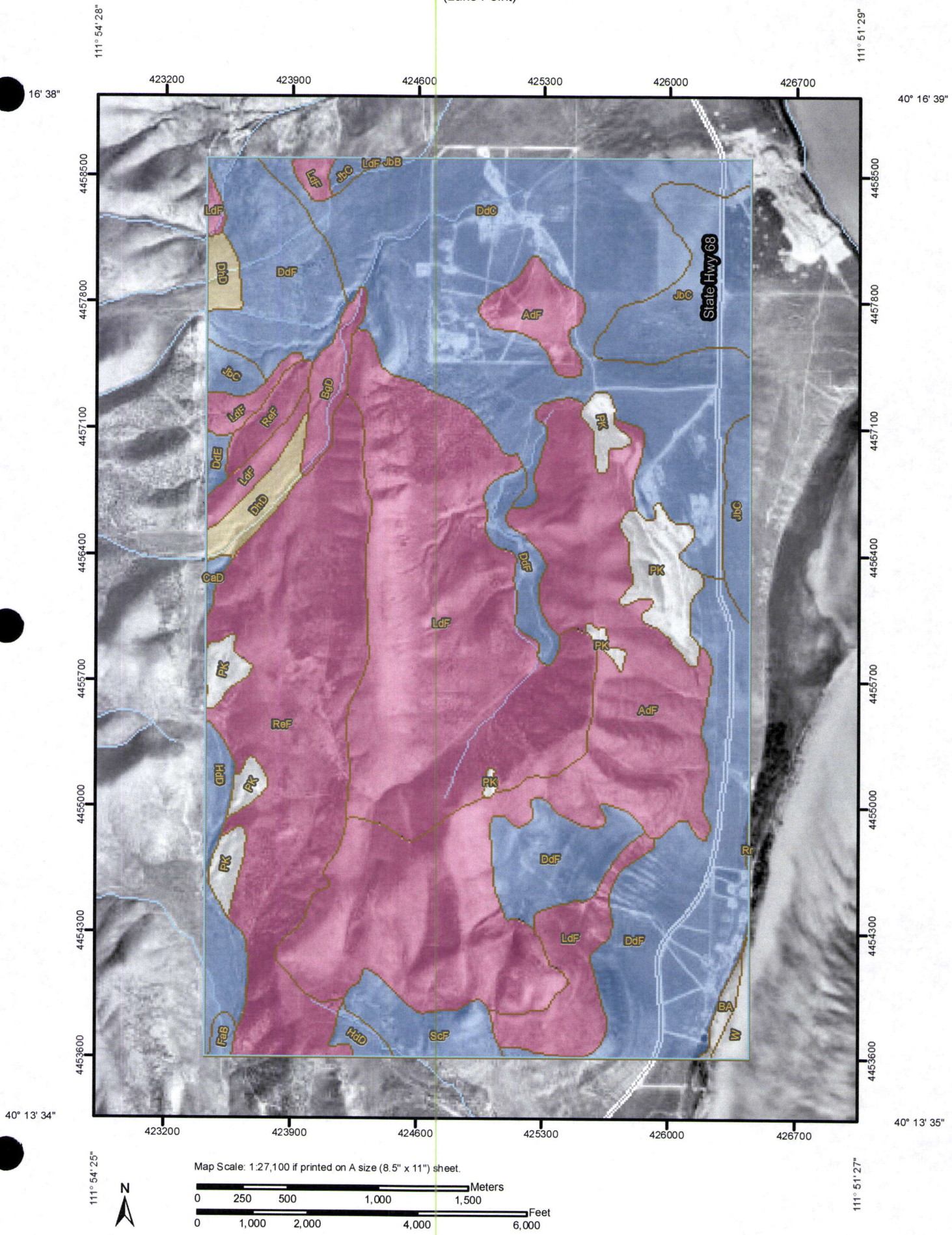
Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps**.

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910

(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Hydrologic Soil Group—Fairfield-Nephi Area, Utah, and Utah County, Utah - Central Part
(Lake Point)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:27,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 12N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fairfield-Nephi Area, Utah
Survey Area Data: Version 5, Sep 2, 2009

Soil Survey Area: Utah County, Utah - Central Part
Survey Area Data: Version 5, Sep 4, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 10/1/1997; 9/12/1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Fairfield-Nephi Area, Utah				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AdF	Amtoft, moist-Rock outcrop complex, 30 to 70 percent slopes	D	682.8	18.3%
BA	Beaches		10.3	0.3%
BgD	Borvant cobbly loam, 8 to 25 percent slopes	D	35.7	1.0%
CaD	Calita loam, 8 to 15 percent slopes	B	5.3	0.1%
DdC	Donnardo stony loam, 2 to 8 percent slopes	B	683.8	18.3%
DdE	Donnardo stony loam, 8 to 25 percent slopes	B	8.6	0.2%
DdF	Donnardo stony loam, 25 to 40 percent slopes	B	578.8	15.5%
DhD	Dry Creek cobbly loam, 4 to 15 percent slopes	C	51.4	1.4%
FaB	Firmage gravelly loam, dry, 2 to 4 percent slopes	B	7.1	0.2%
HdD	Hiko Peak stony sandy loam, 8 to 15 percent slopes	B	70.9	1.9%
JbB	Juab loam, 2 to 4 percent slopes	B	0.4	0.0%
JbC	Juab loam, 4 to 8 percent slopes	B	188.4	5.1%
LdF	Lodar-Rock outcrop complex, 30 to 70 percent slopes	D	709.5	19.0%
PK	Pits-Dumps complex		121.0	3.2%
ReF	Reywat-Rock outcrop complex, 30 to 60 percent slopes	D	501.9	13.5%
Rr	Roshe Springs silt loam	C/D	0.9	0.0%
ScF	Sanpete gravelly fine sandy loam, 15 to 40 percent slopes	B	58.4	1.6%
Subtotals for Soil Survey Area			**3,715.1**	**99.6%**
Totals for Area of Interest			**3,730.3**	**100.0%**

Hydrologic Soil Group— Summary by Map Unit — Utah County, Utah - Central Part				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
W	Water		15.2	0.4%
Subtotals for Soil Survey Area			**15.2**	**0.4%**
Totals for Area of Interest			**3,730.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Project Name: Lake Point | **Project Number: 24585160**

Revision: 0

Date: 3-Jun-2010 | **Designer: lks**

Time of Concentration

				Location		
Sheet Flow				**Little Canyon**		
Upstream Elevation		(ft)	=	5,876.00		
Downstream Elevation		(ft)	=	5,855.00		
Length	L	(ft)	=	100.00		
Average slope	S_0		=	21.00%		
Soil Type			=	Range (natural)		
Manning's roughness	n		=	0.130		
2-yr, 24-hr rainfall depth	P	(in)	=	1.18		
Travel time $t_t = 60\left(\frac{0.007(nL)^{0.8}}{P^{0.5}S_0^{0.4}}\right)$	t_t	(min)	=	5.62		

Shallow Concentrated Flow

Upstream Elevation		(ft)	=	5,855.00		
Downstream Elevation		(ft)	=	5,540.00		
Length	L	(ft)	=	1,500.00		
Average slope	S_0		=	21.00%		
Paved or Unpaved			=	Unpaved		
Average Velocity	V	(ft/s)	=	7.465		
Travel time $t_t = 60\left(\frac{L}{3600V}\right)$	t_t	(min)	=	3.35		

Open Channel Flow

Upstream Elevation		(ft)	=	5,540.00		
Downstream Elevation		(ft)	=	4,740.00		
Length	L	(ft)	=	12,000.00		
Average slope	S_0		=	6.67%		
Channel Width Base		(ft)	=	2.00		
Channel Width Top		(ft)	=	8.00		
Channel Depth		(ft)	=	4.00		
Manning's roughness	n		=	0.04		
Cross-sectional Area		(ft2)	=	20.00		
Wetted Perimeter		(ft)	=	12.00		
Hydraulic Radius		(ft)	=	1.67		
Velocity		(ft/s)	=	13.52		
Travel time $t_t = 60\left(\frac{L}{3600V}\right)$	t_t	(min)	=	14.79		

Total

Time of Concentration	Tc	(min)	=	**23.76**		
Lag Time				**14.26**		

Weighted CN Calculations					
	Total Area (sq miles)	Area by Land Use (acres)	Hydrologic Soil Group	CN	Weighted CN Value
Sagebrush with grass understory	1.27	0.25	B	51	66
Sagebrush with grass understory		1.02	D	70	

CN Values are from the NRCS Urban Hydrology for Small Watersheds TR-55 Manual, June 1986

URS

ATTACHMENT 2 – HYDROLOGIC MODEL OUTPUT

Project: Lake Point Quarry Simulation Run: Little Canyon

Start of Run: 03Jun2010, 12:00 Basin Model: Little Canyon
End of Run: 05Jun2010, 12:00 Meteorologic Model: Little Canyon Met.
Compute Time: 03Jun2010, 15:33:38 Control Specifications: Little Canyon Control

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Little Canyon	1.27	101.0	04Jun2010, 00:12	15.6
Little Canyon Exit	1.27	101.0	04Jun2010, 00:12	15.6

URS

ATTACHMENT 3 – HYDRAULIC MODEL OUTPUTS

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 06/04/2010

Project No. :24585160
Project Name.:Lake Point Quarry
Computed by :Lizel Spencer

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0300
2.	Channel Bottom Width (ft)	0.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.040
6.	Discharge (cfs)	111.72
7.	Depth of Flow (ft)	2.75

OUTPUT RESULTS

Cross Section Area (Sqft)	15.13
Average Velocity (ft/sec)	7.39
Top Width (ft)	11.00
Hydraulic Radius (ft)	1.23
Froude Number	1.11

Increase in Water Surface Elevation around a Bend

Source:
Design of Roadside Channels with Flexible Linings
Hydraulic Engineering Circular Number 15, Third Edition
Equation 3.9 in Chapter 3 General Design Procedures
http://www.fhwa.dot.gov/engineering/hydraulics/pubs/05114/hec1503.cfm#_Toc115781618

$$\Delta d = \frac{V^2 T}{g R_c}$$

Where

Δd =	additional freeboard required because of superelevation (ft)	
V =	7.25	= average channel velocity(ft/s)
T =	10.56	= water surface top width (ft)
g =	32.2	= acceleration due to gravity (ft/s^2)
R_c =	35	= radius of curvature of the bend to the channel centerline (ft)

Δd = 0.492511 **ft**

Bond Calculations Summary Table		
Item	**Structures & Facilities**	**Facility Removal Costs**
1	**Process Facilities**	**$83,477**
2	**Petroleum Storage - Operations**	**$885**
3	**Power Line**	**$12,000**
4	**Lay Down Yard**	**$3,321**
5	**Earthwork**	**$84,328**
6	**Revegetation**	**$29,600**
7	**Post Mine Monitoring**	**$6,840**
	Subtotal	**$220,452**
	Indirect Costs (26.8%) **Subtotal**	**$59,081**
	UT DOGM 5-Year Escalation Factor April 2010 (0.5%)	
	YEAR 1	**$1,398**
	YEAR 2	**$1,405**
	YEAR 3	**$1,412**
	YEAR 4	**$1,419**
	YEAR 5	**$1,426**
	Subtotal	**$7,058.55**
	TOTAL	**$286,591**

RECLAMATION BOND COST FACTORS							
TASK REFERENCE*	**PAGE**	**DESCRIPTION**	**UNIT**	**LABOR**	**EQUIPMENT**	**TOTAL (Overhead & Profit Incl)**	**REMARKS**
02 41 16.13 0100	33	Structure demo	CF	0.12	0.16	**$0.35**	Includes haul 20 miles
0241-16.17-0420	34	Building demo, footings and foundations	SF	3.94	0.66	**$6.85**	Reinforced wiremesh -slab
3123-16.32-2820	219	Ripping; medium hard	CY	0.08	0.28	**$0.43**	300hp
3123-16.46-5200	219	Excavating bulk dozer	CY	0.52	1.73	**$2.68**	300hp; average push = 150'
3123-16.50-2000	220	Excavation bulk scrapers	CY	0.48	2.24	**$3.18**	21CY capacity; 1500' haul
Crew B-11J	464	Ripping/scarifying - fine grade seed prep	Day	-	-	**$1,286.82**	Discounted laborer
Rocky Mtn. Power Co.	-	Power Transmission Line removal	LF	-	-	**$4.80**	Verbal Quote on 4-06-10; Sturgeon Electric
DOGM	-	Standard Revegetation Cost	Acre	-	-	**$1,000.00**	

*Task references are based on RS Means Heavy Construction Cost Data (Edition 2010) unless otherwise noted

CF = Cubic Foot; CY = Cubic Yards; LF = Linear Foot; SF = Square Foot; SY= Square Yard

1. Process Facilities

Item	Facilities Removal	Each	SF	CY	CF	L	W	H	Task Ref.	Cost
1	Jaw Crusher/Feeder	2			5760	40	12	12	02 41 16.13 0100	**4032**
2	Feed Belt	2			1200	60	4	5	02 41 16.13 0100	**840**
3	Screen (JCI 7'x20')	4			4200	35	10	12	02 41 16.13 0100	**5880**
4	Cone	2			5760	40	12	12	02 41 16.13 0100	**4032**
5	Cone Feed	2			1500	60	5	5	02 41 16.13 0100	**1050**
6	Field Conveyors	10			960	60	4	4	02 41 16.13 0100	**3360**
7	Return Belt	2			800	50	4	4	02 41 16.13 0100	**560**
8	Stacker	4			3840	80	4	12	02 41 16.13 0100	**5376**
9	Scale/Scale House	1			17500	50	35	10	02 41 16.13 0100	**6125**
10	Control House/Tower/Tool Shed	3			5400	45	10	12	02 41 16.13 0100	**5670**
11	Scale footings (SF)	8	25			5	5		02 41 16.17 0420	**1370**
12	Facility Disposal Cost (CY)	All		1738					tons	**45182**
	TOTALS:				**46,920**					**$83,477**

General Assumptions

All crushing process equipment is completely portable and sits on metal stands and wood blocks. The scale sits on concrete footings. No concrete structures are utilized. All portable/skid mounted equipment will be transported off site for re-use.

