

# LILA CANYON MINOR REVISION

## 007/013

### CHAPTERS 7 - 8

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- 735. Disposal of Excess Spoil** No excess spoil production is anticipated.
- 736. Coal Mine Waste** Any areas designated for the disposal of coal mine waste will be constructed and maintained to comply with R645-301-746. Details are described under that section.
- 737. Noncoal Mine Waste** Storage and final disposal of noncoal mine waste are described under section 747.
- 738. Temporary Casing and Sealing of Wells** There are no wells proposed to be used to monitor ground water conditions associated with this permit or operation. The three Piezometers will be reclaimed according to the requirements of the Divisions's Performance Standards.
- 740. Design Criteria and Plans** Design criteria and plans for this permit are detailed in Appendix 7-4. The following section will describe the general drainage and sediment control plan.
- 741. General Requirements** The proposed operation is an underground mine with a relatively small surface disturbance for transportation, support and coal handling facilities. The proposed surface facilities will comprise a disturbed perimeter of approximately 42.6 acres. Access roads and utility lines will consist of approximately 10 acres of additional disturbance along a BLM Right-of-Way designated as a "Transportation Corridor".
- The majority of undisturbed runoff from areas above the proposed mine site will be diverted beneath the site via an undisturbed diversion culvert. Runoff from the disturbed mine site area will be directed to a sediment pond, designed to contain and treat the runoff from a 10 year - 24 hour precipitation event for the contributing watershed. Disturbed area runoff will be directed to the sediment pond via a combination of properly sized ditches and culverts. The general drainage control plan for the mine site is shown on Plate 7-5. The complete Drainage Design and Control Plan is provided in Appendix 7-4 of this P.A.P.
- 742. Sediment Control Measures** See Appendix 7-4 for Sediment Control Measure details.

#### **742.100 General Requirements**

**742.110 Designed/Constructed/Maintained** Appropriate sediment control measures will be designed, constructed and maintained using the best technology currently available to:

**742.111** "Prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area;"

This will be accomplished by the construction of undisturbed diversions to allow most undisturbed runoff to by-pass the site and by routing all disturbed runoff to sediment ponds for treatment prior to discharge.

**742.112** "Meet the effluent limitations under R645-301-751;"

Any discharge from the sediment ponds will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the U.S. Environmental Protection Agency set forth in 40 CFR Part 434.

**742.113** "Minimize erosion to the extent possible:" This will be accomplished by proper routing of drainage, and by the use of energy dissipators and/or erosion protection at all sediment pond, ditch and culvert outlets and in ditches where erosive velocities are expected.

**742.120 Sediment Control Measure** Sediment control measures within and adjacent to the disturbed areas are detailed in Appendix 7-4. These measures include, but are not limited to:

**742.121** As discussed in Appendix 7-4, runoff from the disturbed area will be captured in sediment ponds and/or treated as necessary to meet effluent limitations prior to discharge.

**742.122** As discussed in Appendix 7-4, the majority of undisturbed drainage from above the mine site will be diverted via designed undisturbed diversions.

**742.123** Undisturbed diversions will consist of properly designed and protected channels and/or culverts as described in Appendix 7-4.

**742.124** The primary means of velocity reduction is planned to be the use of rip-rap; however, other methods such as straw dikes, check dams and/or vegetative filters may be employed during the operational or reclamation phases as determined necessary, and with Diversion approval.

**742.125** There are no plans to treat runoff with chemicals. Based on extensive experience with runoff in this area, effluent requirements for discharge can normally be met by containment and settling in a sediment pond.

**742.126** It is expected that water will be encountered in the underground mining; however, this water will be used for mining needs and only discharged when no further storage is available underground. Any discharge of mine water will meet applicable effluent limitations. Such water will be sampled (and treated if necessary) prior to discharge.

**742.200 Siltation Structures** As described in Appendix 7-4 the sediment ponds will provide for sediment removal for most of the surface facility disturbance. An alternate sediment control method of berms and silt fences will be used at the fan site. The description of this alternate sediment control method is also described in Appendix 7-4. This is necessary due to its remote location and rough terrain. Other sediment structures that might be used around the surface facilities are temporary sediment traps such as straw dikes and/or catch basins.

**742.210 General Requirements** Siltation structures will be designed, constructed and maintained in accordance with the following regulations.

**742.211** Siltation structures will be constructed using the best technology currently available to prevent additional contributions of suspended solids and sediment to streamflow outside the permit area to the extent possible. Sediment control structures and details are discussed in Appendix 7-4.

**742.212** The siltation structures (i.e. sediment ponds) will be constructed prior to any coal mining and reclamation operations. Upon construction, the ponds and any other siltation structures will be certified by a qualified registered professional engineer to be constructed as designed and approved in the reclamation plan.

**742.213** The sediment ponds will be designed, constructed and maintained in accordance with all applicable regulations. See 732.200, 733.200 and Appendix 7-4 for details.

**742.214** Any discharge of water from underground workings to surface waters will meet applicable effluent limitations of 751. If such water is found not to meet those requirements, the water will be treated underground prior to discharge, or passed through a siltation structure prior to leaving the permit area.

**742.220 Sedimentation Ponds** The sedimentation ponds will meet the following criteria:

**742.221.1** The ponds will be used individually;

**742.221.2** The ponds are located at the lower end of the disturbed area and out of any perennial stream (See Plate 7-5);

**742.221.3** The sediment ponds will be designed, constructed and maintained to:

**742.221.31** The ponds are designed to contain the runoff from a 10 year - 24 hour precipitation event for the area in addition to a minimum of 2 years of sediment storage.

**742.221.32** The ponds are designed to provide a minimum of 24 hour retention of the runoff from a 10 year - 24 hour precipitation event.

**742.221.33** The ponds are designed to contain the runoff from a 10 year - 24 hour precipitation event plus a minimum of 2 years of sediment storage.

**742.221.34** A nonclogging dewatering devices are proved as described in Appendix 7-4.

**742.221.35** This will be accomplished by proper design, construction and maintenance of the ponds as described in Appendix 7-4.

**742.221.36** As discussed in Appendix 7-4, sediment will be removed when the level reaches the 2 year storage level. Since the pond is oversized, this leaves adequate room for storage of the design event.

**742.221.37** The sediment ponds construction ensures against excessive settlement. See "Sediment Pond Construction Requirements" in Appendix 7-4.

**742.221.38** Sediment ponds will be free of sod, large roots, frozen soil, and acid- or toxic-forming coal processing waste. See "Sediment Pond Construction Requirements" in Appendix 7-4.

**742.221.39** The sediment ponds will be compacted properly. See "Sediment Pond Construction Requirements" in Appendix 7-4.

**742.222 Sediment Ponds Meeting MSHA Criteria** The proposed ponds do not meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a). Therefore, this section is not applicable.

**742.223 Sediment Ponds Not Meeting MSHA Criteria** As discussed in Appendix 7-4, the ponds will be equipped with principle spillway and emergency spillway culverts each sized to safely discharge runoff from a 25 year - 6 hour precipitation event.

**742.223.1** The Principle Spillway culverts and the Emergency Spillway culverts will be corrugated, metal pipe. Each one designed to carry sustained flows.

**742.223.2** N/A - See 742.223.1

**742.224** N/A - See 742.223.1

**742.225** N/A - No exception requested.

**742.225.1** N/A

**742.225.2** N/A

**742.230 Other Treatment Facilities** No other treatment facilities are planned for this operation. Therefore, Section 742.230 is not applicable.

**742.240 Exemptions** No exemptions are requested at this time; however, since this is a new proposed operation, the need for Small Area Exemptions and/or Alternate Sediment Control Areas may arise in the future.

## **742.300 Diversions**

### **742.310 General Requirements**

**742.311** All diversions are considered temporary, and will be removed upon final reclamation.

Diversions are designed to minimize adverse impacts to the hydrologic balance within the permit and adjacent areas, to prevent material damage outside the permit area and to assure the safety of the public detailed diversion designs are presented in Appendix 7-4 of this P.A.P.

**742.312** See Appendix 7-4 for diversion designs.

**742.313** As indicated, all diversions for the Lila Canyon Mine are temporary, and will be removed when no longer needed. Land disturbed by removal will be reclaimed in accordance with R645-301 and R645-302. Prior to diversion

removal, downstream water treatment facilities will be modified or removed. See Reclamation Hydrology Section of Appendix 7-4.

**742.320 Diversion of Perennial and Intermittent Steams**

Section 742.320 is not applicable since there are no diversions planned for perennial or intermittent streams within the permit area.

**742.330 Diversion of Miscellaneous Flows** All diversions within the permit area are of miscellaneous flows.

**742.331** Certain miscellaneous undisturbed flows are proposed to be diverted around the disturbed area. Other flows are diverted within the disturbed area and to the sediment ponds, as described in Appendix 7-4.

**742.332** See Appendix 7-4.

**742.333** All temporary diversions are designed to safely pass the peak runoff of a 10-year 6-hour event resulting in a more robust design than the required 2-year 6-hour precipitation event. See Appendix 7-4 for details.

**742.400 Road Drainage**

**742.410 All Roads** All roads are designed in accordance with requirements of 534. Drainage control for all roads is discussed in detail in Appendix 7-4. No part of any road is planned to be located in the channel of an intermittent or perennial stream. As shown on Plate 7-2, roads are located to minimize downstream sedimentation and flooding.

**742.420 Primary Roads** Primary road design is discussed under 534.

**742.421** As described in Section 534, all primary roads are to be located, insofar as practical, on the most stable available surfaces.

**742.422** There are no stream fords planned for this operation.

**742.423 Drainage Control** Road drainage control is discussed in Appendix 7-4.

**742.423.1** Primary roads will be equipped with adequate drainage control, including ditches, culverts and relief drains. The drainage control system is designed, and will be constructed and maintained, to pass the peak runoff safely from a 10 year - 6 hour precipitation event, as described in Appendix 7-4.

**742.423.2** Culvert design and installation details are described in Appendix 7-4. Inlets and outlets are protected from erosion. Undisturbed culvert inlets are to be equipped with trash racks.

**742.423.3** Drainage ditch design details are provided in Appendix 7-4.

**742.423.4** There are plans to alter the drainage channel on the south boundary of the disturbed area. This drainage is an ephemeral channel with no riparian habitat. A stream alteration permit will not be required for this channel. A 60 inch culvert and a sedimentation pond will be placed in this channel. Installation of this culvert and sedimentation control plans are described in Appendix 7-4. To ensure that state of the art technology is incorporated, the final reclamation plans for the sedimentation pond area will be submitted prior to commencement of final reclamation of this area.

**742.423.5** Stream channel crossings will be provided by culverts designed, constructed and maintained using current, prudent engineering practice, as described in Appendix 7-4.

### **743. Impoundments**

**743.100 General Requirements** All impoundments associated with this operation are considered temporary.

**743.110** Not applicable there are no impoundments planned that meet the criteria of MSHA, 30 CFR 77.216 (a).

**743.120** The design of impoundments have been prepared and certified by a qualified, registered professional engineer. As described in Appendix 7-4, the proposed sediment ponds will have at least 2' of freeboard above the highest flow level in the emergency spillway, which is adequate to resist overtopping by waves and by sudden increases in storage volumes.

**743.130** As described in Appendix 7-4, the sediment ponds will be equipped with a culvert riser principal spillway and a culvert riser emergency overflow sized to safely pass the runoff from a 25 year - 6 hour precipitation event.

**743.131** The principal spillway design is discussed below.

**743.131.1** The principle spillway will be constructed of corrugated metal pipe. The emergency spillway will also be constructed of corrugated metal pipe.

#### **744. Discharge Structures**

**744.100** The sediment pond emergency spillway will be a vertical corrugated metal pipe. It will flow into a 60" diameter C.M.P. beneath the pond and discharge onto an engineered rip-rap apron to prevent scouring or erosion. (See Appendix 7-4).

Diversions and culvert outlets that are expected to have flow velocities in excess of 5 fps will also be equipped with erosion and velocity controls as described in Appendix 7-4.

**744.200** Discharge structures have been designed and certified according to standard engineering design procedures. (See Appendix 7-4).

**745. Disposal of Excess Spoil** Section 745 is not applicable since there are no plans for disposal of excess spoil at the Lila Canyon operation.

**746. Coal Mine Waste** The area designated for coal mine waste disposal is within an existing depression area which is located beneath and around the proposed coal storage pile area as shown on Plates 5-2, 7-2 and 7-5. This disposal area will be used for disposal of the rock slope material, reject from coal processing, coal contaminated waste from the mine (i.e. roof falls, etc.) and/or sediment pond waste.

The designated waste area will be within the disturbed area and drained to the sediment pond, and will be constructed according to Division and MSHA requirements. Coal mine waste disposal is discussed in detail under Section 536 of this permit.

#### **746.100 General Requirements**

**746.110** All coal mine waste will be placed in a new disposal area within the permit area as discussed in Section 536 and 746.

**746.120** The area selected for coal mine waste disposal will drain to the sediment pond for final treatment to minimize adverse effects on the surface and ground water quality and quantity. (See Plates 7-2 and 7-5).

**746.200 Refuse Piles.** The refuse area is described under Coal Mine Waste in Section 746 and detailed in Section 536. Rock slope material will be used as fill and is referred to as refuse. No coal refuse pile is anticipated. Other than described in Section 536.

**746.210** In the event a refuse pile is needed for future operations the refuse piles would be designed to meet the requirements of the above listed Division regulations as well as applicable MSHA regulations. See Section 536 for details.

**746.211** The coal mine waste disposal areas will not be located in an area containing springs, seeps or water courses. As shown on Plates 5-2 and 7-5 and described in Appendix 7-4, runoff from the areas will be drained to the sediment pond.

**746.212** As described in Sections 536 and 746, the coal refuse will be placed within the mine workings, rock slope material will be placed in existing depression areas. These areas are below grade and will drain to the sediment pond.

Due to the location (below grade) no berms or diversion ditches are planned for the Coal Mine Waste Area. See Appendix 7-4 for hydrologic details.

**746.213** Not applicable since there are no underdrains planned for this pile.

#### **746.220 Surface Area Stabilization**

**746.221** The plan for revegetation of the area is discussed in Section 536.

**746.222** There are no plans for any permanent impoundments on the refuse or Coal mine waste area. Small depressions may exist for a short time until regrading is completed. These depressions are normally less than one foot in depth and not left for more than 30 days.

**746.300** This section is not applicable since there are no plans to construct any impounding structures of coal mine waste or to impound coal mine waste.

**746.400** This section is not applicable since there are no plans to return coal processing waste to abandoned underground workings.

**747. Disposal of Noncoal Waste.** Disposal of non-coal mine waste is discussed under Section 528.330 of this permit.

**747.100** As indicated in Section 528.330, non-coal mine waste will be stored in a controlled manner in a designated area on site. Final disposal of all noncoal mine waste, except concrete during reclamation, will be in a state-approved solid waste disposal area (E.C.D.C.).

**747.200** As shown on Plates 5-2B and 7-5, the proposed noncoal mine waste storage area is in a designated site, free of springs or seeps, and drained to the sediment pond.

**747.300** There are no plans to dispose of noncoal mine waste within the permit area, except concrete during reclamation. The concrete will

be buried beneath a minimum of 2' of non-acid, non-toxic material, and will not degrade surface or ground water.

**748. Casing and Sealing of Wells** There are only three ground water piezometers on the site IPA-1, IPA-2 and IPA-3. They will be reclaimed according to the requirements of the Division's Performance Standards. If any additional wells are required in the future, requirements of this section will be met.

#### **750. Performance Standards**

**751. Water Quality** Discharges of water from this operation will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the U. S. Environmental Protection Agency set forth in 40 CFR Part 434. See Sections 731 and 742.

**752. Sediment Control Measures** Sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs described under Sections 732, 742, 760 and Appendix 7-4.

**752.100 Siltation Structures** Siltation structures and diversions will be located, maintained, constructed and reclaimed according to plans and designs described under Sections 732, 742, 763 and Appendix 7-4.

**752.200 Road Drainage** Roads will be located, designed, constructed, reconstructed, used, maintained and reclaimed as described under Sections 732.400, 742.400 and 762.

**752.210 Control or Prevent Erosion** See Section 742.400 and Appendix 7-4.

**752.220 Control or Prevent Additional Disturbance** See Section 742.400 and Appendix 7-4.

**752.230 Effluent Standards** See Section 742.400 and Appendix 7-4.

**752.240 Degradation of Ground Water Systems** See Section 742.400 and Appendix 7-4.

**752.250 Altering Normal Flow of Water** See Section 742.400 and Appendix 7-4.

**753. Impoundments and Discharge Structures** Impoundments and discharge structures will be located, maintained, constructed and reclaimed as described in Sections 733, 734, 743, 745, 760 and Appendix 7-4.

**754. Disposal of Excess Spoil, Coal Mine Waste and Noncoal Mine Waste** Disposal areas for excess spoil, coal mine waste and noncoal mine waste will be located, maintained, constructed and reclaimed to comply with Sections 735, 736, 745, 746, 747 and 760.

**755. Casing and Sealing of Wells** Not applicable since no wells are planned for this site. The three Piezometers will be reclaimed according to the requirements of the Divisions's Performance Standards.

**760. Reclamation** Reclamation hydrology is detailed in Appendix 7-4.

**761. General Requirements** Upon completion of operations, the disturbed area will be reclaimed. All drainage and sediment controls are considered temporary and will be removed when no longer required. The sediment pond will remain in place until Phase II Bond Release requirements have been met. At that time, the pond will be removed and the area will be reclaimed in accordance with the approved plan.

**762. Roads** All roads within the disturbed area are temporary, and will be removed and reclaimed upon completion of operations. An access road will be left in place to reach the sediment pond; however, this road will also be removed and reclaimed when the sediment pond is removed.

**762.100** Upon removal of roads, culverts and diversions will also be removed and the natural drainage patterns will be restored.

**762.200** Cut and fill slopes will be reshaped according to the approved reclamation plan. This reshaping will be compatible with the postmining land use and will complement the drainage pattern of the surround terrain. Road reclamation is described in Section 550.

**763. Siltation Structures.** See Appendix 7-4 for details on removal of siltation structures.

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



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**SEDIMENTATION AND DRAINAGE CONTROL PLAN**

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## SEDIMENTATION AND DRAINAGE CONTROL PLAN

### 1- Introduction

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

This plan has been divided into the following three sections:

- 1) Design of Drainage Control Structures for the Proposed Construction
- 2) Design of Sediment Control Structures
- 3) Design of Drainage Control Structures for Reclamation

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

- (a) This is a new site construction. All areas proposed for disturbance will be sloped to drain to surface ditches and/or culverts where runoff will be carried to two sediment ponds. All minesite drainage controls and watersheds are shown on Plate 7-5 "Proposed Sediment Control Map".
- (b) The majority of undisturbed runoff will be diverted around the minesite and beneath the sediment pond #1 by properly sized culverts. Undisturbed diversion culvert UC-1, is located on the northwest end of the site. This diversion will allow the majority of undisturbed runoff from the Right Fork of Lila Canyon to bypass the mine area beneath sediment pond #1. All undisturbed diversions are designed to carry runoff from a 100 year - 6 hour precipitation event. UC-1 is oversized at 60" diameter.

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

## DESIGN OF DRAINAGE CONTROL STRUCTURES

### Design Parameters:

- 2.1 Precipitation
- 2.2 Flow
- 2.3 Velocity
- 2.4 Drainage Areas
- 2.5 Slope Lengths
- 2.6 Runoff
- 2.7 Runoff Curve Numbers
- 2.8 Culvert Sizing
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- Table 5 Runoff Summary - Watersheds Draining to Sediment Pond
- Table 6 Runoff Control Structure - Watershed Summary
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- Table 8 Disturbed Ditch Design Summary
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- Table 10 Undisturbed Culvert Design Summary

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- Figure 4 Trash Rack - Culvert Inlet - Typical Section
- Figure 4A UC-1 Culvert Outlet

## Design Parameters

### 2.1 Precipitation

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

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

## 2.2 Flow

Peak flows, flow depths, areas and velocities were calculated using the computer program "Office of Surface Mining Watershed Model", Storm Version 6.21 by Gary E. McIntosh. All flows are based on the SCS - TR55 Method for both SCS 6-hour and NOAA Type II, 24-hour storms.

Time of concentration of storm events was calculated for each drainage area using the SCS upland curve method included as part of the Storm software. For the undisturbed areas UA-1 and UA-4 the watershed type was set at forested and the curve condition was set at bare ground. For UA-6a and UA-6b and all DA watersheds, the watershed type was set as disturbed and the curve condition was set at bare ground.

## 2.3 Velocity

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

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

where:

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

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

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

Structure	Manning's n
Culverts (cmp)	0.025
Unlined Disturbed Area Ditches	0.035

## 2.4 Drainage Areas

All drainage areas were planimetered directly from either Plate 7-1, "Permit Area Hydrology Map", and Plate 7-2, "Disturbed Area Hydrology/Watershed".

## 2.5 Slopes, Lengths

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

## 2.6 Runoff Volume

Runoff was calculated using the SCS Formula for NOAA Type II, 24-hour storms; using the Storm Version 6.21 computer program:

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

where:

CN	=	Runoff Curve Number
Q	=	Runoff in inches
P	=	Precipitation in inches
S	=	$\frac{1000}{CN} - 10$

## 2.7 Runoff Curve Numbers

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

Two other runoff curve numbers have been used in the calculations. A runoff CN of 90 is used for all disturbed areas (including the areas designated as undisturbed which lie within the disturbed area boundary (See Plate 7-2), and a runoff CN of 95 is used for paved areas. These numbers are based on commonly used and approved values and from Table 2.20, (p. 82, Barfield, et al, 1983).

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

Watershed	Runoff CN
Undisturbed (<30% slopes):	75
Undisturbed (>30% slopes):	83
Disturbed:	90
Paved:	95

## 2.8 Culvert Sizing

Minimum culvert sizing is based on either the inlet control nomograph or Manning's Equation. Culverts were evaluated for inlet control conditions to determine the minimum pipe size using the Culvert Nomograph included as Figure 1 of this Appendix. If the pipe had a HW/D ratio equal to or greater than 1.0 or the slope were less than 2% the Haestad Methods, Flowmaster, Version 6.0 computer program was used to determine the pipe flow diameter using:

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

where:

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

## 2.9 Culverts

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

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

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

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

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

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

## 2.10 Main Canyon Culvert - Outlet Structure

The outlet of culvert UC-1 has been designed to flow onto a rip-rap apron to protect against souring and to allow for energy dissipation. The rip-rap apron is designed to fit the natural channel configuration as closely as possible, and will allow runoff to re-enter the natural channel at a reduced velocity which is no greater than natural flow conditions. Runoff from the 100 year - 6 hour precipitation event in the canyon below the minesite has been calculated at 52.32 cfs, including sediment pond overflow.