Material weight - 1 ton = 1 CY

All solid waste materials will be transported offsite for recycling or disposed of in a licensed facility - North Utah County District Landfill, 2000 W 200 S Lindon Utah (20 miles from site)

$26.00/ton disposal fee - Landfill listed pricing

CF = Cubic Foot; CY = Cubic Yards; LF = Linear Foot; SF = Square Foot; SY= Square Yard; L = Length(ft); W = Width(ft); H = Height(ft)

2. Petroleum Storage - Operations

Item	Type	Number	Load Cost	Trucking	Total
1	Fuel Tank	1	$100.00	$195.00	**$295**
2	Oil Tanks	1	$100.00	$195.00	**$295**
3	Lube Cubes	1	$100.00	$195.00	**$295**
				TOTAL	**$885**

Items	Details
(1) Fuel Tank	10,000 gal
(2) Oil tanks - 1 each	500 gal each
(3) Lube Cubes - 1 each	500 gal each

General Assumptions

All tanks will be transported off site for re-use

No foundations or containment structures around tanks

Costs are based on removal from site; loading & transport

Load Tanks $100.00 each

Transport to Vendor - 30 mile x 2 = 60 miles @ $3.25 per mile = $195 each

$3.25 per mile trucking cost is current loaded per mile cost average (Ames)

Disposal of used oil - None - no tank on site

fuel.

3. Power Lines

Item	Removal	Each	LF	SF	TASK REF	Cost
1	Power transmission line to site		2500		Rocky Mountain Power Co.	**$12,000**
					TOTAL	**$12,000**

Items	Details
(1) Poles (20'), power lines	2500 LF
(2) Substation transformer for re-use	None
(3) Transformer pad	None

General Assumptions

All items are considered as solid waste and will be chopped and demolished

Electrical wire will have a high recycle value however no credit is being allocated

No transformers required

LF = Linear Foot; SF = Square Foot

4. Lay Down Yard

Item	Type	Tons	Transports	Days	CF	CY	L	W	H	Cost
1	Off-Site Transport		2			-				$260
2	Material Loading			1						$1,007
3	Off-Site Disposal	79			2,125	79	25	25	3.4	$2,054
									TOTAL	$3,321

Items	Details
Misc. Scrap materials, plastics, wood, etc.	25'l x 25'w x 3.4'h
Off-Site Disposal quantity- based on 100% of total area volume	

General Assumptions

All solid waste materials will be transported offsite for recycling or disposed of in a licensed facility - North Utah County District Landfill, 2000 W 200 S Lindon Utah (20 miles from site)

Transport to Landfill - 20 miles x 2 = 40 miles @ $3.25 per mile = $130.00 each

Material weight - 1 ton = 1 CY

Average load is 40 tons - 79tons/40 = 2 trips

$26.00/ton disposal fee - Landfill listed pricing

Material Loading - 950 Loader plus operator - $1,007.00 per day per current rental fees and wages - No applicable Means rate could be located

CF = Cubic Foot; CY = Cubic Yards; LF = Linear Foot; SF = Square Foot; SY= Square Yard; L = Length(ft); W = Width(ft); H = Height(ft)

5. Earthwork

Item	Type	CY	Day	Acres	TASK REF.	Cost
1	Ripping and scarifying compacted surfaces	40,656		17	3123-16.32-2820	**$17,482**
2	Surface shaping & grading	5,000		17	3123-16.46-5200	**$13,400**
3	Surface soil placement	16,200		17	3123-16.50-2000	**$51,516**
4	Fine grading and seedbed preparation		1.50	30	Crew B-11J	**$1,930**
					TOTAL	**$84,328**

Items	Details
(1) Pit backfilling	No costs for reclamation.
(2) Ripping and scarifying compacted surfaces	Includes regrade to blend with adjacent topography during greatest surface disturbance period. Ultimate pit floor will be 16.8 acres. Areas included: stockpile, pond, processing area, (16.8 acres approx. 18"depth) (15730CY).
(3) Surface grading & profiling	Quantity is based on the greatest possible surface disturbance period, prior to reaching the ultimate pit floor, process area, stockpile area and pit floor. Estimated average cut to fill = 1.5' material per acre for 17 acres = 4987 CY (5,000CY)
(4) Surface soil replacement	Quantity is based on the greatest possible surface disturbance period, prior to reaching the ultimate pit floor. Materials will be placed and spread with a scraper and grader to approx 0.5': process area, stockpile area and pit floor.
(5) Fine grading and seedbed preparation	Complete with a grader; assuming production is 20 acres per day - (30/20= 1.5 days)

General Assumptions

Ephemeral drainage relocation will be constructed to its final configuration including surface soil salvage/placement, seeding, etc during the active mine phase. However, for surety estimate, reseeding of the channel is encompassed. Refer to worksheet number 6.

CY = Cubic Yards

6. Revegetation

Item	Type	Acres	TASK REF.	Cost	TOTAL
1	Mine Area	26.6	DOGM	$1,000	$26,600
2	Ephemeral Drainage/Safety Berms	3.0	DOGM	$1,000	$3,000
	TOTALS	**29.6**			**$29,600**

General Assumptions

Seed will be broadcasted

Seed blend will be the DOGM recommended seed mix

7. Post Mine Monitoring								
Item	**Vegetation Monitoring Survey and Reports**							
Hourly Rate ----->	**Principal 150**	**PM 105**	**Sr. Ecologist 100**	**GIS 60**	**Office Asst. 55**	**Direct Labor Cost**	**Travel/ Equipment/ Misc. Costs**	**Task Subtotal**
Field Work			30			$3,000.00		**$3,000.00**
Yearly Summary x3			4	4	2	$750.00		**$750.00**
Final Report	2	4	16	6	2	$2,790.00		**$2,790.00**
Lodging							$0.00	**$0.00**
Auto Rental							$300.00	**$300.00**
Gas							$0.00	**$0.00**
Per Diem							$0.00	**$0.00**
Subtotal Labor	2	4	50	10	4	$6,540.00	$300.00	**$6,840.00**
TOTALS:	**2**	**4**	**50**	**10**	**4**	**$6,540.00**	**$300.00**	**$6,840.00**

General Assumptions

Task will include: 1 day work, 1 biologist, one time per year for 3 years, total 3 days in the field. Establish transects using GPS for the site that can be revisited each year for a yearly comparison, and photo documentation. Annual reporting; and one final data summary report.

Application for Mineral Mine Plan Revision or Amendment

Operator: Ames Construction Inc.

Mine Name: Lake Point Quarry **File Number: M/049/0076**

DETAILED SCHEDULE OF CHANGES TO THE MINING AND RECLAMATION PLAN

Comment #	Rule				DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
1	R647-4-105; 105.1	ADD	**REPLACE**	REMOVE	Figure 1. Base Map/Location Map
2	R647-4-105; 105.3	ADD	**REPLACE**	REMOVE	Figure 7a. Cross Sections
3	R647-4-106; 106.8	ADD	**REPLACE**	REMOVE	Figure 11. Geologic Formation Map
4	R647-4-109; 109.1	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
4	R647-4-109; 109.1	ADD	**REPLACE**	REMOVE	Figure 5. Mine Excavation Plan
4	R647-4-109; 109.1	**ADD**	REPLACE	REMOVE	Appendix I – Hydrologic Analysis Report
5	R647-4-110; 110.2	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
6	R647-4-110; 110.2	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
7	R647-4-110; 110.5	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
8	R647-4-110; 110.5	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
9	R647-4-113	ADD	**REPLACE**	REMOVE	Form MR-LMO - Redline Strike Out
9	R647-4-113	**ADD**	REPLACE	REMOVE	Table 110.3.1: Surface Facilities to be Reclaimed
9	R647-4-113	ADD	**REPLACE**	REMOVE	Figure 5. Mine Excavation Plan
10	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Summary Sheet
11	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 3 of 9: Process Facilities
12	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H
13	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 4 of 9: Petroleum Storage - Operations
14	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H
15	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 6 of 9: Lay Down Yard; please note that this sheet cannot be more detailed at this time as the materials are hypothetical the volume of which was based on experience
16	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 7 of 9: Earthwork
17	R647-4-113	ADD	**REPLACE**	REMOVE	Appendix H – Sheet 8 of 9: Revegetation
N/A		ADD	REPLACE	**REMOVE**	Appendix I: Surety Vendor Quote
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To maximize production and maintain a "No-discharge" operation, the ephemeral drainage will be relocated along the northwestern property boundary and will tie into its existing channel at the northeastern boundary during later periods of mining. It will continue to perpetuate offsite flows and receive stormwater discharge from the newly relocated Utah County Long Ridge Road (Figure's 4 & 5). ~~The new channel section will be constructed to mimic the approximate depth and width hydraulic geometric profiles of the existing channel.~~ The channel will be reconstructed as a "V-Ditch" 15' wide and 3.75' deep on average with a 3% gradient and 2H:1V side slopes. These dimensions were determined by a hydrologic model and is sized to pass the 100 year 24 hour storm event (see Appendix I: Hydrologic Analysis Report). At the channel bend locations, the channel will need an additional 0.5 feet for a total depth of 4.25 feet and total width of 17'. Armoring with 4-6" rip rap may be required for the two tie in points where the material is anticipated to be unconsolidated alluvium. However, most of the new channel will be constructed in bedrock; therefore, no further armoring will be required.

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During the early period of operations the existing ephemeral drainage splits the permit area. Therefore, stormwater runoff from the stockpile/crusher plant area northwest of the drainage will be contained by the earthen berm and stormwater runoff from the quarry will sheet flow and be contained along the quarry face (Figure 8b). As mining operations advance and the existing channel is relocated, stormwater runoff from the mining operation, processing and stockpiles will be contained within the quarry(Figure 8b). Stormwater runoff from the entire site will directly sheet flow or be collected and diverted via a ditch network.

To ensure that the site can adequately contain the 100-year 24-hour storm event, the Rational Method was utilized to calculate a conservative run-off volume and resultant required for the following three areas: 1. Early phase stockpile/crusher; 2. Early phase mine area; and 3. Later phase entire site. Point Precipitation Frequency Estimates from NOAA Atlas 14 at 40.26 N and -111.87 W, 4,606' elevation was utilized. Refer to Appendix G for the backup calculations with resultant containment volumes and Figure 8b for the containment areas shown in relation to the mining operation.

Once inside the quarry, water disperses across the quarry floor. The crusher plant staging area and stockpile area will be graded to be higher than the surrounding areas to prevent contamination of stormwater within the quarry. This approximate 16.7 acre area has the capacity to contain much more water than would ever accumulate in a 100-year 24-hour storm event.

The project will not adversely impact surface water resources

Ground Water

It is anticipated that the mine operation excavation necessary for material product and resultant quarry floor bottom elevation of 4,732' will not intercept groundwater. Utah Division of Water Rights Well Log Database was searched to ascertain depths to water below the ground surface (bgs). Analysis of the project vicinity indicates that depth to groundwater is approximately 220 feet below original ground surface. Based on elevations of wellheads and depth to water data from the two closest wells, groundwater elevation is anticipated to range from 4,661' down to 4,499'.

The project will not adversely impact groundwater resources.

109.2 - Wildlife habitat and endangered species

Threatened and Endangered Species

Background information pertaining to state and federally listed threatened and endangered species and species of special concern was obtained through online resources at the U.S Fish and Wildlife Service and the Utah Division of Wildlife Resources (DWR). An information request letter was submitted to DWR on March 12, 2010 in order to obtain additional information regarding the possible presences of threatened or endangered species and/or the potential for their habitats to exist within or near the Lake Point Quarry site.

Seven federally protected species were identified for Utah County (UDWR 2009a). A list of threatened and endangered species is contained in Appendix A. There are 35 State Listed Species in Utah County (UDWR 2009b). Seven of these species may occur in or near the site. A list of these seven species is contained in Appendix A. URS Corporation conducted a site survey for presence of the aforementioned March 16 and 17, 2010.

No individuals or potential habitats of any of the listed species were identified during fieldwork.

Wildlife

Eleven species of wildlife were identified during field surveys (Appendix A). Most were visual observations of individuals, but identifications were also made by verifying and identifying scat and tracks or burrows. The species identified were typical of arid areas that have limited resources due to low precipitation. One major resource is the permanent source of water afforded by the Utah Lake which is only about one mile east of the site.

The project area appears to support a mule deer population. No visual observations were made of mule deer utilizing the area, but tracks and scat were seen in numerous areas within the project site. The diversity of bird species appeared to be limited. The majority of the bird species identified appeared to be traveling through the area and were not hunting or nesting. There were no visual observations of any reptiles on the site, but they were likely still hibernating.

Due to a highly altered site from fire, grazing, and historic mining, wildlife habitat is poor at best.

109.3 - Existing soil and plant resources

The only effective mitigation practice for plant and soil measures is to salvage, store and outplace topsoil upon final reclamation as previously described in section 106.5 – 106.6. Approximately 30 acres of surface will be impacted including the vegetation growing at the site. As previously mentioned, the plant community that currently exists has been highly disturbed from fire, grazing, and past mining activity. No impacts will occur to riparian or wetland areas, as they do not exist on the site no impacts will occur to threatened or endangered plant species (refer to Section 109.2).