The rip-rap apron design is based on Figure 7-26, Design of Outlet Protection - Maximum Tailwater Condition, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983. Based on the figure, the apron should be a minimum of 15' in length, widening from 5' to 9', with a 0.1% slope. The proposed length has been increased to 20', to ensure adequate time for velocity reduction. The apron slope is kept at 0.1%. Rip-rap size is conservatively placed at 12"  $D_{50}$ . Rip-rap will be placed to a depth of 1.5  $D_{50}$  and will be placed on a 6" layer of 2" drain rock filter. Rip-rap will also be placed on the 2H:1V side slopes to the height of the culvert (4') at the culvert outlet tapering to 3' at the outlet of the apron. This rip-rap apron has been sized and designed to adequately dissipate energy from flow velocities of a 100 year - 6 hour precipitation event and resist dislodgement. The drain rock filter bed will also serve to secure the rip-rap boulders firmly in place, to add an additional element of stability, and prevent scouring underneath the armored apron. (See Figure 4A for construction details). The natural channel below the culvert has a gradient of approximately 7.76%. When the flow is routed from the culvert across the apron to the natural channel, the velocity is reduced from 4.79 fps at the culvert outlet to 1.50 fps at the outlet of the apron. (See Culvert Outlet Rip-Rap Apron Flow Velocity Calculations in Appendix 1.)

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

## 2.11 Ditches

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

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

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

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

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

TABLE 1

Table 1 Undisturbed Watershed Summary		
Watershed	Drains To	Final
UA-1	UC-1	Lila Canyon
UA-2	DD-2	Sediment Pond
UA-4	Sediment Pond	Sediment Pond
UA-6a	DD-12	Sediment Pond
UA-6b	DD-11	Sediment Pond
UA-7	ASCA Area	Lila Canyon

TABLE 2

Table 2 Disturbed Watershed Summary		
Watershed	Drains To	Final
DA-1a	DD-1a	Sediment Pond
DA-1b	DD-1b	Sediment Pond
DA-1c	DD-1c	Sediment Pond
DA-2a	DD-2a	Sediment Pond
DA-2b	DD-2b	Sediment Pond
DA-2c	DD-2c	Sediment Pond
DA-3	DD-3	Sediment Pond
DA-4a	DD-4a	Sediment Pond
DA-4b	DD-4b	Sediment Pond
DA-4c	DD-4c	Sediment Pond
DA-5a	DD-5a	Sediment Pond
DA-5b	DD-5b	Sediment Pond
DA-5c	DD-5c	Sediment Pond
DA-6a	DD-6a	Sediment Pond
DA-6b	DD-6b	Sediment Pond
DA-6c	DD-6c	Sediment Pond
DA-7	DD-7	Sediment Pond
DA-8a	DD-8a	Sediment Pond
DA-8b	DD-8b	Sediment Pond
DA-8c	DD-8c	Sediment Pond
DA-9	DD-9	Sediment Pond
DA-10	DD-10	Sediment Pond
DA-11	DD-11	Sediment Pond
DA-13a	DD-13a	Sediment Pond
DA-13b	DD-13d	Sediment Pond
DA-13c	DD-13e	Sediment Pond
DA-14a	DD-14a	Sediment Pond 2
DA-14b	DD-14b	Sediment Pond 2
DA-15a	DD-15a	Sediment Pond 2
DA-15b	DD-15b	Sediment Pond 2
DA-16a	DD-16a	Sediment Pond 2
DA-16b	DD-16b	Sediment Pond 2
DA-17a	DD-17a	Sediment Pond 2
DA-17b	DD-17b	Sediment Pond 2
DA-18a	DD-18a	Sediment Pond 2
DA-18b	DD-18b	Sediment Pond 2
TS-1	Topsoil Berm	Sediment Pond
POND	Sediment Pond	Sediment Pond

TABLE 3

Table 3 Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Undisturbed Watersheds					
UA-1	248.41	5200	1480	28.46	75
UA-2	10.01	1500	1000	66.67	83
UA-4	14.08	1950	595	47.76	83
UA-6a	1.45	230	80	34.70	90
UA-6b	0.40	90	30	33.33	90
UA-7	0.60	195	25	12.80	90
Disturbed Watersheds					
DA-1a	0.33	680	152	22.35	95
DA-1b	0.31	420	48	11.43	95
DA-1c	0.20	225	20	8.89	95
DA-2a	0.93	680	162	23.82	95
DA-2b	0.14	350	36	10.29	95
DA-2c	0.10	106	16	15.10	95
DA-3	0.30	170	16	9.41	90
DA-4a	0.14	100	12	12.00	95
DA-4b	0.12	270	28	10.37	95
DA-4c	0.60	580	54	9.31	95
DA-5a	0.07	180	24	13.33	95
DA-5b	0.33	125	14	11.20	90
DA-5c	0.42	570	54	9.47	95
DA-6a	0.28	200	54	27.00	90
DA-6b	3.35	760	70	9.21	90
DA-6c	2.51	690	70	10.14	90
DA-7	2.68	630	30	4.76	95
DA-8a	0.26	284	54	19.01	90
DA-8b	0.76	670	52	7.80	90
DA-8c	0.95	410	42	10.24	90
DA-9	0.05	50	6	12.00	95
DA-10	2.89	700	20	2.86	95
DA-11	0.78	340	16	4.70	95
DA-13a	1.97	470	12	2.55	95
DA-13b	0.49	280	4	1.43	90
DA-13c	0.40	460	22	4.78	90
DA-14a	0.36	390	34	8.71	95
DA-14b	0.75	540	16	2.96	95

TABLE 3

Table 3 Watershed Parameters					
Watershed	Area (Acre)	Hydraulic Length (ft.)	Elevation Change (ft.)	% Slope	CN
Disturbed Watersheds					
DA-15a	0.38	525	50	9.52	95
DA-15b	0.62	270	12	4.44	95
DA-16a	0.16	370	10	2.70	95
DA-16b	0.09	210	13	6.19	95
DA-17a	0.42	610	19	3.11	95
DA-17b	0.07	100	5	5.00	95
DA-18a	0.07	175	6	3.43	95
DA-18b	0.44	650	24	3.69	95
TS-1	2.95	660	38	5.75	83
POND	1.92	380	50	13.16	95

TABLE 4

Table 4 Runoff Summary Undisturbed Watersheds (Not Draining to Ponds)					
Watershed	10 yr. / 6 hr. Peak Flow - cfs	25 yr. / 6 hr. Peak Flow - cfs	100 yr. / 6 hr. Peak Flow - cfs	10 yr. / 24 hr. Peak Flow - cfs	10 yr. / 24 hr. Volume - ac.ft.
UA-1	7.02	10.31	20.48	25.53	6.90
UA-7	0.21	0.27	0.40	0.43	0.03

TABLE 5

Table 5 Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Undisturbed Watersheds draining to Pond #1				
UA-2	2.11	3.11	6.11	0.52
UA-4	3.14	4.65	9.20	0.74
UA-6a	0.47	0.60	0.95	0.12
UA-6b	0.10	0.13	0.21	0.03
Disturbed Watersheds draining to Pond #1				
DA-1a	0.22	0.26	0.37	0.04
DA-1b	0.20	0.24	0.33	0.04
DA-1c	0.11	0.14	0.19	0.02
DA-2a	0.61	0.73	1.03	0.11
DA-2b	0.09	0.10	0.15	0.02
DA-2c	0.04	0.05	0.08	0.01
DA-3	0.11	0.14	0.21	0.03
DA-4a	0.06	0.08	0.11	0.02
DA-4b	0.07	0.08	0.12	0.01
DA-4c	0.42	0.51	0.71	0.07
DA-5a	0.05	0.06	0.09	0.01
DA-5b	0.11	0.14	0.21	0.03
DA-5c	0.29	0.35	0.49	0.05
DA-6a	0.09	0.12	0.18	0.02
DA-6b	1.60	2.06	3.27	0.28
DA-6c	1.18	1.52	2.40	0.21
DA-7	1.98	2.39	3.36	0.31
DA-8a	0.10	0.12	0.19	0.02
DA-8b	0.36	0.47	0.74	0.06
DA-8c	0.40	0.52	0.81	0.08
DA-9	0.04	0.05	0.07	0.01
DA-10	2.19	2.65	3.73	0.33
DA-11	0.52	0.63	0.89	0.09
DA-13a	1.46	1.76	2.47	0.23
DA-13b	0.23	0.30	0.47	0.04
DA-13c	0.19	0.24	0.38	0.03
TS-1	0.65	0.96	1.90	0.15
POND	1.18	1.42	1.99	0.22
TOTAL		26.58		3.95

TABLE 5

Table 5 Runoff Summary Watershed Drainage to Sediment Pond				
Watershed	10 yr. / 6 hr. Peak Flow-cfs	25 yr. / 6 hr. Peak Flow-cfs	10 yr. / 24 hr. Peak Flow-cfs	10 yr. / 24 hr. Volume-ac-ft
Disturbed Watersheds draining to Pond #2				
DA-14a	0.23	0.28	0.39	0.04
DA-14b	0.56	0.67	0.95	0.09
DA-15a	0.26	0.31	0.44	0.04
DA-15b	0.40	0.48	0.67	0.07
DA-16a	0.11	0.14	0.19	0.02
DA-16b	0.06	0.07	0.10	0.01
DA-17a	0.31	0.38	0.53	0.05
DA-17b	0.05	0.06	0.09	0.01
DA-18a	0.06	0.07	0.10	0.01
DA-18b	0.33	0.40	0.56	0.05
TOTAL		2.86		0.39

**TABLE 6**

Table 6 Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
UC-1	Culvert	UA-1, UA-7, Sediment Pond Overflow
DD-1a	Ditch	DA-1a
DD-1b	Ditch	DD-1a, DA-1b, UA-6b
DC-2	Culvert	DD-1b
DD-1c	Ditch	DC-2, DA-1c
DD-2a	Ditch	DA-2a, UA-2
DD-2b	Ditch	DD-2a, DA-2b
DC-1	Culvert	DD-2b, UA-2
DD-2c	Ditch	DC-1, DA-2c
DC-3	Culvert	DD-2c
DD-3	Ditch	DA-3
DC-4	Culvert	DD-3
DD-4a	Ditch	DA-4a
DD-4b	Ditch	DD-4a, DC-4, DA-4b
DC-20	Culvert	DD-4b
DD-4c	Ditch	Dc-20, DA-4c
DC-9	Culvert	DD-4c
DD-5a	Ditch	DA-5a
DD-5b	Ditch	DD-5a, DA-5b
DC-5	Culvert	DD-5b
DD-5c	Ditch	DC-5, DA-5c
DC-10	Culvert	DD-5c, DC-9
DD-6a	Ditch	DC-3, DD-1c, DA-6a

Table 6 Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DC-6	Culvert	DD-6a
DD-6b	Ditch	DC-6, DA-6b
DD-6c	Ditch	DA-6c
DC-8	Culvert	DD-6b, DD-6c
DD-7	Ditch	DA-7
DC-7	Culvert	DD-7
DD-8a	Ditch	DA-8a
DD-8b	Ditch	DD-8a, DC-7, DA-8b
DD-8c	Ditch	DD-8b, DC-8, DA-8c
DD-9	Ditch	DC-10, DD-5c, DA-9
DC-11	Culvert	DD-9
DD-10	Ditch	DA-10
DC-12	Culvert	DD-10
DD-11	Ditch	DA-11
DD-12	Ditch	DD-7, UA-6a
DD-13a	Ditch	DC-11, DA-13a
DD-13b	Ditch	DD-13a, DD-11
DD-13c	Ditch	DD-13b, DC-12
DD-13d	Ditch	DD-13c, DD-8c, DD-13b
DC-13	Culvert	DD-13d
DD-13e	Ditch	DC-13, DA-13c
DD-14a	Ditch	DA-14a
DD-14b	Ditch	DA-14b
DC-14	Culvert	DD-14a, DD-14b
DD-15a	Ditch	DA-15a

Table 6 Runoff Control Structure Watershed Summary		
Structure	Type	Contributing Watersheds/Structures
DD-15b	Ditch	DD-15a, DA-15b
DC-19	Culvert	DD-15b
DD-16a	Ditch	DA-16a
DC-15	Culvert	DD-16a
DD-16b	Ditch	DC-15, DA-16b
DD-17a	Ditch	DA-17a
DC-16	Culvert	DD-17a
DD-17b	Ditch	DC-16, DC-14, DA-17b
DC-17	Culvert	DD-17b, DD-16b
DD-18a	Ditch	DA-18a
DC-18	Culvert	DD-18a
DD-18b	Ditch	DC-18, DA-18b

DD-12 does not exist.

TABLE 7

Table 7 Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	25yr. / 6hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
UC-1	Culvert	38.67	57.40	42.02	52.32
DD-1a	Ditch	0.22	0.37	0.26	--
DD-1b	Ditch	0.52	0.91	0.63	--
DC-2	Culvert	0.52	0.91	0.63	--
DD-1c	Ditch	0.63	1.10	0.77	--
DD-2a	Ditch	2.72	7.14	3.84	--
DD-2b	Ditch	2.81	7.29	3.94	--
DC-1	Culvert	2.81	7.29	3.94	--
DD-2c	Ditch	2.85	7.37	3.99	--
DC-3	Culvert	2.85	7.37	3.99	--
DD-3	Ditch	0.11	0.21	0.14	--
DC-4	Culvert	0.11	0.21	0.14	--
DD-4a	Ditch	0.06	0.11	0.08	--
DD-4b	Ditch	0.24	0.44	0.30	--
DC-20	Culvert	0.24	0.44	0.30	--
DD-4c	Ditch	0.66	1.15	0.81	--
DC-9	Culvert	0.66	1.15	0.81	--
DD-5a	Ditch	0.05	0.09	0.06	--
DD-5b	Ditch	0.16	0.30	0.20	--
DC-5	Culvert	0.16	0.30	0.20	--
DD-5c	Ditch	0.45	0.79	0.55	--
DC-10	Culvert	1.11	1.94	1.36	--

Table 7 Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	25yr. / 6hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
DD-6a	Ditch	2.94	7.55	4.11	--
DC-6	Culvert	2.94	7.55	4.11	--
DD-6b	Ditch	4.54	10.82	6.17	--
DD-6c	Ditch	1.18	2.40	1.52	--
DC-8	Culvert	5.72	13.22	7.69	--
DD-7	Ditch	2.45	4.31	2.99	--
DC-7	Culvert	2.45	4.31	2.99	--
DD-8a	Ditch	0.10	0.19	0.12	--
DD-8b	Ditch	2.91	5.24	3.58	--
DD-8c	Ditch	6.12	14.03	8.21	--
DD-9	Ditch	0.04	2.80	1.96	--
DC-11	Culvert	1.60	2.80	1.96	--
DD-10	Ditch	2.19	3.73	2.65	--
DC-12	Culvert	2.19	3.73	2.65	--
DD-11	Ditch	0.52	0.89	0.63	--
DD-13a	Ditch	3.06	5.27	3.72	--
DD-13b	Ditch	3.58	6.16	4.35	--
DD-13c	Ditch	5.77	9.89	7.00	--
DD-13d	Ditch	6.35	14.50	8.51	--
DC-13	Culvert	6.35	14.50	8.51	--
DD-13e	Ditch	6.54	14.88	8.75	--
DD-14a	Ditch	0.23	0.39	0.28	--
DD-14b	Ditch	0.56	0.95	0.67	--
DC-14	Culvert	0.79	1.34	0.95	--

Table 7 Runoff Control Structure Flow Summary					
Structure	Type	10yr. / 6hr. Peak Flow-cfs	10yr. / 24hr. Peak Flow-cfs	25yr. / 6hr. Peak Flow-cfs	100yr. / 6hr. Peak Flow-cfs
DD-15a	Ditch	0.26	0.44	0.31	--
DD-15b	Ditch	0.66	1.11	0.79	--
DC-19	Culvert	0.66	1.11	0.79	--
DD-16a	Ditch	0.11	0.19	0.14	--
DC-15	Culvert	0.11	0.19	0.14	--
DD-16b	Ditch	0.17	0.29	0.21	--
DD-17a	Ditch	0.31	0.53	0.38	--
DC-16	Culvert	0.31	0.53	0.38	--
DD-17b	Ditch	1.15	1.96	1.39	--
DC-17	Culvert	1.32	2.25	1.60	--
DD-18a	Ditch	0.06	0.10	0.07	--
DC-18	Culvert	0.06	0.10	0.07	--
DD-18b	Ditch	0.39	0.66	0.47	--

DD-12 does not exist.

UC-1 flow values include 25yr-6hr sediment pond peak flow 31.44 cfs.

TABLE 8

Table 8 Disturbed Ditch Design Summary						
Ditch	DD-1a	DD-1b	DD-1c	DD-2a	DD-2b	DD-2c
Slope (%)	11.42	11.20	10.00	12.06	10.29	14.29
Length (ft.)	683	420	20	680	350	105
Manning's No.	0.035	0.035	0.035	0.035	0.035	0.035
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	0.00	0.00	0.00	2.00	2.00	2.00
Peak Flow 10/6 (cfs)	0.22	0.52	0.63	2.72	2.81	2.85
Peak Flow 10/24 (cfs)	0.37	0.91	1.10	7.14	7.29	7.37
Flow Depth (ft.) 10/6	0.20	0.27	0.30	0.23	0.24	0.22
Flow Depth (ft.) 10/24	0.24	0.34	0.37	0.39	0.42	0.38
Flow Area (ft. <sup>2</sup> ) 10/6	0.08	0.15	0.18	0.56	0.61	0.55
Flow Area (ft. <sup>2</sup> ) 10/24	0.11	0.23	0.27	1.10	1.18	1.06
Velocity (fps) 10/6	2.84	3.49	3.51	4.81	4.61	5.18
Velocity (fps) 10/24	3.23	4.02	4.04	6.49	6.18	6.96
Rip-Rap Req'd (Y/N)	N	N	N	N	N	N
Rip-Rap D <sub>50</sub>	-	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.						

TABLE 8 (Continued)

Table 8 (Continued) Disturbed Ditch Design Summary							
Ditch	DD-3	DD-4a	DD-4b	DD-4c	DD-5a	DD-5b	DD-5c
Slope (%)	0.60	11.00	10.26	10.00	13.11	11.11	9.52
Length (ft.)	171	100	273	580	183	126	567
Manning's No.	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Peak Flow 10/6 (cfs)	0.11	0.06	0.24	0.66	0.05	0.16	0.45
Peak Flow 10/24 (cfs)	0.21	0.11	0.44	1.15	0.09	0.30	0.79
Flow Depth (ft.) 10/6	0.26	0.12	0.21	0.30	0.11	0.18	0.27
Flow Depth (ft.) 10/24	0.34	0.15	0.26	0.38	0.14	0.22	0.33
Flow Area (ft. <sup>2</sup> ) 10/6	0.14	0.03	0.09	0.19	0.02	0.06	0.14
Flow Area (ft. <sup>2</sup> ) 10/24	0.23	0.05	0.14	0.28	0.04	0.10	0.22
Velocity (fps) 10/6	0.79	2.02	2.79	3.55	2.06	2.59	3.17
Velocity (fps) 10/24	0.93	2.35	3.24	4.08	2.39	3.04	3.65
Rip-Rap Req'd (Y/N)	N	N	N	N	N	N	N
Rip-Rap D <sub>50</sub>	-	-	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Table 8 (Continued) Disturbed Ditch Design Summary							
Ditch	DD-6a	DD-6b	DD-6c	DD-7	DD-8a	DD-8b	DD-8c
Slope (%)	18.00	2.56	3.38	1.08	20.42	7.81	10.34
Length (ft.)	200	507	532	370	284	666	406
Manning's No.	0.040	0.035	0.035	0.035	0.035	0.035	0.040
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	3.00	1.00	1.00	1.00	0.00	1.00	2.00
Peak Flow 10/6 (cfs)	2.94	4.54	1.18	2.45	0.10	2.91	6.12
Peak Flow 10/24 (cfs)	7.55	10.82	2.40	4.31	0.19	5.24	14.03
Flow Depth (ft.) 10/6	0.19	0.60	0.28	0.55	0.13	0.37	0.41
Flow Depth (ft.) 10/24	0.32	0.90	0.41	0.72	0.17	0.49	0.63
Flow Area (ft. <sup>2</sup> ) 10/6	0.62	1.32	0.45	1.15	0.03	0.63	1.14
Flow Area (ft. <sup>2</sup> ) 10/24	1.17	2.52	0.75	1.75	0.06	0.98	2.07
Velocity (fps) 10/6	4.71	3.43	2.64	2.12	2.90	4.59	5.35
Velocity (fps) 10/24	6.47	4.29	3.21	2.46	3.40	5.37	6.78
Rip-Rap Req'd (Y/N)	Y	N	N	N	N	N	Y
Rip-Rap D <sub>50</sub>	6"	-	-	-	-	-	6"
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Table 8 (Continued) Disturbed Ditch Design Summary							
Ditch	DD-9	DD-10	DD-11	DD-13a	DD-13b	DD-13c	DD-13d
Slope (%)	10.00	3.02	5.06	2.53	3.23	3.30	1.25
Length (ft.)	50	696	336	474	62	38	278
Manning's No.	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	0.00	1.00	0.00	1.00	1.00	1.00	3.00
Peak Flow 10/6 (cfs)	0.04	2.19	0.52	3.06	3.58	5.77	6.35
Peak Flow 10/24 (cfs)	0.07	3.73	0.89	5.27	6.16	9.89	14.50
Flow Depth (ft.) 10/6	0.11	0.40	0.32	0.50	0.51	0.63	0.57
Flow Depth (ft.) 10/24	0.13	0.53	0.39	0.65	0.66	0.82	0.89
Flow Area (ft. <sup>2</sup> ) 10/6	0.02	0.73	0.20	0.99	1.02	1.44	2.36
Flow Area (ft. <sup>2</sup> ) 10/24	0.03	1.08	0.30	1.48	1.52	2.15	4.25
Velocity (fps) 10/6	1.76	3.00	2.59	3.08	3.51	4.01	2.69
Velocity (fps) 10/24	2.03	3.46	2.97	3.55	4.05	4.61	3.41
Rip-Rap Req'd (Y/N)	N	N	N	N	N	N	N
Rip-Rap D <sub>50</sub>	-	-	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Table 8 (Continued) Disturbed Ditch Design Summary							
Ditch	DD-13e	DD-14a	DD-14b	DD-15a	DD-15b	DD-16a	DD-16b
Slope (%)	4.78	8.72	3.15	9.70	4.07	2.97	6.06
Length (ft.)	460	390	540	525	270	370	165
Manning's No.	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Side Slope (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1
*Bottom Width (ft.)	3.00	0.00	0.00	0.00	0.00	0.00	0.00
Peak Flow 10/6 (cfs)	6.54	0.23	0.56	0.26	0.66	0.11	0.17
Peak Flow 10/24 (cfs)	14.88	0.39	0.95	0.44	1.11	0.19	0.29
Flow Depth (ft.) 10/6	0.40	0.21	0.36	0.22	0.36	0.20	0.20
Flow Depth (ft.) 10/24	0.63	0.26	0.43	0.26	0.44	0.24	0.25
Flow Area (ft. <sup>2</sup> ) 10/6	1.52	0.09	0.25	0.09	0.26	0.08	0.08
Flow Area (ft. <sup>2</sup> ) 10/24	2.68	0.13	0.38	0.14	0.38	0.12	0.12
Velocity (fps) 10/6	4.31	2.59	2.21	2.78	2.54	1.44	2.10
Velocity (fps) 10/24	5.54	2.96	2.52	3.18	2.89	1.65	2.40
Rip-Rap Req'd (Y/N)	N	N	N	N	N	N	N
Rip-Rap D <sub>50</sub>	-	-	-	-	-	-	-
Note: Slope/Lengths from Plate 7-2.							