109.4 - Slope stability, erosion control, air quality, public health & safety

Describe the impacts this mining operation will have on slope stability, erosion, air quality, public health and safety. Include descriptions of highwall and slope configurations and their stability. Air quality permits from the Utah Division of Air Quality may be required for mining operations. Please reference any such permits. Describe measures to be taken to minimize or mitigate impacts to slope stability, erosion, air quality, or public health and safety.

Slope Stability

There are no slope stability impacts anticipated because they are mitigated by the open pit design. The open pit plan establishes an overall 1h:1v high wall slope (including catch benches) and flatter final slopes on non-high wall areas. The limestone being mined is a very stable competent material, which will yield a stable high wall finished surface.

Erosion Control

Erosion impacts will be limited as the grading directs runoff from the mined areas into the mining area. Topsoil storage piles will be stabilized with track walking and seeding. Initial stockpile areas will have berms placed along the stockpile pad perimeters to capture runoff until such time the stockpiles are within the open pit mine area.

Air Quality

Dust will have a limited impact. Each blast will generate dust. Fugitive dust generated from operations are mitigated and controlled with water. In addition, the site access road will be watered and or chemically stabilized with magnesium chloride or recycled asphalt grindings. Processing operations will use water for stockpile materials, loading areas and water spray bars at drop point and conveyors. All processing/crushing equipment to be used on this project is currently permitted with the State of Utah Division of Air Quality. See Appendix D

Public Health and Safety

Public health and safety will be mitigated with the installation of signs posted around the perimeter of the permit boundary and earthen berms at key locations. The signs will provide warnings: No Trespassing, Danger - Blasting & Mining Operations and contact information. Earthen berms will be placed around the perimeter of the high wall and along the Class D road. Fencing will be placed along the southern high wall.

VII. Rule R647-4-110 - RECLAMATION PLAN
110.1 - Current land use and postmining land use

Current or premining land use(s) [other than mining]: Mining and Grazing

List future post-mine land-use(s) proposed): Mining and Grazing

(Develop the reclamation plan to meet proposed post-mine land use.)

110.2 - Reclamation of roads, highwalls, slopes, leach pads, dumps, etc.

Describe how the following features will be reclaimed: roads, highwalls, slopes, impoundments, drainages and natural drainage patterns, pits, ponds, dumps, shafts, adits,8 drill holes and leach

pads. Describe the configuration of these features after final reclamation. Describe the rinsing and neutralization of leach pads associated with final decommissioning.

Reclaimed Features

Describe how roads will be reclaimed. Road reclamation may include: regrading cut and fill sections, ripping the road surface with a dozer, topsoil replacement, construction of water bars, construction of traffic control berms or ditches, and reseeding.

Roads
Temporary roads will be mined away as the open pit advances downward and gets smaller. One road, about fifteen feet wide, will remain at the end on mine life to access the bottom of the open pit.

Describe how highwalls will be reclaimed. Highwall reclamation may include: drilling and blasting, backfilling, regrading, topsoil replacement, and reseeding.

Highwalls
Highwalls and catch benches will remain at the end of mine life. The wall and catch bench configuration will be constructed as mining advances. No additional grading is anticipated at the end of mining.

Describe how slopes will be reclaimed. Slope reclamation may include: regrading to a 3 horizontal : 1 vertical (3h:1v) configuration, topsoil replacement, contour ripping, pitting, and reseeding.

Slopes
The site will be mined leaving 45 degree or 1H:1V slopes; whereas, highwalls and safety benches will not be recontoured. In the event that unconsolidated material remains, the area will be shaped to a slope of 3H:1V and roughened by deep ripping (18" min.) on contour, Slope flatter than a 2.5H:1V will have topsoil applied and reseeded. Contour scarification will be conducted on the top soil surface. ~~Water bars may be placed on contour where long continuous slopes occur at approximately 100 foot intervals.~~

Describe how impoundments, pits and ponds will be reclaimed. Include the final elevations and final disposition of the drainage in and around the impoundment. If the impoundment, pit, or pond is intended to be left as part of the post-mining land use, then an agreement with the land managing agency/owner is required. Structures to remain must be left in a stable condition.

Impoundments & Ponds
There are no impoundments planned for this project. The water storage pond and wash water pond will be mined out or regarded during final contouring.

Include the final size of the impoundment, pit, pond in acre-feet of storage and the capacity of the spillway to safely pass storm events.

Open Pit
An open pit will remain at the end of mine life. The floor of the pit will be top soiled and re-seeded. The open pit will not impound water.

Impoundments, pits, and ponds, which are not approved as part of the post mining land use shall be reclaimed, free draining, and the natural drainage patterns restored.

Describe how drainages will be reclaimed. Drainage reclamation would include: the reestablishment of a natural drainage pattern which fits in with the upstream and downstream cross-section of existing drainage in the vicinity of the disturbance; the reestablishment of a stable channel in the reclaimed reach of channel, using the necessary armoring to prevent excessive erosion and downstream sedimentation.

Drainages
A new permanent ephemeral drainage will be constructed to replace the existing natural ephemeral drainage prior to completion of mining. This new drainage will maintain a natural drainage pattern to transport storm water from the pre-existing drainage upstream and a point downstream of the property which enters the same down-gradient ephemeral drainage system.

Include cross-sections and profiles of reestablished channels to demonstrate compatibility with existing drainage characteristics.

See Figure 7a

Describe how waste dumps will be reclaimed. Waste dump reclamation may include regrading to a 3h:1v configuration, topsoil replacement, mulch or biosolids applications, contour ripping or pitting, and reseeding. Characterization of the physical and chemical nature of the waste dump materials should be provided.

Waste Dumps
No waste dumps will be constructed.
Describe how shafts and adits will be reclaimed. Reclamation of shafts may include: backfilling, installation of a metal grate, installation of a reinforced concrete cap, topsoil replacement and reseeding. Reclamation of adits may include: backfilling, installation of a block wall, installation of a metal grate, topsoil replacement and reseeding.

Shafts, Adits
None of these items are associated features with this project

Describe how drill holes will be reclaimed. Drill hole reclamation must be consistent with the rules for plugging drill holes (R647-4-108). Reclamation of plugged drill holes may include topsoil replacement and reseeding.

Drill Holes
Drill holes are not associated features with this project.

Describe how tailings areas will be reclaimed. Tailings reclamation may include: dewatering, neutralization, placement of cap materials, placement of subsoil materials, topsoil replacement and reseeding. Characterization of the physical and chemical makeup of the tailings material should be provided.

Tailings
There are no Tailings associated with this project.

Describe how leach pads will be reclaimed. Reclamation of leached materials may include: neutralization or leached materials, rinsing of leached materials, dewatering leached materials, regrading slopes of leached materials to 3h:1v, extending pad liners, placement of capping materials, placement of subsoil materials, mulch or biosolids application, topsoil replacement and reseeding. Characterization of the physical and chemical makeup of the leached materials should be provided. Post closure monitoring and collection of drain down fluids should also be addressed.

Leach Pads
There are not leach pads associated with this project.

NOTE: The Minerals Rules require overall highwall angles of no more than 45° at final reclamation unless a variance is granted. All dump or fill slopes should be left at an angle of 3h:1v or less. Any slopes steeper than 3h:1v must be reclaimed using state-of-the-art surface stabilization technology. Pit benches exceeding 35 feet in width should be topsoiled, or covered with fines, and revegetated.

Describe the final disposition of any stockpiled materials on site at the time of final reclamation.

Stockpiles
No stockpile will remain at the time of final reclamation.

110.3 - Surface facilities to be left

Describe any surface facilities which are proposed to remain on-site after reclamation (buildings, utilities, roads, drainage structures, impoundments, etc.). Describe their post-mine application. Justification for not reclaiming these facilities must be included in the variance request section.
No facilities will remain on site after reclamation.

Table 110.3.1: Surface Facilities to be Reclaimed

Structure	Dimensions
2 QTY Jaw Crusher	40' x 12' x 12'
2 QTY Feed Belt	60' x 4' x 5'
4 QTY 7'x20' Screens	35' x 10' x 12'
2 QTY Cone Crusher	40' x 12' x 12'
2 QTY Cone Feed	60' x 5' x 5'
10 QTY Field Conveyors	60' x 4' x 4'
2 QTY Return Belt	50' x 4' x 4'
4 QTY Stacker	80' x 4' x 12'
1 QTY Scale House	50' x 35' x 10'
3QTY Control House/Tower/Tool Shed	45' x 10' x 12'
1 QTY Aboveground Fuel Tank (Diesel)	10,000 Gallon Capacity

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110.4 - Treatment, location and disposition of deleterious materials

Describe the nature and extent of any deleterious or acid forming materials located on-site. Describe how these materials will be neutralized, removed, or disposed of on site. Describe how buildings, foundations, trash and other waste materials will be disposed of.

No deleterious materials will remain on site during or after reclamation. No buildings are planned to support the operations, therefore there are none to dispose of. All trash and other wastes generated from the operations will be disposed off site in a licensed landfill.

110.5 - Revegetation planting program and topsoil redistribution

Highly compacted areas (i.e. processing/laydown) will be ripped to a minimum of 18 inches depth on contour ~~thereby reducing compaction~~after topsoil placement. The quarry bottom will be comprised of bedrock substrate so this area is not included. Final shaping and grading will then occur ~~followed by topsoil placement~~.

Soil Material Replacement

Topsoil will be spread throughout the site (excluding highwall benches) using scrapers to place soil after being loaded from the stockpile. A grader will spread the soil to a depth of 6 inches. Because of the highwalls, there will be a surplus of topsoil material to adequately cover any remaining areas that will facilitate site revegetation success.

Seed Bed Preparation

Finally, the grader will scarify the topsoil media alleviating compaction created by the scrapers. The resultant roughened surface will then be considered prepped for seed catchment and precipitation retention/infiltration.

Seed Mixture

Table 110.5.1 below provides the seed mixture that will be used in reclamation at the Lake Point Quarry (see Appendix H for cost).

Table 110.5.1: Reclamation Seed Mix for Lake Point Quarry

Scientific Name	Common Name	Pure Live Seed lbs/acre
~~*Pseudoroegneria spicata ssp. Spicata*~~*Agropyron intermedium*	~~Bluebunch Wheatgrass~~Intermediate Wheatgrass	2.~~8~~0
~~*Elymus elymoides*~~*Agropyron dasystachum*	~~Bottlebrush Squirreltail~~Thickspike Wheatgrass	2.0
~~*Triticum aestivum x Secale cereale*~~*Dactylis glomerata*	~~Quickguard Sterile Triticale~~Piute Ochard Grass	~~10.1~~0.5
~~*Poa secunda ssp. sandbergii*~~*Elymus cinereus*	~~Sandberg Bluegrass~~Great Basin	~~0~~2.5

	Wildrye	
Artemisia frigida *Oryzopsis Hymenoides*	Fringed Sagebrush *IndianRrice Grass*	0.122.0
Sanguisorba minor	Small Burnet	5.3
Penstemon palmeri	Palmer Penstemon	0.60.5
Aster chilensis	Pacific Aster	0.1
Melilotus officinalis	Yellow Sweetclover	0.5
Artemisia tridentata vaseyana	Mountain Big Sagebrush	0.1
Atripliex canescens	4-Wing Saltbush	1.0
Chrysothamnus nauseosus	Rubber Rabbitbrush	0.3
Kochia prostrate	Forage Kochia	0.5
	TOTAL	**21.512.0**

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Seeding Method

The sSeed will be broadcasted by a tractor with wire harrow drag for tillage utilizing a conventional applicator during late autumn. Seeding will occur immediately following surface roughening. .

Fertilization and Soil Amendments

Approximately 1,200 pounds per acre of Biosol organic fertilizer will be applied at the time of seedingtopsoil placement. Seedbed preparation will then follow (see above). It will be mixed with the seed and applied through the broadcast spreader and tilled in slightly by the wire harrow drag method.

Other Revegetation Procedures

None.

VIII. Rule R647-4-112 VARIANCE

There are no variances being requested from Rules R647-4-107 (Operation Practices), R647-4-108 (Hole Plugging), and R647-4-111 (Reclamation Practices).

IX. Rule R647-4-113 – SURETY

Please refer to Appendix H for Surety Calculations.

A Reclamation cost estimate based upon RS MEANS, or third party costs has been developed.

X. PERMIT FEE [Mined Land Reclamation Act 40-8-7(i)]

The Utah Mined Land Reclamation Act of 1975 [40-8-7 (I)] provides the authority for the assessment of permitting fees. Commencing with the 1998 fiscal year (July 1 - June 30), **and revised July 1, 2002,** annual permit fees are assessed to new and existing notices of intention and annually thereafter until the project disturbances are successfully reclaimed by the Permittee / Operator and released by the Division.

Large mining permits require an initial submission fee and annual fee of $500.00 for surface disturbance of 50 or less acres, or a $1,000.00 fee for surface disturbance greater

than 50 acres (see page six Section III, Rule R647-4-106.3 for estimated disturbance calculation). The appropriate fee MUST accompany this application or it cannot be processed by the Division.

PLEASE NOTE: If you are expanding from a small mining operation to a large mining operation, the appropriate large mine permit fee, less the annual $150.00 small mine fee (if already paid) MUST accompany this application.

REFERENCES

Bullock, K.C., 1951. Geology of Lake Mountain, Utah. Bulletin 41, Utah Geological and Mineralogical Survey.

Crawford, A.L. and A.M. Buranek, 1948. A Reconnaissance of the Geology and Mineral Deposits of the Lake Mountains, Utah County, Utah. Circular No. 35, Utah Geological and Mineralogical Survey.

Davis, F.D., 1983. Geologic Map of the Southern Wasatch Front, Utah. Map 55-A, Utah Geological and Mineral Survey.

Okerlund, M.D., 1951. A Study of the Calcite-Aragonite Deposits of Lake Mountain, Utah. M.S. Thesis, Brigham Young University.

Solomon, B. J., R. F. Biek, and S. M. Ritter, 2009, Geologic map of the Pelican Point Quadrangle, Utah County, Utah, Utah Geological and Mineral Survey.

XI. SIGNATURE REQUIREMENT

I hereby certify that the foregoing is true and correct. **(Note: This form must be signed by the owner or officer of the company/corporation who is authorized to bind the company/corporation).**

Signature of Permittee / Operator/Applicant:_____

Name (typed or print): _____

Title/Position (if applicable): _____

Date: _____

PLEASE NOTE:

Section 40-8-13(2) of the Mined Land Reclamation Act provides for maintenance of confidentiality concerning certain portions of this report. Please check to see that any information desired to be held confidential is so labeled and included on separate sheets or maps.

Only information relating to the location, size or nature of the deposit may be protected as confidential.

Confidential Information Enclosed: ( ) Yes ( ) No

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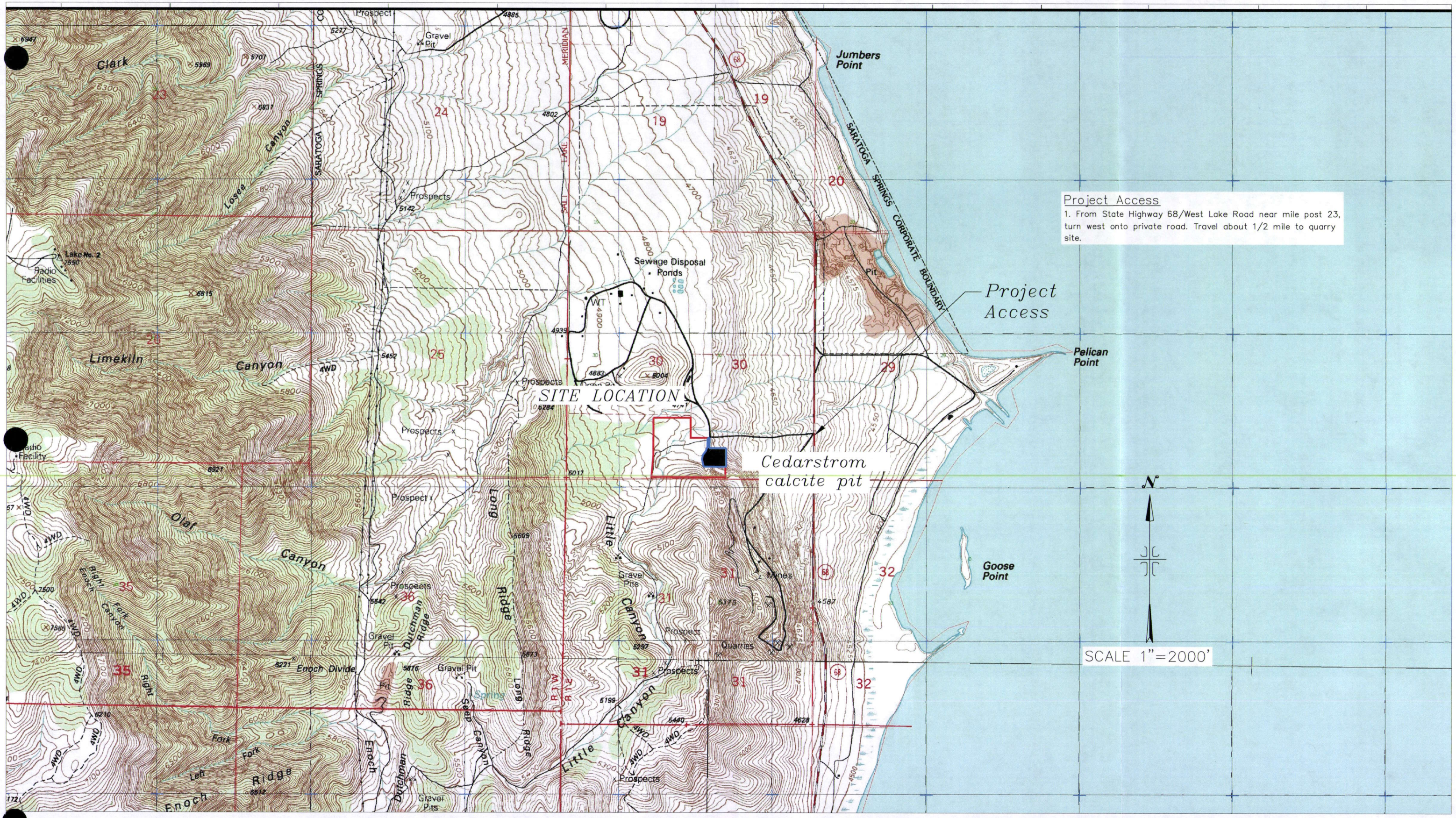
BASE MAP



NO.	REVISIONS	BY	DATE
5			
4			
3			
2			
1	Initial review comments from DOGM		6-1-10

DESIGNED BY:		DATE:	
DRAWN BY:		DATE:	4-5-2010
CHECKED BY:		DATE:	
APPROVED:		DATE:	
COGO FILE:		DATE:	
REV. COGO FILE:		DATE:	

LAKE POINT QUARRY
UTAH COUNTY DOGM
PERMIT APPLICATION

BASE MAP/LOCATION MAP
FIGURE 1

UTAH COUNTY, UTAH

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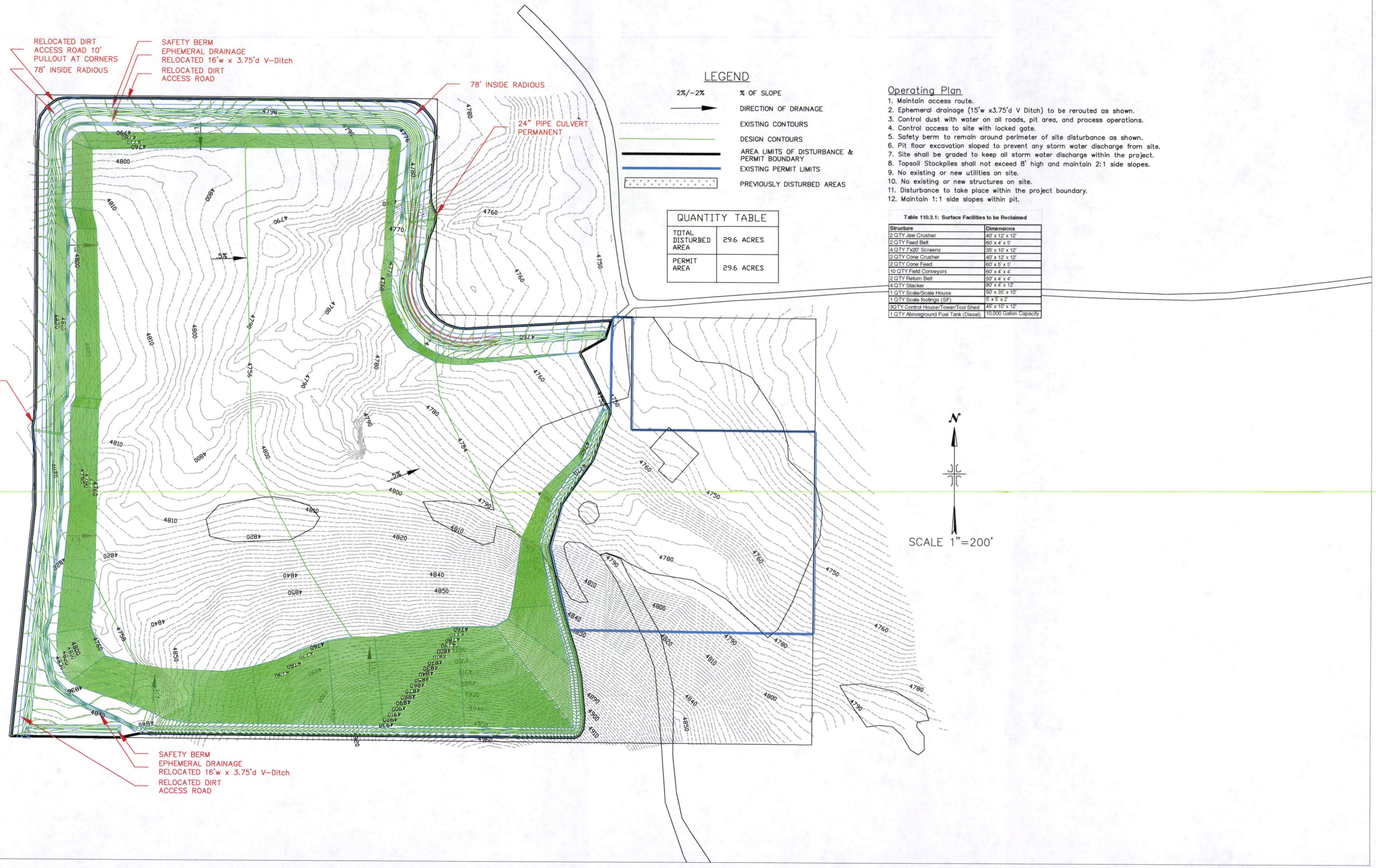
WEST VALLEY CITY,
UTAH 84120
801-977-8012

JOB NO.

FIGURE 1

MINE EXCAVATION PLAN



LEGEND

2%/-2%	% OF SLOPE
→	DIRECTION OF DRAINAGE
	EXISTING CONTOURS
	DESIGN CONTOURS
	AREA LIMITS OF DISTURBANCE & PERMIT BOUNDARY
	EXISTING PERMIT LIMITS
	PREVIOUSLY DISTURBED AREAS

QUANTITY TABLE

TOTAL DISTURBED AREA	29.6 ACRES
PERMIT AREA	29.6 ACRES

Operating Plan

1. Maintain access route.
2. Ephemeral drainage (15'w x3.75'd V Ditch) to be rerouted as shown.
3. Control dust with water on all roads, pit area, and process operations.
4. Control access to site with locked gate.
5. Safety berm to remain around perimeter of site disturbance as shown.
6. Pit floor excavation sloped to prevent any storm water discharge from site.
7. Site shall be graded to keep all storm water discharge within the project.
8. Topsoil Stockpiles shall not exceed 8' high and maintain 2:1 side slopes.
9. No existing or new utilities on site.
10. No existing or new structures on site.
11. Disturbance to take place within the project boundary.
12. Maintain 1:1 side slopes within pit.

Table 110.3.1: Surface Facilities to be Reclaimed

Structure	Dimensions
2 QTY Jaw Crusher	40' x 12' x 12'
2 QTY Feed Belt	60' x 4' x 5'
4 QTY 7'x20' Screens	35' x 10' x 12'
2 QTY Cone Crusher	40' x 12' x 12'
2 QTY Cone Feed	60' x 5' x 5'
10 QTY Field Conveyors	60' x 4' x 4'
2 QTY Return Belt	50' x 4' x 4'
4 QTY Stacker	80' x 4' x 12'
1 QTY Scale/Scale House	50' x 35' x 10'
1 QTY Scale footings (SF)	5' x 5' x 2'
3QTY Control House/Tower/Tool Shed	45' x 10' x 12'
1 QTY Aboveground Fuel Tank (Diesel)	10,000 Gallon Capacity

NO.	REVISIONS	BY	DATE
5			
4			
3			
2			
1	Initial review comments from DOGM		6-1-10

DESIGNED BY:	DATE:
DRAWN BY:	DATE: 4-5-2010
CHECKED BY:	DATE:
APPROVED:	DATE:
COGO FILE:	DATE:
REV. COGO FILE:	DATE:

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UTAH COUNTY DOGM
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MINE EXCAVATION PLAN
FIGURE 5