TABLE 8 (Continued)

Table 8 (Continued) Disturbed Ditch Design Summary							
Ditch	DD-17a	DD-17b	DD-18a	DD-18b			
Slope (%)	2.68	4.12	2.86	3.54			
Length (ft.)	485	97	175	650			
Manning's No.	0.035	0.035	0.035	0.035			
Side Slope (H:V)	2:1	2:1	2:1	2:1			
*Bottom Width (ft.)	0.00	0.00	0.00	0.00			
Peak Flow 10/6 (cfs)	0.31	1.15	0.06	0.39			
Peak Flow 10/24 (cfs)	0.53	1.96	0.10	0.66			
Flow Depth (ft.) 10/6	0.29	0.44	0.16	0.30			
Flow Depth (ft.) 10/24	0.36	0.54	0.19	0.37			
Flow Area (ft. <sup>2</sup> ) 10/6	0.17	0.39	0.05	0.18			
Flow Area (ft. <sup>2</sup> ) 10/24	0.26	0.59	0.07	0.27			
Velocity (fps) 10/6	1.80	2.93	1.22	2.11			
Velocity (fps) 10/24	2.05	3.35	1.39	2.41			
Rip-Rap Req'd (Y/N)	N	N	N	N			
Rip-Rap D <sub>50</sub>	-	-	-	-			
Note: Slope/Lengths from Plate 7-2.							

TABLE 9

Table 9 Disturbed Culvert Design Summary						
Culvert	DC-1	DC-2	DC-3	DC-4	DC-5	DC-6
Slope (%)	13.33	10.77	3.03	21.50	12.00	5.00
Length (ft.)	30	65	33	135	50	80
Manning's No.	0.025	0.025	0.025	0.025	0.025	0.025
Peak Flow 10/6 (cfs)	2.81	0.52	2.85	0.11	0.16	2.94
Peak Flow 10/24 (cfs)	7.29	0.91	7.37	0.21	0.30	7.55
Diam. Proposed (ft.)	1.50	1.50	1.50	1.50	1.50	2.00
Velocity (fps) 10/24	10.72	5.31	5.94	4.35	3.95	7.27
Rip-Rap D <sub>50</sub>	6"	6"	6"	N/A	N/A	6"
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster, Version 6.0)						

TABLE 9

Table 9 Disturbed Culvert Design Summary						
Culvert	DC-7	DC-8	DC-9	DC-10	DC-11	DC-12
Slope (%)	46.40	38.80	5.70	14.25	4.60	4.00
Length (ft.)	110	85	35	55	65	50
Manning's No.	0.025	0.025	0.025	0.025	0.025	0.025
Peak Flow 10/6 (cfs)	2.45	5.72	0.66	1.11	1.60	2.19
Peak Flow 10/24 (cfs)	4.31	13.22	1.15	1.94	2.80	3.73
Diam. Proposed (ft.)	1.50	2.00	1.50	1.50	1.50	1.50
Velocity (fps) 10/24	14.05	17.69	4.55	7.33	5.44	5.60
Rip-Rap D <sub>50</sub>	12"	12"	N/A	6"	6"	6"
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster, Version 6.0)						

TABLE 9

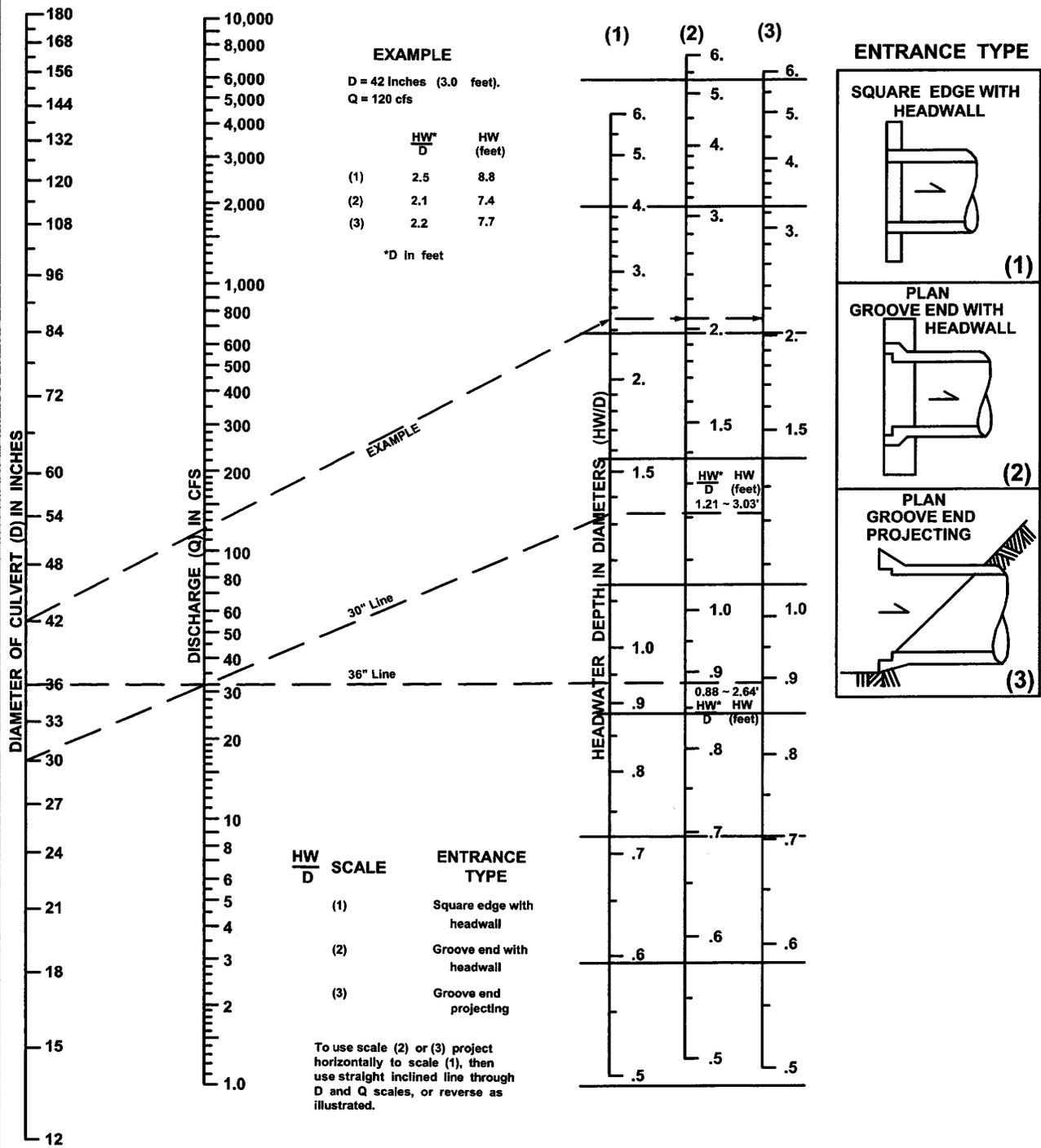
Table 9 Disturbed Culvert Design Summary						
Culvert	DC-13	DC-14	DC-15	DC-16	DC-17	DC-18
Slope (%)	3.33	3.33	3.33	3.33	4.00	5.70
Length (ft.)	30	60	60	60	75	35
Manning's No.	0.025	0.025	0.025	0.025	0.025	0.025
Peak Flow 10/6 (cfs)	6.35	0.79	0.11	0.31	1.32	0.06
Peak Flow 10/24 (cfs)	14.50	1.34	0.19	0.53	2.25	0.10
Diam. Proposed (ft.)	2.00	1.50	1.50	1.50	1.50	1.50
Velocity (fps) 10/24	7.34	3.93	2.20	2.99	4.87	2.19
Rip-Rap D <sub>50</sub>	6"	N/A	N/A	N/A	N/A	N/A
Note: Slope/Lengths from Plate 7-5. Velocity: (Haestad Methods, Flowmaster, Version 6.0)						

**TABLE 9**

Table 9 Disturbed Culvert Design Summary						
Culvert	DC-19					
Slope (%)	2.50					
Length (ft.)	40					
Manning's No.	0.025					
Peak Flow 10/6 (cfs)	0.66					
Peak Flow 10/24 (cfs)	1.11					
Diam. Proposed (ft.)	1.50					
Velocity (fps) 10/24	3.36					
Rip-Rap D <sub>50</sub>	N/A					
Note: Slope/Lengths from Plate 7-5. Source: (Haestad Methods, Flowmaster, Version 6.0)						

TABLE 10

Table 10 Undisturbed Culvert Design Summary		
Culvert	UC-1	
Slope (%)	4.58	
Length (ft.)	480	
Manning's No.	0.025	
Peak Flow 10/6 (cfs)	38.67	
Peak Flow 100/6 (cfs)	52.32	
Diam. Proposed (ft.)	5.00	
Velocity (fps) 100/6	11.19	
* Note: Peak Flows include 25 year - 6 hour design overflow 31.44 cfs from sediment pond.		