UTAH COUNTY, UTAH

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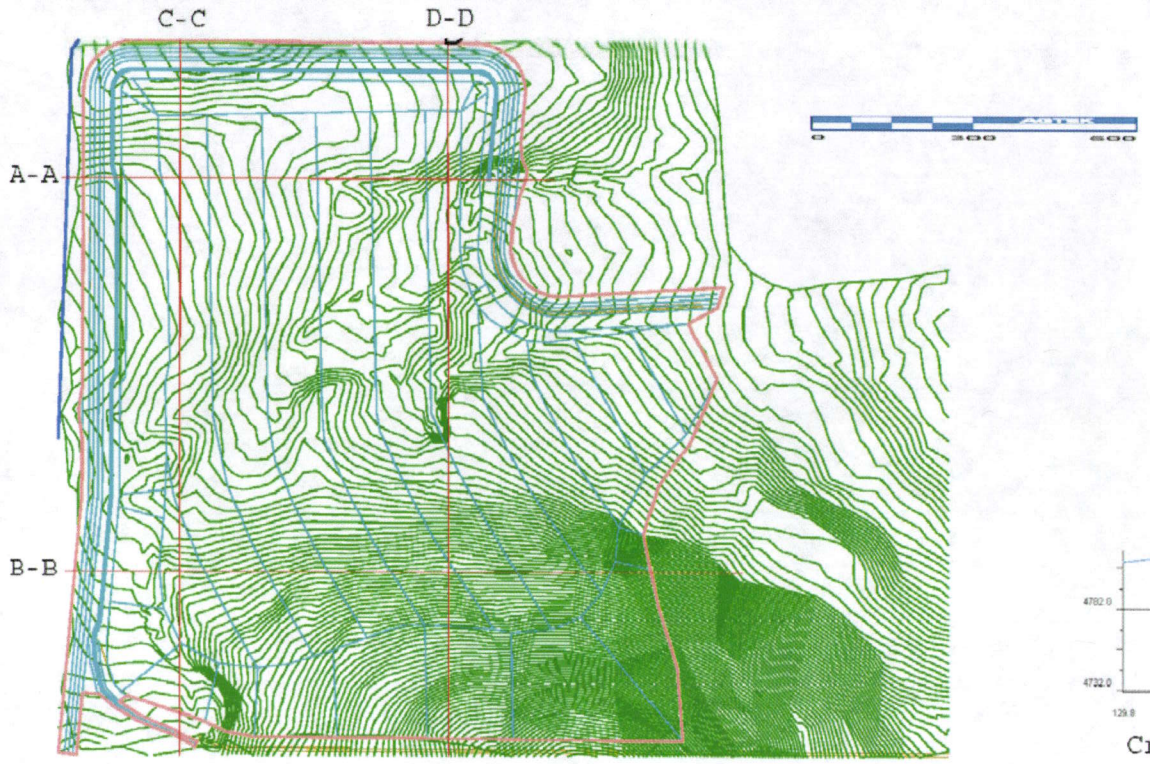
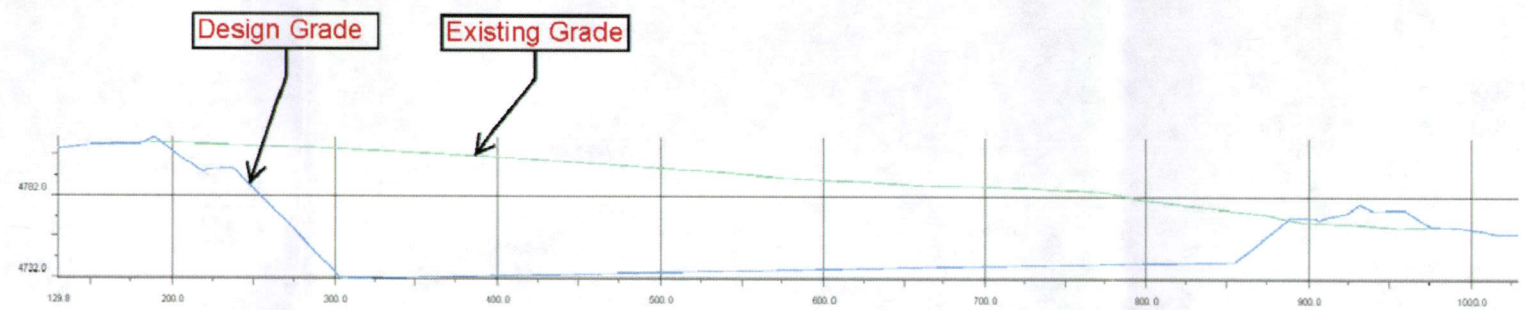
801-977-8012

JOB NO.

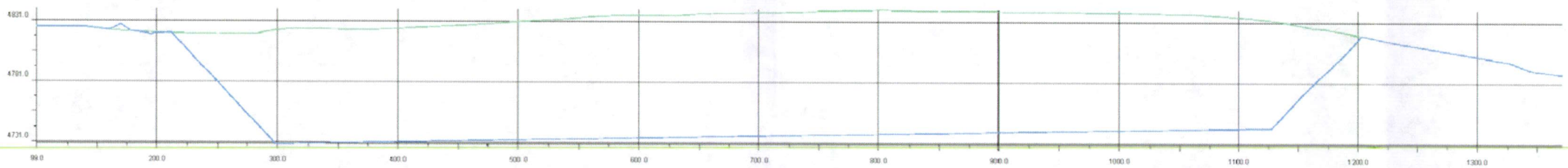
FIGURE 5

CROSS SECTIONS





Cross Section A-A



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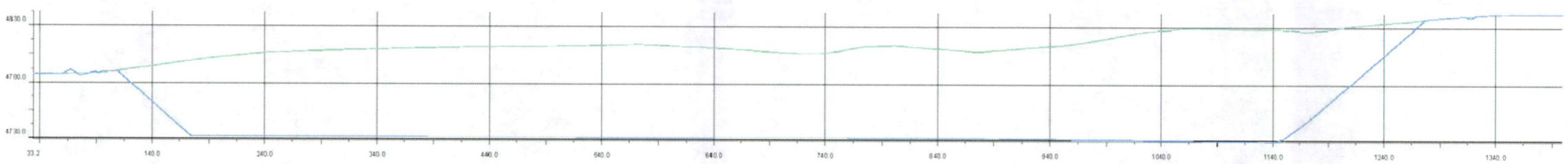
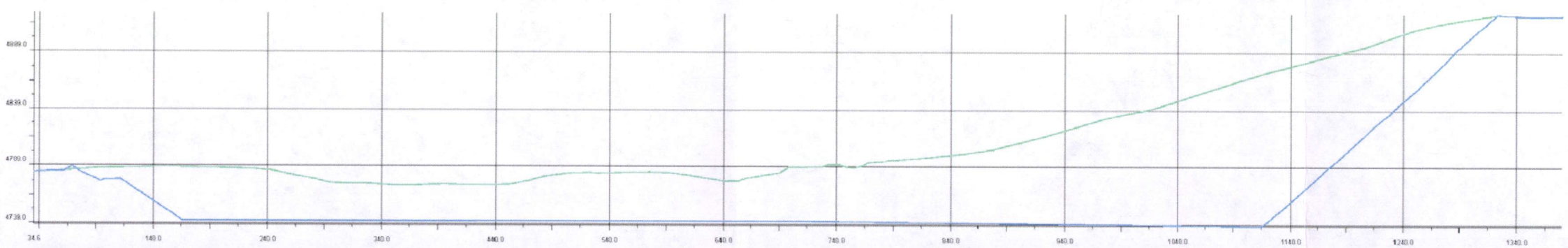


Cross Section C-C



Cross Section D-D

NO.	REVISIONS	BY	DATE
5			
4			
3			
2			
1	Initial review comments from DOGM		6-1-10

DESIGNED BY:	DATE:
DRAWN BY:	DATE: 4-5-2010
CHECKED BY:	DATE:
APPROVED:	DATE:
COGO FILE:	DATE:
REV. COGO FILE:	DATE:

LAKE POINT QUARRY
UTAH COUNTY DOGM
PERMIT APPLICATION

CROSS SECTIONS
FIGURE 7a

UTAH COUNTY, UTAH

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WEST VALLEY CITY,
UTAH 84120
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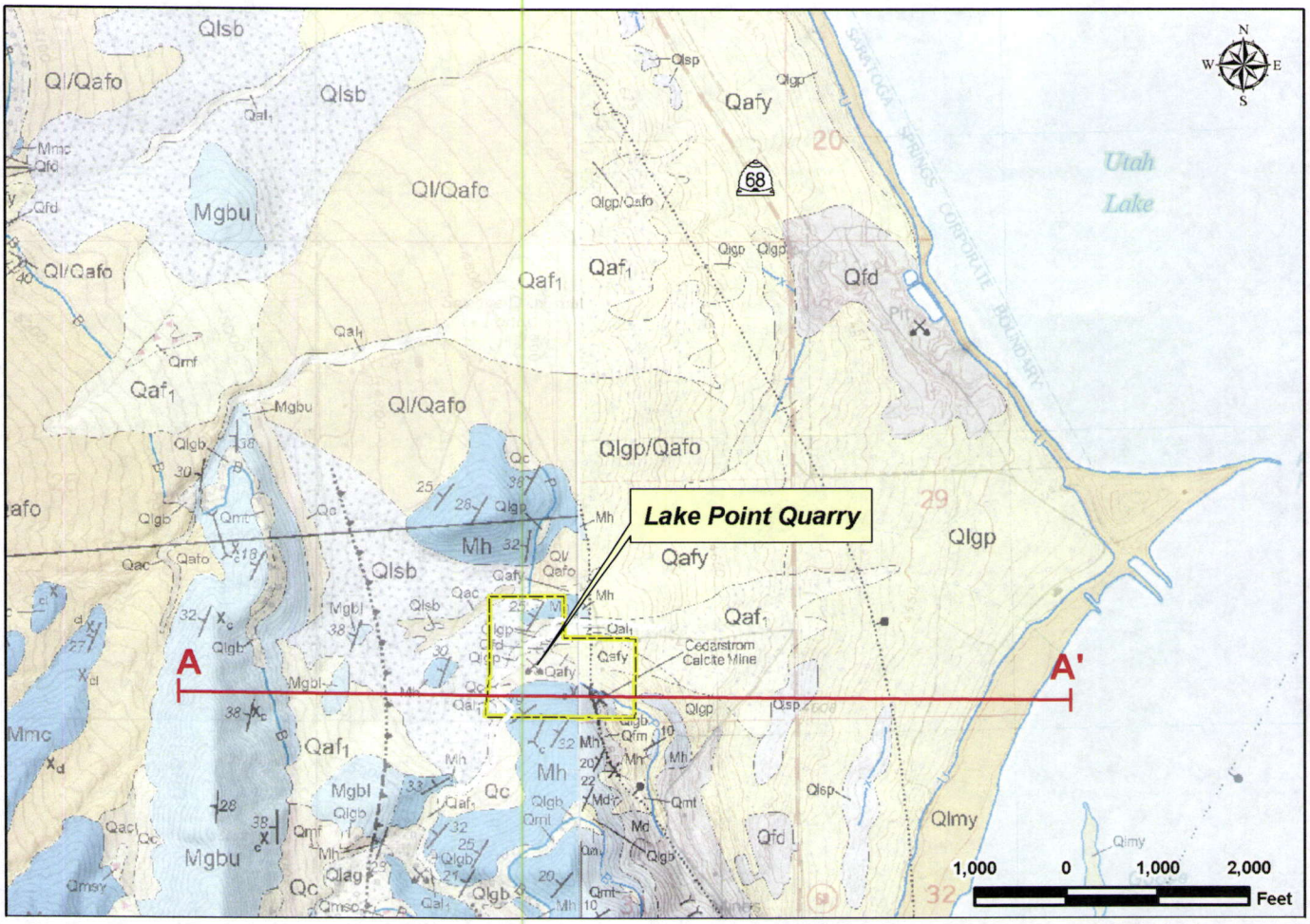
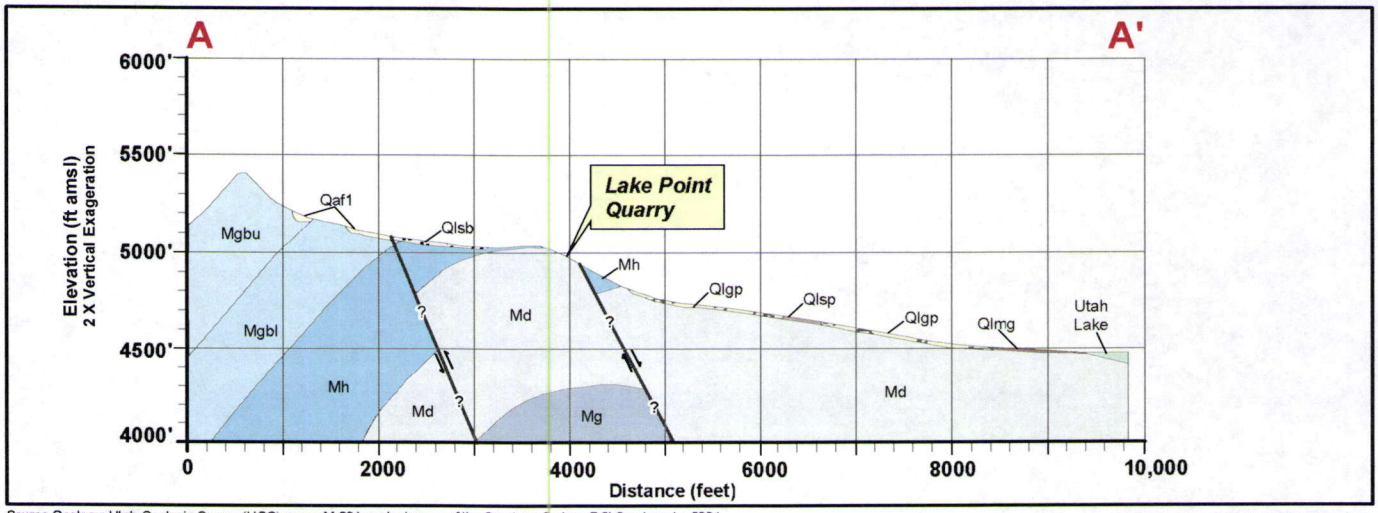
JOB NO.

FIGURE 7a





Source Geology: Utah Geologic Survey (UGS), maps M-201 geologic map of the Saratoga Springs 7.5' Quadrangle, 2004 and M-244 geologic map of the Pelican Point 7.5' Quadrangle, 2009
Cross Section modified from R.F. Biek, 2004

Approximate strike and dip of inclined bedding	
Normal fault, dashed were inferred, bar and ball on down-dropped side	
Thrust or reverse fault, saw teeth on upper plate	
Qal1	Level-1 stream deposits (upper Holocene)
Qaf1	Level-1 alluvial-fan deposits (upper Holocene)
Qafy	Young alluvial-fan deposits, undivided (Holocene to upper Pleistocene
Qfd	Disturbed land (Historical)
Qfm	Mine-dump deposits (Historical)
Qc	Colluvial deposits (Holocene to upper Pleistocene)
Qlgp	Lacustrine gravel and sand Provo (upper Pleistocene)
Qlsb	Lacustrine sand and silt Bonneville (upper Pleistocene)
Qlsp	Lacustrine sand and silt Provo (upper Pleistocene)
Mgbu	Great Blue Limestone (Upper Mississippian)
Mgbl	Great Blue Limestone Long Trail Member (Upper Mississippian)
Mh	Humbug Formation (Upper Mississippian)
Md	Deseret Limestone (Upper to Lower Mississippian)
Mg	Gardison Limestone (Lower Mississippian)
	Lake Point Quarry

FIGURE 11
Lake Point Quarry
Geologic Formation Map
June, 2010
Township 6 South, Range 1 East,
Section 30
Utah County, Utah

URS

APPENDIX I – HYDROLOGIC ANALYSIS REPORT

URS

Memorandum

Date: June 4, 2010

To: Ames Construction, Inc.
3737 West 2100 South
West Valley City, UT 84120

From: Amber Fortner, Project Manager, Lizel Spencer, P.E.
URS Corporation
756 East Winchester Street, Suite 400
Salt Lake City, UT 84107

Subject: **Lake Point – Response to Comment #4**
Utah County, Utah

INTRODUCTION

This memorandum presents the supporting documentation for the hydrology and hydraulics for the diversion channel that circles Lake Point Quarry.

Watershed Hydrology

The hydrologic analysis was completed using the Hydraulic Engineering Center's Hydrologic Modeling System (HEC-HMS) Version 3.4 developed by the U.S. Army Corps of Engineers (U.S. Army, 2009). The National Resource Conservation (NRCS) method was used to estimate the 100-year, 24-hour peak discharge for the site (NRCS,1986). The watershed area for the Lake Point Quarry site includes 1.27 square miles of Little Canyon (see Attachment 1, Hydrologic Model Inputs for Figure 8a Ephemeral Drainage Watershed Boundary Map).

Precipitation information was obtained from the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 online database, located at http://dipper.nws.noaa.gov/hdsc/pfds/sa /ut/pfds.html. See Attachment 1 for the NOAA precipitation estimate. Based on information from the NOAA atlas, the 100-year, 24-hour storm event produces 2.24 inches of precipitation. NRCS Type II 24-hour synthetic rainfall distribution was used for this analysis.

The NRCS TR-55 method was chosen to calculate the time of concentration. The HEC-HMS model requires the input of lag time. The lag time is 0.6 times the time of concentration (see Attachment 1, Time of Concentration Calculations.)

The weighted runoff curve number (CN value) is estimated to be 66, based on observation of the watershed and classifying the vegetated cover as sagebrush with grass understory with fair ground cover. Hydrologic soil types for the site were determined using published NRCS Web Soil Survey information; the watershed includes hydrologic soil groups B and D (see Attachment 1, Hydrologic Model Inputs for Soil Data and Weighted CN Values).

The peak flows for the 100-year, 24-hour storm event was computed based on the information presented above. The HEC-HMS model determined that the 100-year, 24-hour peak discharge is 101 cubic feet per second (cfs) (see Attachment 2 Hydrologic Model Output for HEC-HMS Report).

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Suite 400
Salt Lake City, UT 84107
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Fax: 801.904.4100

Conveyance Hydraulics

Visual Urban (HY-22) Urban Drainage Design Program was used to size the ditch to adequately convey the 100-year, 24-hour peak flow around the Lake Point Quarry. The ditch was designed to have one foot of freeboard during the 100-yr 24-hr event. The required ditch geometry is as follows:

Channel Slope = 3.0%

Channel Side Slope = 2:1

Channel Depth = 3.75 feet

The channel has several bends with a radius of approximately 35 feet. The increase in water surface elevation at the outside of the bend caused by the superelevation of the water surface was determined using equation 3.9 in the Design of Roadside Channels, Hydraulic Engineering Circular Number 15, Third Edition. The channel will need an additional 0.5 feet around all bends, for a total channel depth of 4.25 feet around bends.

References

U.S. Army Corps Of Engineers August 2009. HEC-HMS Hydrologic Modeling System. User Manual Version 3.4.

U.S. Department of Agriculture, National Resources Conservation Service (NRCS). *Urban Hydrology for Small Watersheds,* Technical Release 55. June 1986.

U.S. Department of Transportation Federal Highway Administration, August 2001. *Urban Drainage Design Manual*, Hydraulic Engineering Circular No. 22, Second Edition.

U.S. Department of Transportation Federal Highway Administration, August 2005. *Design of Roadside Channels with Flexible Linings*, Hydraulic Engineering Circular No. 15, Third Edition.

List of Attachments

Attachment 1 – Hydrologic Model Inputs
- Ephemeral Drainage Watershed Boundary Map
- NOAA Precipitation Estimate
- Hydrologic Soil Group
- Weighted CN Calculation
- Time of Concentration Calculation

Attachment 2 – Hydrologic Model Output
- HEC-HMS Model Report

Attachment 3 – Hydraulic Model
- HY-22 Summary
- Increase in Water Surface Elevation around a Bend

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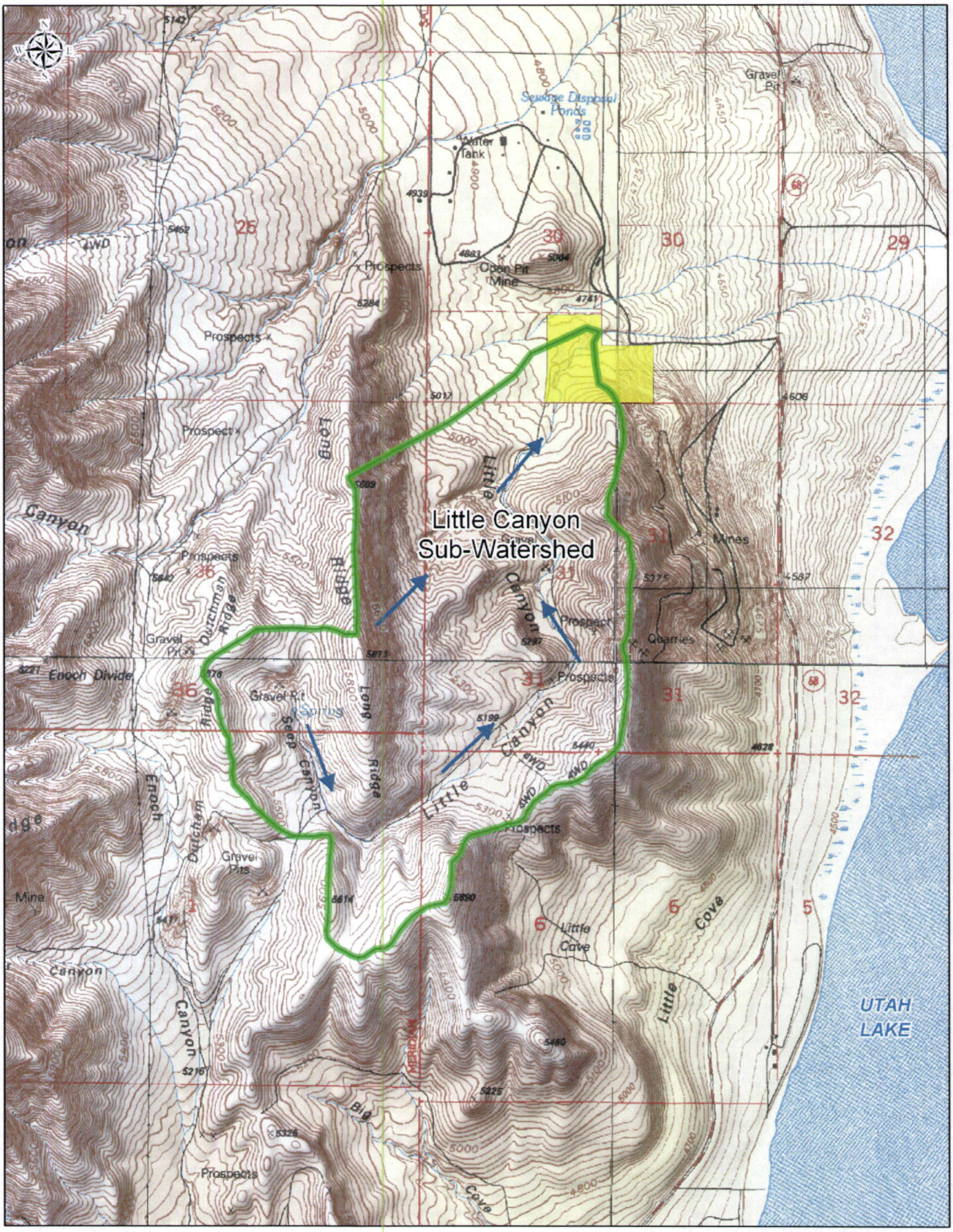
ATTACHMENT 1 – HYDROLOGIC MODEL INPUTS



Drainage Flow Direction

Lake Point Quarry

Little Canyon Sub-Watershed
782 Acres

1,000 0 1,000 2,000
Feet

FIGURE 8a
Ephemeral Drainage Watershed Boundary Map
April, 2010
Township 6 South, Range 1 East, Section 30
Utah County, Utah

URS

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Utah 40.26 N 111.87 W 4606 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Thu Jun 3 2010

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.12	0.18	0.22	0.30	0.37	0.45	0.52	0.65	0.81	0.96	1.10	1.28	1.48	1.65	2.13	2.53	3.10	3.63
2	0.15	0.23	0.28	0.38	0.47	0.57	0.64	0.81	0.99	1.18	1.35	1.56	1.81	2.01	2.61	3.09	3.78	4.43
5	0.21	0.32	0.39	0.53	0.65	0.75	0.82	0.99	1.20	1.41	1.61	1.86	2.15	2.38	3.08	3.64	4.42	5.16
10	0.26	0.40	0.49	0.66	0.82	0.92	0.98	1.15	1.38	1.60	1.82	2.12	2.43	2.67	3.44	4.06	4.91	5.72
25	0.34	0.52	0.65	0.87	1.08	1.19	1.24	1.39	1.63	1.85	2.10	2.46	2.80	3.06	3.89	4.61	5.51	6.42
50	0.42	0.64	0.79	1.06	1.32	1.43	1.46	1.59	1.83	2.04	2.32	2.74	3.08	3.34	4.21	5.01	5.93	6.90
100	0.51	0.77	0.96	1.29	1.59	1.71	1.73	1.84	2.04	2.24	2.54	3.02	3.36	3.61	4.52	5.39	6.32	7.34
200	0.61	0.93	1.15	1.55	1.92	2.04	2.05	2.12	2.29	2.43	2.76	3.30	3.64	3.87	4.80	5.75	6.67	7.73
500	0.77	1.18	1.46	1.96	2.43	2.57	2.60	2.63	2.71	2.73	3.04	3.69	3.99	4.20	5.14	6.19	7.05	8.17
1000	0.92	1.40	1.73	2.33	2.88	3.04	3.07	3.10	3.13	3.17	3.26	3.98	4.26	4.43	5.36	6.50	7.27	8.43

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.14	0.21	0.26	0.35	0.44	0.52	0.58	0.72	0.89	1.04	1.18	1.39	1.61	1.78	2.31	2.73	3.34	3.89
2	0.18	0.27	0.33	0.45	0.56	0.66	0.72	0.89	1.09	1.28	1.45	1.69	1.96	2.17	2.83	3.33	4.07	4.75
5	0.24	0.37	0.46	0.62	0.77	0.87	0.93	1.09	1.32	1.52	1.72	2.01	2.32	2.56	3.32	3.91	4.74	5.51
10	0.31	0.47	0.58	0.78	0.97	1.06	1.11	1.27	1.51	1.72	1.94	2.28	2.61	2.87	3.70	4.36	5.25	6.10
25	0.41	0.62	0.77	1.03	1.28	1.38	1.41	1.54	1.79	1.99	2.24	2.66	3.00	3.27	4.18	4.94	5.88	6.83
50	0.50	0.76	0.94	1.27	1.57	1.67	1.67	1.78	2.03	2.19	2.47	2.96	3.31	3.57	4.53	5.36	6.33	7.34
100	0.61	0.93	1.15	1.55	1.92	2.02	2.04	2.07	2.29	2.40	2.71	3.26	3.60	3.87	4.86	5.78	6.73	7.80
200	0.74	1.13	1.40	1.89	2.34	2.45	2.47	2.50	2.60	2.61	2.95	3.57	3.90	4.16	5.17	6.17	7.09	8.22
500	0.96	1.46	1.81	2.44	3.02	3.14	3.17	3.20	3.23	3.26	3.30	4.00	4.30	4.52	5.54	6.67	7.49	8.68
1000	1.16	1.76	2.19	2.94	3.65	3.79	3.83	3.87	3.91	3.95	3.98	4.34	4.60	4.78	5.79	7.01	7.73	8.96