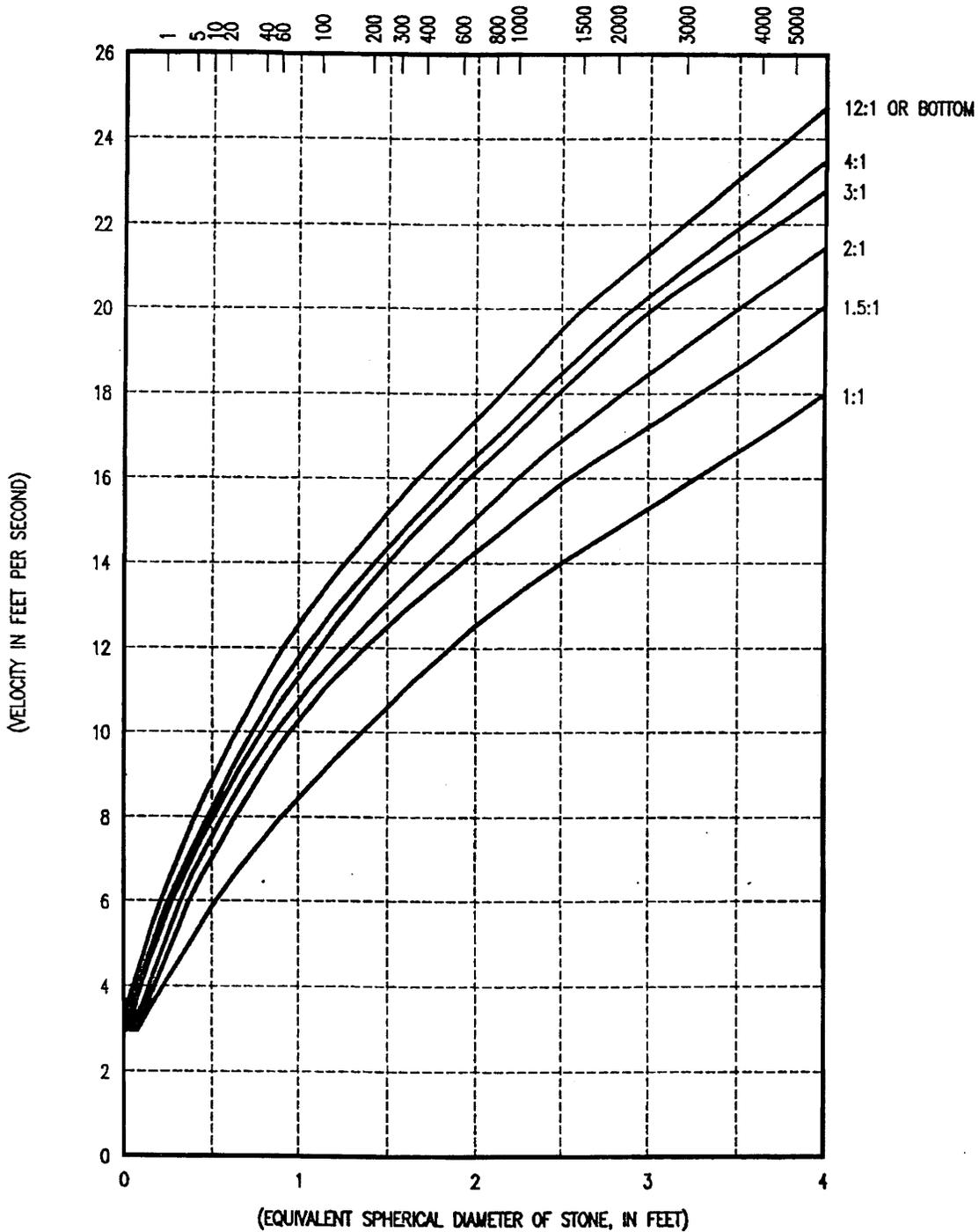
Headwater Depth for Smooth Interior Pipe Culverts with Inlet Control



FIGURE 1. HEADWATER DEPTH NOMOGRAPH

# RIP-RAP CHART

(STONE WEIGHT, IN POUNDS)

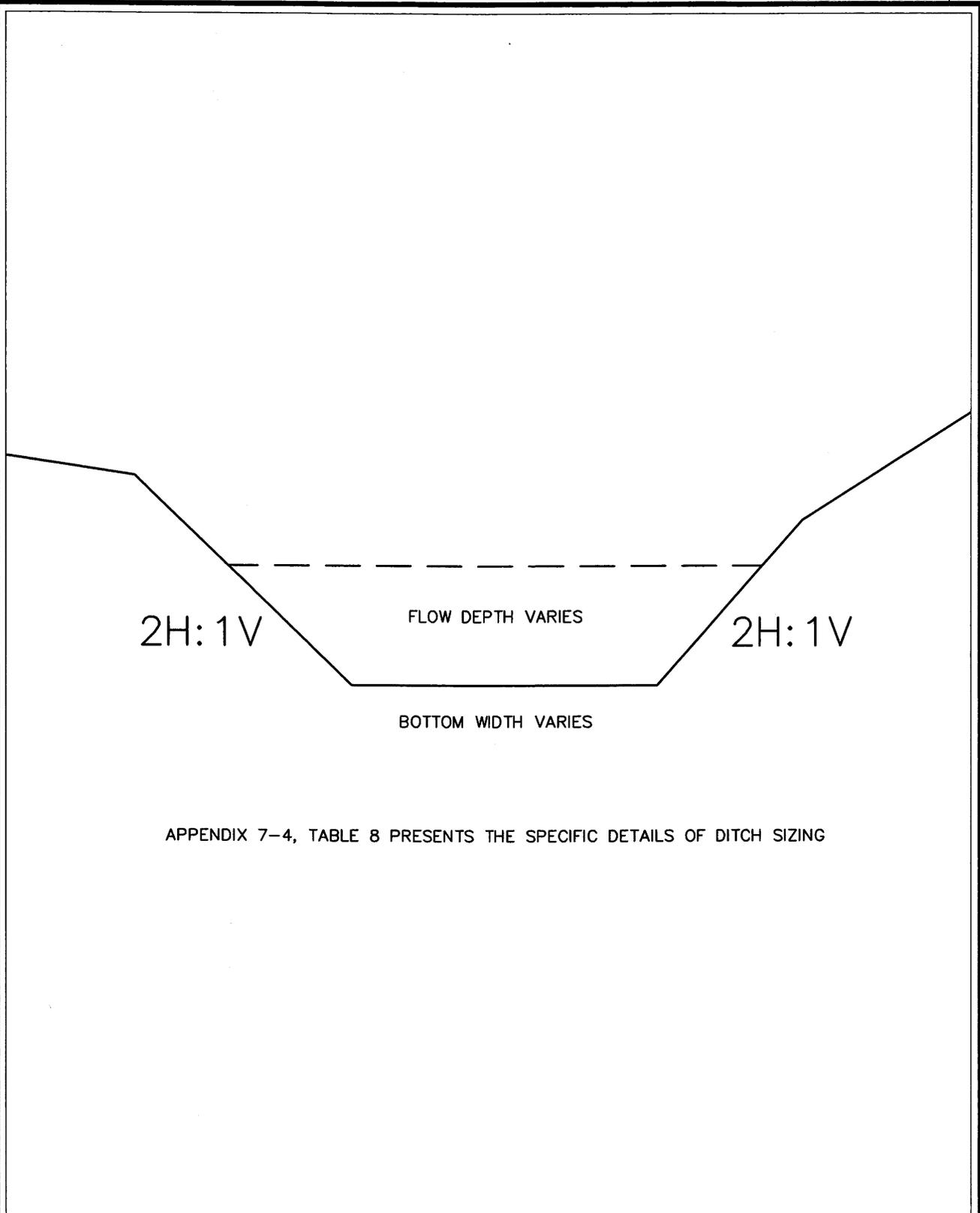


SIZE OF STONE THAT WILL RESIST DISPLACEMENT FOR VARIOUS VELOCITIES AND SIDE SLOPES

NOTE:

ADAPTED FROM REPORT OF SUBCOMMITTEE ON SLOPE PROTECTION, AM. SOC. CIVIL ENGINEERS PROC. JUNE 1948.  
FOR STONE WEIGHING 165 LBS. PER CUBIC FEET.