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

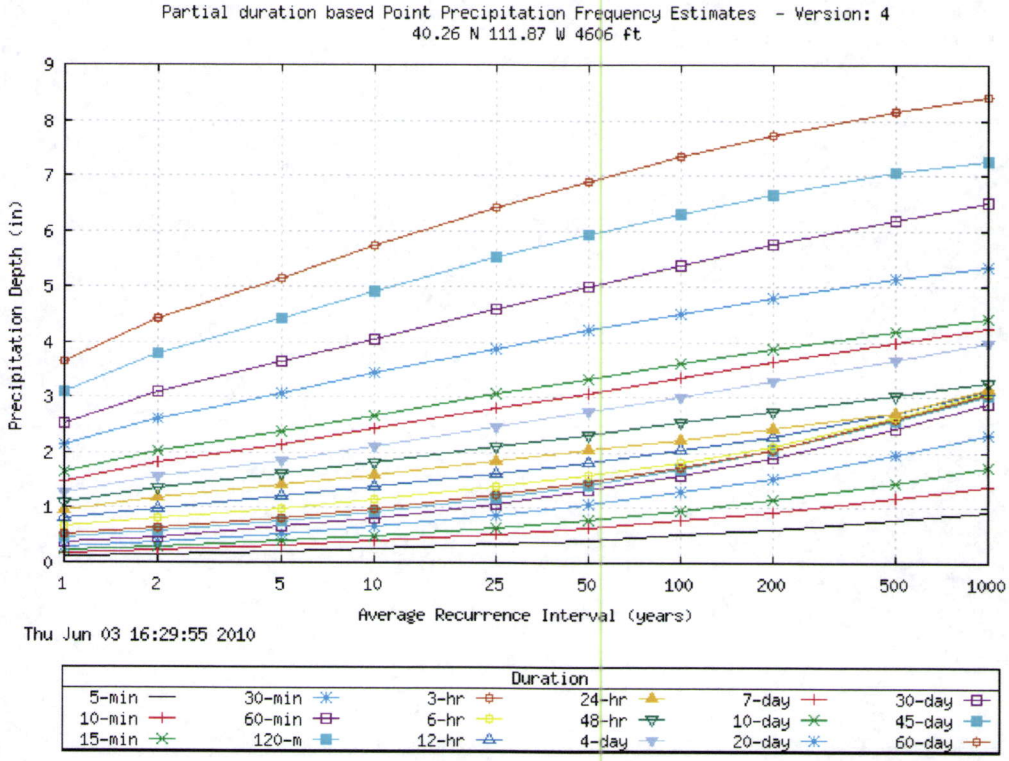
*** Lower bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

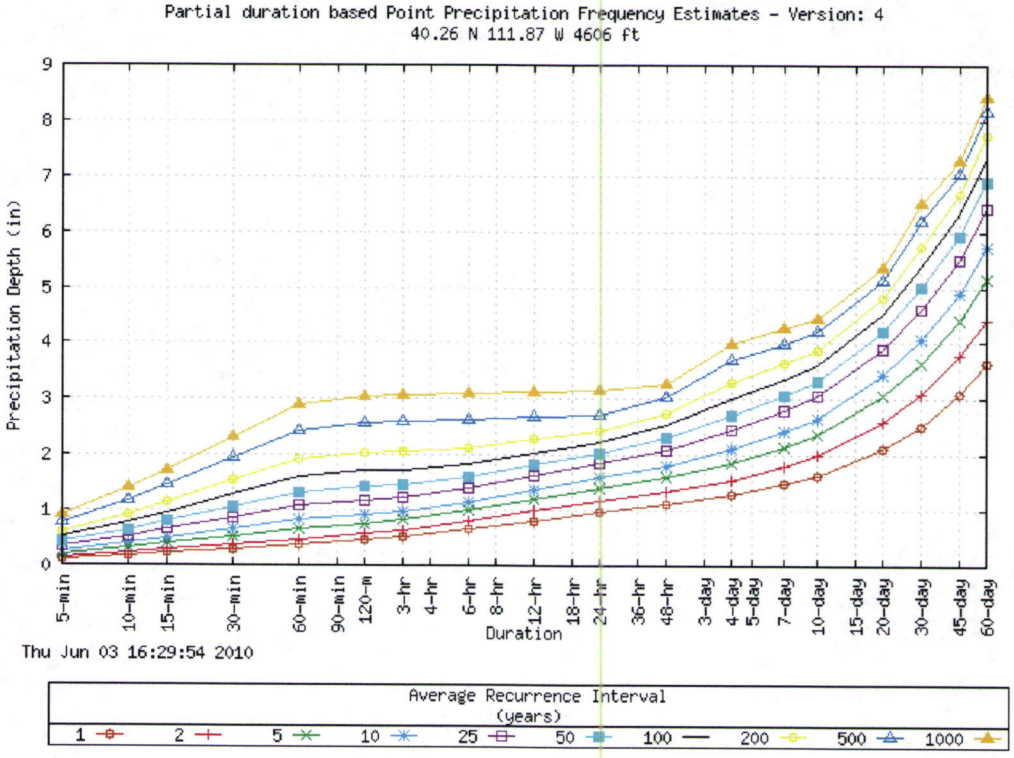
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.10	0.15	0.19	0.26	0.32	0.40	0.47	0.60	0.74	0.90	1.03	1.18	1.37	1.52	1.97	2.34	2.88	3.38
2	0.13	0.20	0.24	0.33	0.41	0.50	0.58	0.74	0.91	1.10	1.26	1.45	1.68	1.86	2.41	2.86	3.52	4.12
5	0.18	0.27	0.34	0.45	0.56	0.66	0.73	0.91	1.11	1.32	1.50	1.73	1.99	2.21	2.85	3.38	4.12	4.81
10	0.22	0.34	0.42	0.56	0.70	0.80	0.87	1.05	1.26	1.49	1.70	1.96	2.25	2.48	3.18	3.77	4.58	5.34
25	0.28	0.43	0.54	0.72	0.90	1.01	1.08	1.25	1.48	1.72	1.96	2.28	2.59	2.83	3.60	4.28	5.14	5.99
50	0.34	0.52	0.64	0.86	1.07	1.19	1.25	1.41	1.64	1.89	2.15	2.52	2.85	3.09	3.90	4.64	5.54	6.44
100	0.40	0.61	0.76	1.02	1.26	1.39	1.44	1.59	1.80	2.06	2.35	2.77	3.10	3.34	4.18	4.99	5.91	6.85
200	0.47	0.71	0.88	1.18	1.46	1.60	1.66	1.80	1.99	2.23	2.54	3.02	3.35	3.57	4.44	5.31	6.23	7.21
500	0.56	0.85	1.06	1.43	1.77	1.91	1.99	2.16	2.29	2.44	2.78	3.33	3.65	3.86	4.75	5.70	6.59	7.63
1000	0.64	0.98	1.21	1.63	2.02	2.18	2.27	2.46	2.53	2.60	2.96	3.58	3.88	4.06	4.95	5.96	6.82	7.89

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables





Maps -

overview map

These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

detailed map

Please read disclaimer for more information.

map legend

Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (40.26/-111.87). Digital ASCII data can be obtained directly from **NCDC**.

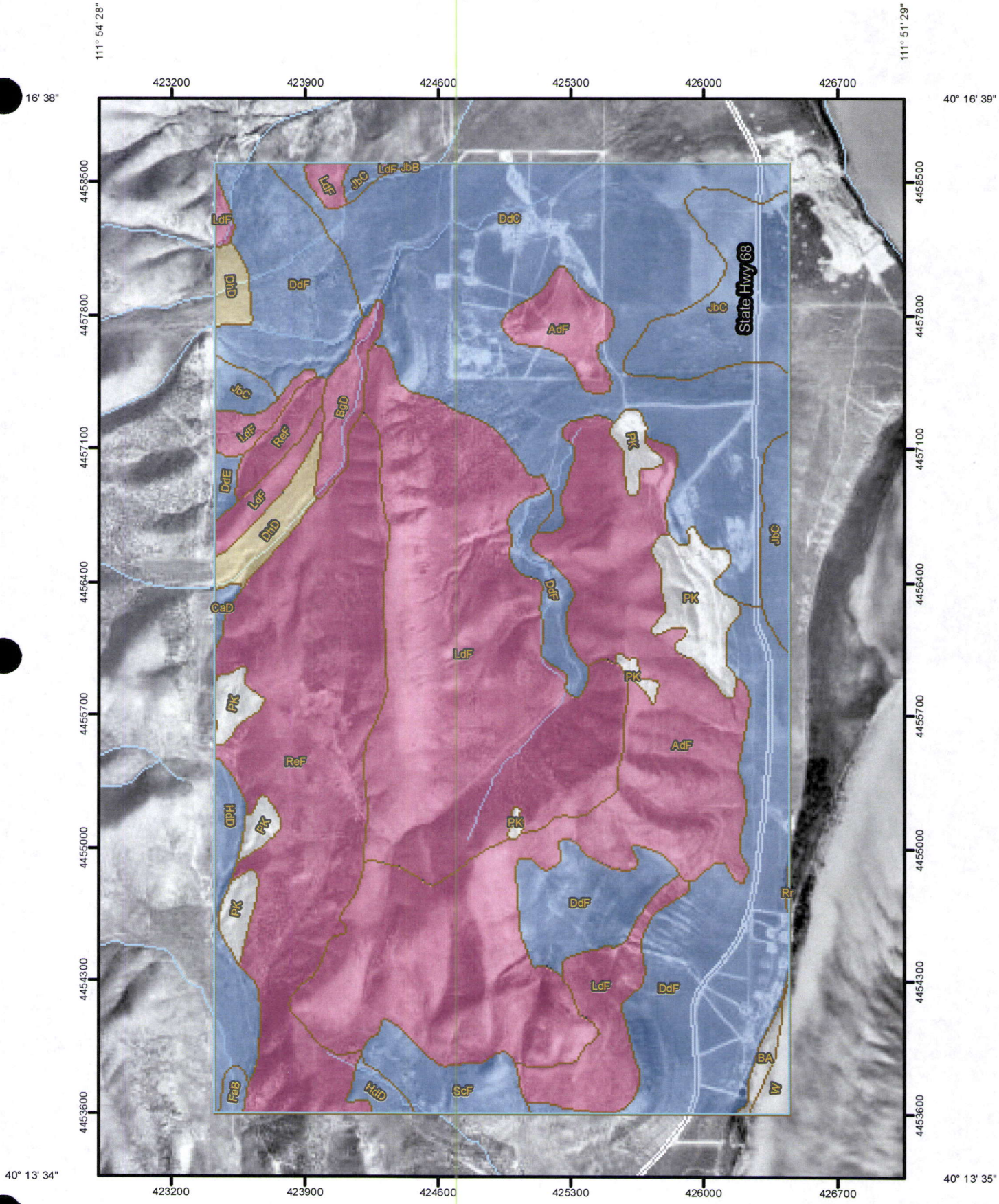
Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps**.

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910

(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Hydrologic Soil Group—Fairfield-Nephi Area, Utah, and Utah County, Utah - Central Part
(Lake Point)



Map Scale: 1:27,100 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 250 500 1,000 1,500

Feet: 0 1,000 2,000 4,000 6,000

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:27,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 12N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fairfield-Nephi Area, Utah
Survey Area Data: Version 5, Sep 2, 2009

Soil Survey Area: Utah County, Utah - Central Part
Survey Area Data: Version 5, Sep 4, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 10/1/1997; 9/12/1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Fairfield-Nephi Area, Utah				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AdF	Amtoft, moist-Rock outcrop complex, 30 to 70 percent slopes	D	682.8	18.3%
BA	Beaches		10.3	0.3%
BgD	Borvant cobbly loam, 8 to 25 percent slopes	D	35.7	1.0%
CaD	Calita loam, 8 to 15 percent slopes	B	5.3	0.1%
DdC	Donnardo stony loam, 2 to 8 percent slopes	B	683.8	18.3%
DdE	Donnardo stony loam, 8 to 25 percent slopes	B	8.6	0.2%
DdF	Donnardo stony loam, 25 to 40 percent slopes	B	578.8	15.5%
DhD	Dry Creek cobbly loam, 4 to 15 percent slopes	C	51.4	1.4%
FaB	Firmage gravelly loam, dry, 2 to 4 percent slopes	B	7.1	0.2%
HdD	Hiko Peak stony sandy loam, 8 to 15 percent slopes	B	70.9	1.9%
JbB	Juab loam, 2 to 4 percent slopes	B	0.4	0.0%
JbC	Juab loam, 4 to 8 percent slopes	B	188.4	5.1%
LdF	Lodar-Rock outcrop complex, 30 to 70 percent slopes	D	709.5	19.0%
PK	Pits-Dumps complex		121.0	3.2%
ReF	Reywat-Rock outcrop complex, 30 to 60 percent slopes	D	501.9	13.5%
Rr	Roshe Springs silt loam	C/D	0.9	0.0%
ScF	Sanpete gravelly fine sandy loam, 15 to 40 percent slopes	B	58.4	1.6%
Subtotals for Soil Survey Area			**3,715.1**	**99.6%**
Totals for Area of Interest			**3,730.3**	**100.0%**

Hydrologic Soil Group— Summary by Map Unit — Utah County, Utah - Central Part				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
W	Water		15.2	0.4%
Subtotals for Soil Survey Area			**15.2**	**0.4%**
Totals for Area of Interest			**3,730.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Project Name: Lake Point | **Project Number: 24585160**

Revision: 0

Date: 3-Jun-2010 | **Designer: lks**

Time of Concentration

				Location		
Sheet Flow				**Little Canyon**		
Upstream Elevation		(ft)	=	5,876.00		
Downstream Elevation		(ft)	=	5,855.00		
Length	L	(ft)	=	100.00		
Average slope	S_0		=	21.00%		
Soil Type			=	Range (natural)		
Manning's roughness	n		=	0.130		
2-yr, 24-hr rainfall depth	P	(in)	=	1.18		
Travel time $t_t = 60\left(\frac{0.007(nL)^{0.8}}{P^{0.5}S_0^{0.4}}\right)$	t_t	(min)	=	5.62		