Figure 2



APPENDIX 7-4, TABLE 8 PRESENTS THE SPECIFIC DETAILS OF DITCH SIZING



FIGURE 3. DISTURBED DITCH TYPICAL SECTION

UNDISTURBED CULVERT INLET  
TYPICAL SECTION

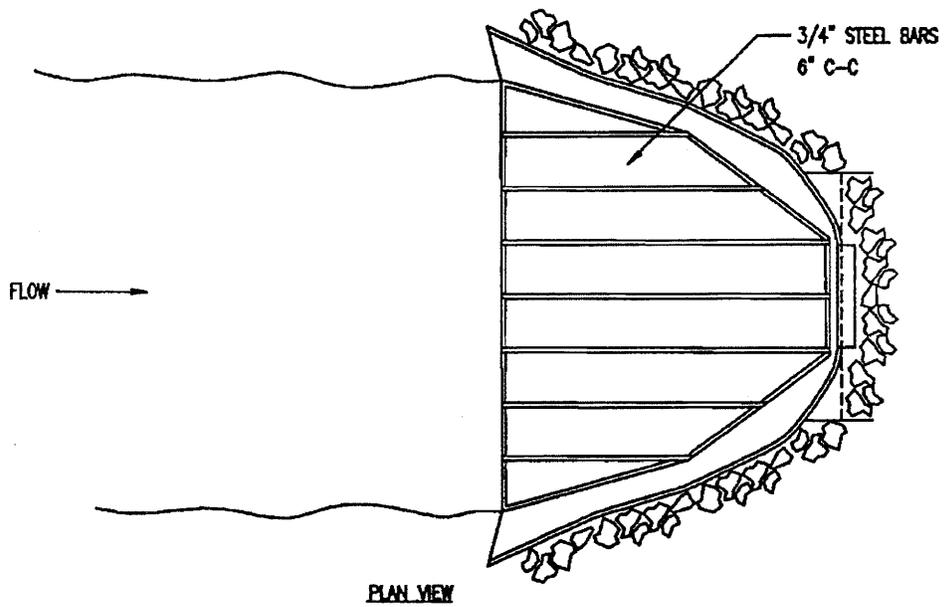
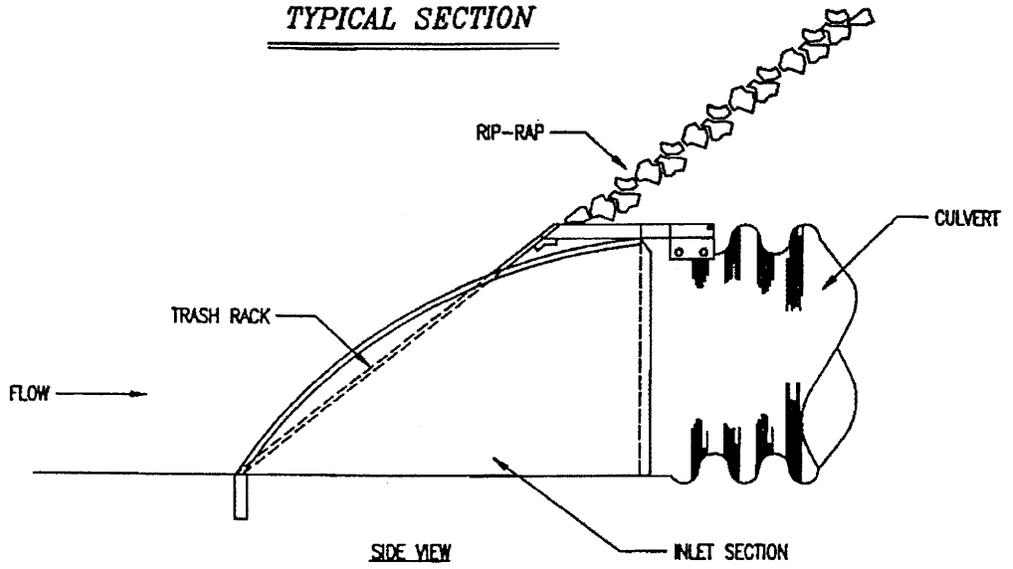
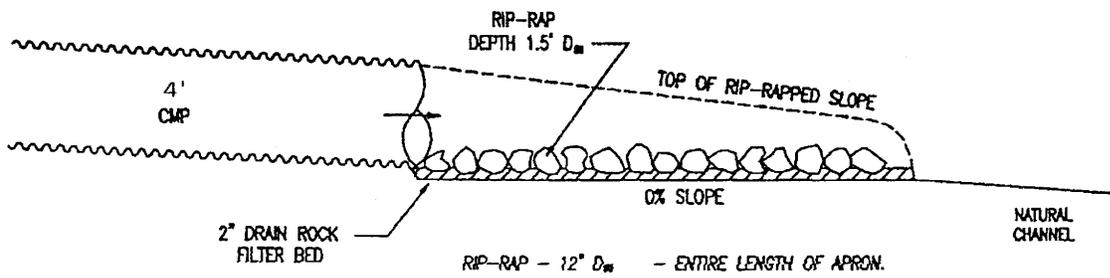
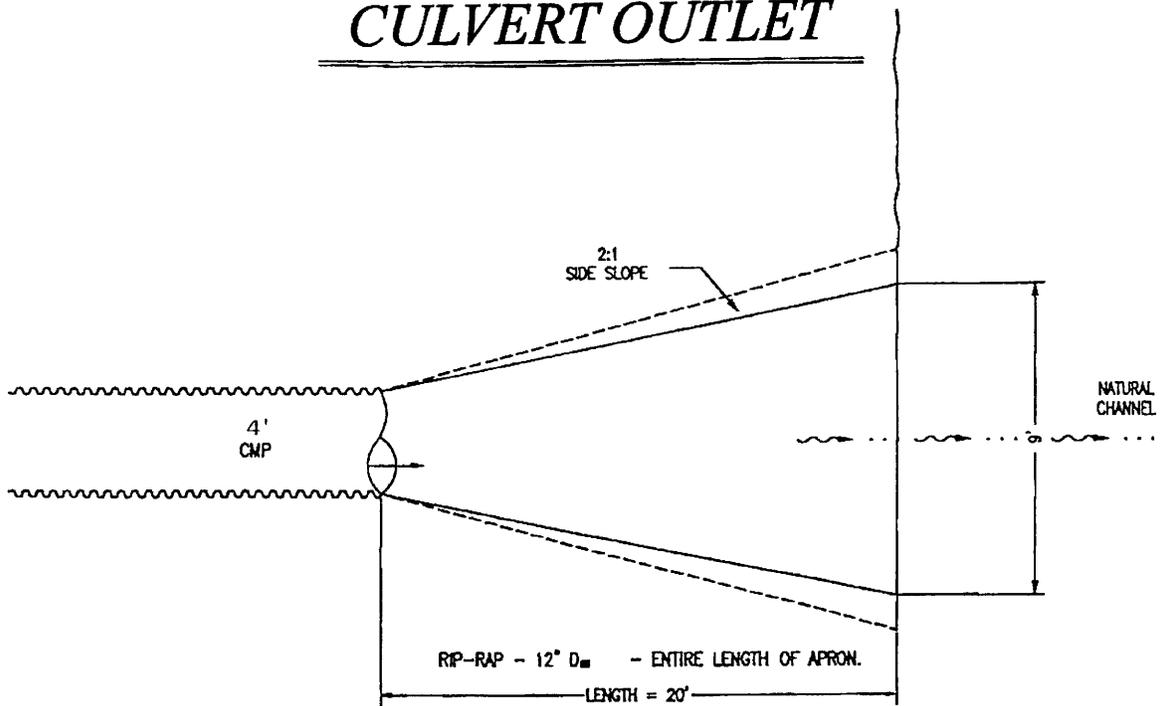


Figure 4

# UC-1 CULVERT OUTLET



\* DESIGN BASED ON FIGURE 7-26, DESIGN OF OUTLET PROTECTION - MAXIMUM TAILWATER CONDITION,  
"APPLIED HYDROLOGY AND SEDIMENTOLOGY FOR DISTURBED AREAS", BARFIELD, WARNER & HAAN, 1983.

Figure 4A

## DESIGN OF SEDIMENT CONTROL STRUCTURES

### Design Specifications:

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

### Tables:

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

### Figures:

Figure 5a	Sediment Pond #1 Stage-Volume Curve
Figure 5b	Sediment Pond #2 Stage-Volume Curve
Figure 6a	Sediment Pond #1 Stage-Discharge Curve
Figure 6b	Sediment Pond #2 Stage-Discharge Curve
Figure 7	Removal of Culvert UC-1 for Final Reclamation

### 3.1 Design and Construction Specifications for Sedimentation Pond

- a) All construction of sedimentation ponds will be performed under the direction of a qualified, registered professional engineer.
- b) The sediment pond #1 will be located in an existing low area where the Right Fork of Lila Canyon passes beneath the existing road. The existing road fill and culvert will be removed, and the pond embankment (road fill) will be reconstructed and compacted. The existing culvert will be replaced with UC-1 which will extend approximately 300' up the Right Fork of Lila Canyon. This culvert will be equipped with an inlet section and trash rack, and will allow undisturbed runoff and treated access road drainage to pass beneath the sediment pond. The majority of the pond will be in an existing channel area, and is therefore considered incised. The embankment will be reconstructed to a maximum of 2h:1v slopes, with the total of inside and outside slopes not less than 5h:1v. The pond will be equipped with a culvert riser principal spillway with an oil skimmer, a decant, and a second culvert riser emergency spillway with an oil skimmer. Both spillways will discharge to the oversized (60") CMP culvert running beneath the pond.
- c) The area of pond constructed shall be examined for topsoil, and where present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.
- d) In areas where fill is to be placed for the pond impoundment structures, natural ground shall be removed to at least 12" below the base of the structure.
- e) Native materials shall be used where practical. Fill will be placed in lifts not to exceed 6" and compacted prior to placement of next lift. Compaction of all fill materials shall be at least 95%.
- f) Rip-rap or other protection (culverts, concrete, etc. ) will be placed at all pond inlets to prevent scouring. Rip-rap will consist of substantial, angular (non-slaking) rock material of adequate size.

- g) Decanting of the pond, as required, will be accomplished by use of a decant pipe with an inverted inlet as shown on Plate 7-6. Samples will be collected prior to decanting of the pond. If the quality of the water meets the requirements of the U.P.D.E.S. Permit, decanting will proceed. Discharge samples will be collected as per the approved U.P.D.E.S. Discharge Permit.
- h) Slopes of the embankments shall not be steeper than 2h:1v, inside or outside, with a total of the inslope and outslope not less than 5h:1v, except where areas of the pond are incised.
- i) External slopes of the impoundment will be planted with an approved seed mix to help prevent erosion and promote stability.
- j) Top width of the embankment shall be not less than  $(H+35)/5$ , where H = Height of Dam in feet.

### 3.2 Sediment Yield

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

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

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

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

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

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

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

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

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

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

#### SEDIMENT YIELD CALCULATIONS - USLE - Sediment Pond #1

Drainage	R	K	Acres	Slope Length Feet	Slope (%)	LS	CP	A	Yield
DA-1a	14.34	0.500	0.33	680	22.35	12.50	1.20	107.55	0.0163
DA-1b	14.34	0.500	0.31	420	11.43	3.30	1.20	28.39	0.0040
DA-1c	14.34	0.500	0.20	225	8.89	1.70	1.20	14.63	0.0013
DA-2a	14.34	0.500	0.93	680	23.82	13.00	1.20	111.85	0.0478
DA-2b	14.34	0.500	0.14	350	10.29	2.80	1.20	24.09	0.0015
DA-2c	14.34	0.500	0.10	106	15.10	2.60	1.20	22.37	0.0010
DA-3	14.34	0.500	0.30	170	9.41	1.60	1.20	13.77	0.0019
DA-4a	14.34	0.500	0.14	100	12.00	1.80	1.20	15.49	0.0010
DA-4b	14.34	0.500	0.12	270	10.37	2.40	1.20	20.65	0.0011
DA-4c	14.34	0.500	0.60	580	9.31	2.70	1.20	23.23	0.0064
DA-5a	14.34	0.500	0.07	180	13.33	2.80	1.20	24.09	0.0008
DA-5b	14.34	0.500	0.33	125	11.20	1.80	1.20	15.49	0.0023
DA-5c	14.34	0.500	0.42	570	9.47	3.00	1.20	25.81	0.0050
DA-6a	14.34	0.500	0.28	200	27.00	9.50	1.20	81.74	0.0105
DA-6b	14.34	0.500	3.35	710	9.21	3.20	1.20	27.53	0.0423
DA-6c	14.34	0.500	2.51	690	10.14	3.60	1.20	30.97	0.0357
DA-7	14.34	0.500	2.68	630	4.76	1.25	1.20	10.76	0.0132
DA-8a	14.34	0.500	0.26	284	19.01	4.80	1.20	41.30	0.0049

DA-8b	14.34	0.500	0.76	670	7.80	2.40	1.20	20.65	0.0072
DA-8c	14.34	0.500	0.95	410	10.24	2.80	1.20	24.09	0.0105
DA-9	14.34	0.500	0.05	50	12.00	1.35	1.20	11.62	0.0003
DA-10	14.34	0.500	2.89	700	2.86	0.43	0.01	0.03	0.0000
DA-11	14.34	0.500	0.78	340	4.70	0.85	1.20	7.31	0.0026
DA-13a	14.34	0.500	1.97	470	2.55	0.38	0.01	0.03	0.0000
DA-13b	14.34	0.500	0.49	280	1.43	0.22	1.20	1.89	0.0004
DA-13c	14.34	0.500	0.40	460	4.78	1.05	1.20	9.03	0.0017
UA-2	14.34	0.500	10.01	1500	66.67	75.00	0.15	80.66	0.3707
UA-4	14.34	0.500	14.08	1950	47.76	50.00	0.15	53.78	0.3476
UA-6a	14.34	0.500	1.45	230	34.70	15.00	0.15	16.13	0.0107
UA-6b	14.34	0.500	0.40	90	33.33	9.00	0.15	9.68	0.0018

Total Sediment 1 year (ac.ft.) ..... 0.9491

Total Sediment 3 years (ac. ft.) ..... 2.8473

\* Disturbed Runoff / Uncompacted Area

\*\* Paved Areas

SEDIMENT YIELD CALCULATIONS - USLE - Sediment Pond #2

Drainage	R	K	Acres	Slope Length Feet	Slope (%)	LS	CP	A	Yield
DA-14a	14.34	0.500	0.36	390	8.71	2.25	1.20	19.36	0.0032
DA-14b	14.34	0.500	0.75	540	2.96	0.44	1.20	3.79	0.0013
DA-15a	14.34	0.500	0.38	525	9.52	3.40	1.20	29.25	0.0051
DA-15b	14.34	0.500	0.62	270	4.44	0.62	1.20	5.33	0.0015
DA-16a	14.34	0.500	0.16	370	2.70	0.38	1.20	3.27	0.0002
DA-16b	14.34	0.500	0.09	210	6.19	1.05	1.20	9.03	0.0004
DA-17a	14.34	0.500	0.42	610	3.11	0.50	1.20	4.30	0.0008
DA-17b	14.34	0.500	0.07	100	5.00	0.54	1.20	4.65	0.0002
DA-18a	14.34	0.500	0.07	175	3.43	0.40	1.20	3.44	0.0001
DA-18b	14.34	0.500	0.44	650	3.69	0.65	1.20	5.59	0.0011
Total									0.014

Total Sediment 1 year (ac.ft.) ..... 0.014

Total Sediment 3 years (ac. ft.) ..... 0.042

\* Disturbed Runoff / Uncompacted Area

\*\* Paved Areas

**3.3 Sediment Pond Volume**

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

TABLE 11a

Table 11a Sediment Pond #1 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (from Table 5, 10yr/24hr) + (8.73 ac *1.01 ac-in /12 in/ft) =	4.68 ac-ft <sup>(1)</sup>
3. Sediment Storage Volume USLE 0.9491 ac.ft./yr. x 3 yrs. =	2.85 ac-ft
4. Total Required Pond Volume 4.68 + 2.85 =	7.53 ac-ft
5. Peak Flow (25 yr. - 6 hr. event)* =	31.44 cfs <sup>(2)</sup>
6. Pond Design Volume @ Principle Spillway = (See Table 12a)	8.060 ac-ft
* Peak Flow values from Table 5, sum of all contributing watersheds plus possible future flow from UA-1.	