Shallow Concentrated Flow

Upstream Elevation		(ft)	=	5,855.00		
Downstream Elevation		(ft)	=	5,540.00		
Length	L	(ft)	=	1,500.00		
Average slope	S_0		=	21.00%		
Paved or Unpaved			=	Unpaved		
Average Velocity	V	(ft/s)	=	7.465		
Travel time $t_t = 60\left(\frac{L}{3600V}\right)$	t_t	(min)	=	3.35		

Open Channel Flow

Upstream Elevation		(ft)	=	5,540.00		
Downstream Elevation		(ft)	=	4,740.00		
Length	L	(ft)	=	12,000.00		
Average slope	S_0		=	6.67%		
Channel Width Base		(ft)	=	2.00		
Channel Width Top		(ft)	=	8.00		
Channel Depth		(ft)	=	4.00		
Manning's roughness	n		=	0.04		
Cross-sectional Area		(ft2)	=	20.00		
Wetted Perimeter		(ft)	=	12.00		
Hydraulic Radius		(ft)	=	1.67		
Velocity		(ft/s)	=	13.52		
Travel time $t_t = 60\left(\frac{L}{3600V}\right)$	t_t	(min)	=	14.79		

Total

Time of Concentration	Tc	(min)	=	**23.76**		
Lag Time				**14.26**		

Weighted CN Calculations					
	Total Area (sq miles)	Area by Land Use (acres)	Hydrologic Soil Group	CN	Weighted CN Value
Sagebrush with grass understory	1.27	0.25	B	51	66
Sagebrush with grass understory		1.02	D	70	

CN Values are from the NRCS Urban Hydrology for Small Watersheds TR-55 Manual, June 1986

URS

ATTACHMENT 2 – HYDROLOGIC MODEL OUTPUT

Project: Lake Point Quarry Simulation Run: Little Canyon

Start of Run: 03Jun2010, 12:00 Basin Model: Little Canyon
End of Run: 05Jun2010, 12:00 Meteorologic Model: Little Canyon Met.
Compute Time: 03Jun2010, 15:33:38 Control Specifications: Little Canyon Control

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Little Canyon	1.27	101.0	04Jun2010, 00:12	15.6
Little Canyon Exit	1.27	101.0	04Jun2010, 00:12	15.6

URS

ATTACHMENT 3 – HYDRAULIC MODEL OUTPUTS

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 06/04/2010

Project No. :24585160
Project Name.:Lake Point Quarry
Computed by :Lizel Spencer

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0300
2.	Channel Bottom Width (ft)	0.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.040
6.	Discharge (cfs)	111.72
7.	Depth of Flow (ft)	2.75

OUTPUT RESULTS

Cross Section Area (Sqft)	15.13
Average Velocity (ft/sec)	7.39
Top Width (ft)	11.00
Hydraulic Radius (ft)	1.23
Froude Number	1.11

Increase in Water Surface Elevation around a Bend

Source:
Design of Roadside Channels with Flexible Linings
Hydraulic Engineering Circular Number 15, Third Edition
Equation 3.9 in Chapter 3 General Design Procedures
http://www.fhwa.dot.gov/engineering/hydraulics/pubs/05114/hec1503.cfm#_Toc115781618

$$\Delta d = \frac{V^2 T}{g R_c}$$

Where

Δd = additional freeboard required because of superelevation (ft)

V =	7.25	= average channel velocity(ft/s)
T =	10.56	= water surface top width (ft)
g =	32.2	= acceleration due to gravity (ft/s^2)
R_c =	35	= radius of curvature of the bend to the channel centerline (ft)

Δd = 0.492511 **ft**

Bond Calculations		
Summary Table		
Item	**Structures & Facilities**	**Facility Removal Costs**
1	Process Facilities	$83,477
2	Petroleum Storage - Operations	$885
3	Power Line	$12,000
4	Lay Down Yard	$3,321
5	Earthwork	$84,328
6	Revegetation	$29,600
7	Post Mine Monitoring	$6,840
	Subtotal	$220,452
	Indirect Costs (26.8%) Subtotal	$59,081
	UT DOGM 5-Year Escalation Factor April 2010 (0.5%)	
	YEAR 1	$1,398
	YEAR 2	$1,405
	YEAR 3	$1,412
	YEAR 4	$1,419
	YEAR 5	$1,426
	Subtotal	$7,058.55
	TOTAL	**$286,591**

RECLAMATION BOND COST FACTORS							
TASK REFERENCE*	**PAGE**	**DESCRIPTION**	**UNIT**	**LABOR**	**EQUIPMENT**	**TOTAL (Overhead & Profit Incl)**	**REMARKS**
02 41 16.13 0100	33	Structure demo	CF	0.12	0.16	**$0.35**	Includes haul 20 miles
0241-16.17-0420	34	Building demo, footings and foundations	SF	3.94	0.66	**$6.85**	Reinforced wiremesh -slab
3123-16.32-2820	219	Ripping; medium hard	CY	0.08	0.28	**$0.43**	300hp
3123-16.46-5200	219	Excavating bulk dozer	CY	0.52	1.73	**$2.68**	300hp; average push = 150'
3123-16.50-2000	220	Excavation bulk scrapers	CY	0.48	2.24	**$3.18**	21CY capacity; 1500' haul
Crew B-11J	464	Ripping/scarifying - fine grade seed prep	Day	-	-	**$1,286.82**	Discounted laborer
Rocky Mtn. Power Co.	-	Power Transmission Line removal	LF	-	-	**$4.80**	Verbal Quote on 4-06-10; Sturgeon Electric
DOGM	-	Standard Revegetation Cost	Acre	-	-	**$1,000.00**	

*Task references are based on RS Means Heavy Construction Cost Data (Edition 2010) unless otherwise noted

CF = Cubic Foot; CY = Cubic Yards; LF = Linear Foot; SF = Square Foot; SY= Square Yard

1. Process Facilities

Item	Facilities Removal	Each	SF	CY	CF	L	W	H	Task Ref.	Cost
1	Jaw Crusher/Feeder	2			5760	40	12	12	02 41 16.13 0100	**4032**
2	Feed Belt	2			1200	60	4	5	02 41 16.13 0100	**840**
3	Screen (JCI 7'x20')	4			4200	35	10	12	02 41 16.13 0100	**5880**
4	Cone	2			5760	40	12	12	02 41 16.13 0100	**4032**
5	Cone Feed	2			1500	60	5	5	02 41 16.13 0100	**1050**
6	Field Conveyors	10			960	60	4	4	02 41 16.13 0100	**3360**
7	Return Belt	2			800	50	4	4	02 41 16.13 0100	**560**
8	Stacker	4			3840	80	4	12	02 41 16.13 0100	**5376**
9	Scale/Scale House	1			17500	50	35	10	02 41 16.13 0100	**6125**
10	Control House/Tower/Tool Shed	3			5400	45	10	12	02 41 16.13 0100	**5670**
11	Scale footings (SF)	8	25			5	5		02 41 16.17 0420	**1370**
12	Facility Disposal Cost (CY)	All		1738					tons	**45182**
	TOTALS:				**46,920**					**$83,477**

General Assumptions

All crushing process equipment is completely portable and sits on metal stands and wood blocks. The scale sits on concrete footings. No concrete structures are utilized. All portable/skid mounted equipment will be transported off site for re-use.

Material weight - 1 ton = 1 CY

All solid waste materials will be transported offsite for recycling or disposed of in a licensed facility - North Utah County District Landfill, 2000 W 200 S Lindon Utah (20 miles from site)

$26.00/ton disposal fee - Landfill listed pricing

CF = Cubic Foot; CY = Cubic Yards; LF = Linear Foot; SF = Square Foot; SY= Square Yard; L = Length(ft); W = Width(ft); H = Height(ft)

2. Petroleum Storage - Operations

Item	Type	Number	Load Cost	Trucking	Total
1	Fuel Tank	1	$100.00	$195.00	**$295**
2	Oil Tanks	1	$100.00	$195.00	**$295**
3	Lube Cubes	1	$100.00	$195.00	**$295**
				TOTAL	**$885**

Items	Details
(1) Fuel Tank	10,000 gal
(2) Oil tanks - 1 each	500 gal each
(3) Lube Cubes - 1 each	500 gal each

General Assumptions

All tanks will be transported off site for re-use

No foundations or containment structures around tanks

Costs are based on removal from site; loading & transport

Load Tanks $100.00 each

Transport to Vendor - 30 mile x 2 = 60 miles @ $3.25 per mile = $195 each

$3.25 per mile trucking cost is current loaded per mile cost average (Ames)

Disposal of used oil - None - no tank on site

fuel.

3. Power Lines

Item	Removal	Each	LF	SF	TASK REF	Cost
1	Power transmission line to site		2500		Rocky Mountain Power Co.	**$12,000**
					TOTAL	**$12,000**

Items	Details
(1) Poles (20'), power lines	2500 LF
(2) Substation transformer for re-use	None
(3) Transformer pad	None

General Assumptions

All items are considered as solid waste and will be chopped and demolished

Electrical wire will have a high recycle value however no credit is being allocated

No transformers required

LF = Linear Foot; SF = Square Foot

4. Lay Down Yard

Item	Type	Tons	Transports	Days	CF	CY	L	W	H	Cost
1	Off-Site Transport		2			-				$260
2	Material Loading			1						$1,007
3	Off-Site Disposal	79			2,125	79	25	25	3.4	$2,054
									TOTAL	$3,321

Items	Details
Misc. Scrap materials, plastics, wood, etc.	25'l x 25'w x 3.4'h
Off-Site Disposal quantity- based on 100% of total area volume	

General Assumptions

All solid waste materials will be transported offsite for recycling or disposed of in a licensed facility - North Utah County District Landfill, 2000 W 200 S Lindon Utah (20 miles from site)

Transport to Landfill - 20 miles x 2 = 40 miles @ $3.25 per mile = $130.00 each

Material weight - 1 ton = 1 CY

Average load is 40 tons - 79tons/40 = 2 trips

$26.00/ton disposal fee - Landfill listed pricing

Material Loading - 950 Loader plus operator - $1,007.00 per day per current rental fees and wages - No applicable Means rate could be located

CF = Cubic Foot; CY = Cubic Yards; LF = Linear Foot; SF = Square Foot; SY= Square Yard; L = Length(ft); W = Width(ft); H = Height(ft)

5. Earthwork

Item	Type	CY	Day	Acres	TASK REF.	Cost
1	Ripping and scarifying compacted surfaces	40,656		17	3123-16.32-2820	**$17,482**
2	Surface shaping & grading	5,000		17	3123-16.46-5200	**$13,400**
3	Surface soil placement	16,200		17	3123-16.50-2000	**$51,516**
4	Fine grading and seedbed preparation		1.50	30	Crew B-11J	**$1,930**
					TOTAL	**$84,328**

Items	Details
(1) Pit backfilling	No costs for reclamation.
(2) Ripping and scarifying compacted surfaces	Includes regrade to blend with adjacent topography during greatest surface disturbance period. Ultimate pit floor will be 16.8 acres. Areas included: stockpile, pond, processing area, (16.8 acres approx. 18"depth) (15730CY).
(3) Surface grading & profiling	Quantity is based on the greatest possible surface disturbance period, prior to reaching the ultimate pit floor, process area, stockpile area and pit floor. Estimated average cut to fill = 1.5' material per acre for 17 acres = 4987 CY (5,000CY)
(4) Surface soil replacement	Quantity is based on the greatest possible surface disturbance period, prior to reaching the ultimate pit floor. Materials will be placed and spread with a scraper and grader to approx 0.5': process area, stockpile area and pit floor.
(5) Fine grading and seedbed preparation	Complete with a grader; assuming production is 20 acres per day - (30/20= 1.5 days)

General Assumptions

Ephemeral drainage relocation will be constructed to its final configuration including surface soil salvage/placement, seeding, etc during the active mine phase. However, for surety estimate, reseeding of the channel is encompassed. Refer to worksheet number 6.

CY = Cubic Yards

6. Revegetation

Item	Type	Acres	TASK REF.	Cost	TOTAL
1	Mine Area	26.6	DOGM	$1,000	$26,600
2	Ephemeral Drainage/Safety Berms	3.0	DOGM	$1,000	$3,000
	TOTALS	**29.6**			**$29,600**

General Assumptions

Seed will be broadcasted

Seed blend will be the DOGM recommended seed mix

7. Post Mine Monitoring								
Item	**Vegetation Monitoring Survey and Reports**							
Hourly Rate ----->	**Principal 150**	**PM 105**	**Sr. Ecologist 100**	**GIS 60**	**Office Asst. 55**	**Direct Labor Cost**	**Travel/ Equipment/ Misc. Costs**	**Task Subtotal**
Field Work			30			$3,000.00		**$3,000.00**
Yearly Summary x3			4	4	2	$750.00		**$750.00**
Final Report	2	4	16	6	2	$2,790.00		**$2,790.00**
Lodging							$0.00	**$0.00**
Auto Rental							$300.00	**$300.00**
Gas							$0.00	**$0.00**
Per Diem							$0.00	**$0.00**
Subtotal Labor	2	4	50	10	4	$6,540.00	$300.00	**$6,840.00**
TOTALS:	**2**	**4**	**50**	**10**	**4**	**$6,540.00**	**$300.00**	**$6,840.00**

General Assumptions

Task will include: 1 day work, 1 biologist, one time per year for 3 years, total 3 days in the field. Establish transects using GPS for the site that can be revisited each year for a yearly comparison, and photo documentation. Annual reporting; and one final data summary report.