(1) Capacity is 0.73 ac-ft higher than Table 5. This includes flow from undisturbed portion of UA-1 within mine boundary. There is a possibility that the undisturbed area may be needed if the surface facilities were to be expanded.

(2) Peak flow is 7.65 cfs higher than Table 5. This is to allow for flow from UA-5. There is a possibility that UA-5 may be needed if the surface facilities were to be expanded.

TABLE 11b

Table 11b Sediment Pond #2 Design	
1. Use 1.90" for 10 year - 24 hour event.	
2. Runoff Volume - (from Table 5, 10yr/24hr) =	0.39 ac-ft.
3. Sediment Storage Volume USLE 0.014 ac.ft./yr. x 3 yrs. =	0.04 ac-ft
4. Total Required Pond Volume 0.39 + 0.04 =	0.43 ac-ft
5. Peak Flow (25 yr. - 6 hr. event)* =	2.86 cfs
6. Pond Design Volume @ Principle Spillway = (See Table 12b)	0.60 ac-ft
* Peak Flow values from Table 5, sum of all contributing watersheds.	

TABLE 12a

Table 12a Sediment Pond #1 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
5830	22620	0	0.000	Bottom of Pond
5831	26136	24380	0.56	
5832	29460	27800	1.20	
5833	31340	30400	1.90	
5834	33260	32300	2.64	Sediment Cleanout Level
5835	35250	34255	3.42	Decant
5836	37240	36245	4.26	
5837	39320	38280	5.13	
5838	41400	40360	6.06	
5839	43550	42475	7.04	
5840	45700	44625	8.06	Principal Spillway
5841	47950	46825	9.14	Emergency Spillway
5842	50200	49075	10.26	
5843	55000	52600	11.47	Top of Embankment

TABLE 12b

Table 12b Sediment Pond #2 Stage/Volume Data				
Elevation	Area (sq. ft.)	Volume (sq. ft.)	Acc. Volume (ac. ft.)	Remarks
5838	3560	0	0.00	Bottom of Pond
5838.4		1740	0.04	Sediment Cleanout Level
5838.6		2610	0.06	Decant
5839	4205	3882	0.09	
5840	4850	4527	0.19	
5841	5565	5207	0.31	
5842	6280	5922	0.45	Principal Spillway
5843	7055	6667	0.60	Emergency Spillway
5844	7830	7442	0.77	Top of Embankment

TABLE 13a

Table 13a Sediment Pond #1 Stage/Discharge Data			
Head (ft.)	Q (cfs) Weir Controlled	Q (cfs) Orifice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	2.53	15.22	95.68
0.4	7.15	21.53	96.23
0.6	13.14	26.36	96.77
0.8	20.23	30.44	97.31
1.0	28.27	34.04	97.85
1.2	37.17	37.28	98.38
1.4	46.84	40.27	98.91
1.6	57.22	43.05	98.91
1.8	68.28	45.66	99.44
2.0	79.97	48.13	99.97

Note: 1- 25 year - 6 hour flow = 31.44 cfs.

2- Flow will be weir controlled at a head of 1.07' over riser inlet.

Weir Controlled

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

Orifice Controlled

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

Pipe Flow Controlled

$Q = \frac{a(2gH')^{0.5}}{(1+K_e+K_b+K_cL)^{0.5}}$

; where

a = Area of Pipe = 7.07 ft<sup>2</sup>, R = 1.5'

H' = Head = H + 14.5 (Riser) + 0.35 (Slope) + 0.6\*4 (barrel height)

K<sub>e</sub> = 1.0

K<sub>b</sub> = 0.5

K<sub>c</sub> = 0.043

L = 70'

TABLE 13b

Table 13b Sediment Pond #2 Stage/Discharge Data			
Head (ft.)	Q (cfs) Weir Controlled	Q (cfs) Orifice Controlled	Q (cfs) Pipe Flow Controlled
0.0	-	-	-
0.2	0.84	1.69	5.81
0.4	2.38	2.39	5.88
0.6	4.38	2.93	5.95
0.8	6.74	3.38	6.02
1.0	9.42	3.78	6.09
1.2	12.39	4.14	6.16
1.4	15.61	4.47	6.22
1.6	19.07	4.78	6.29
1.8	22.76	5.07	6.36
2.0	26.66	5.35	6.42

Note: 1- 25 year - 6 hour flow = 2.86 cfs.

2- Flow will be orifice controlled at a head of 0.57' over riser inlet.

Weir Controlled

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

Orifice Controlled

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

Pipe Flow Controlled

$Q = \frac{a(2gH')^{0.5}}{(1+K_e+K_b+K_cL)^{0.5}}$  ; where

- $a =$  Area of Pipe  $= 0.79 \text{ ft}^2$ ,  $R = 0.5'$
- $H' =$  Head  $= H + 6.0$  (Riser)  $+ 0.8$  (Slope)  $+ 0.6 \times 2$  (barrel height)
- $K_e = 1.0$
- $K_b = 0.5$
- $K_c = 0.043$
- $L = 160'$

### 3.4 Sediment Pond Summary

- a) The sedimentation ponds have been designed to contain the disturbed area (and contributing undisturbed area) runoff from a 10 year-24 hour precipitation event, along with 3 years of sediment storage capacity. Runoff to the ponds will be directed by various ditches and culverts as described in the plan.
- b) The required volume for Sediment Pond #1 is calculated at 7.53 acre feet, including 3 years of sediment storage. The proposed sediment pond size will have a volume of approximately 8.06 acre feet (at the principal spillway), which is more than adequate. The required volume for Sediment Pond #2 is calculated at 0.43 acre feet, including 3 years of sediment storage. The proposed sediment pond size will have a volume of approximately 0.45 acre feet (at the principal spillway), which is more than adequate.
- c) The ponds will meet a theoretical detention time of 24 hours. Both are equipped with a decant, a culvert principal spillway and a culvert emergency spillway. Any discharge from the ponds will be in accordance with the approved UPDES Permit.
- d) The pond inlets will be protected from erosion, and the spillways will discharge into the natural drainages in a controlled manner.
- e) The ponds are temporary, and will be removed upon final reclamation of the property.
- f) The ponds will be constructed according to the regulations and under supervision of a Registered, Professional Engineer.

FIGURE 5a. Stage-Volume Curve  
Lila Sediment Pond #1

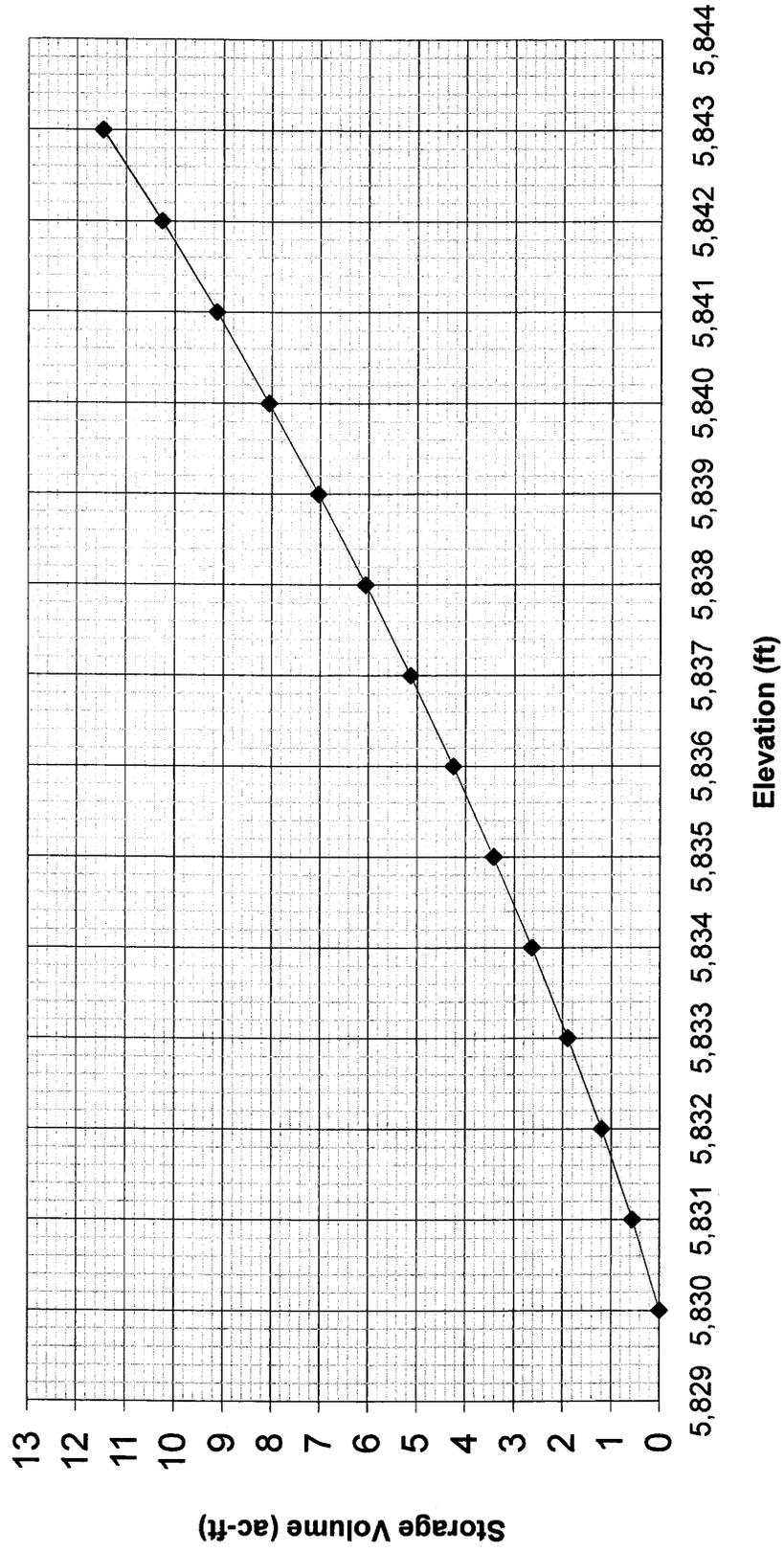
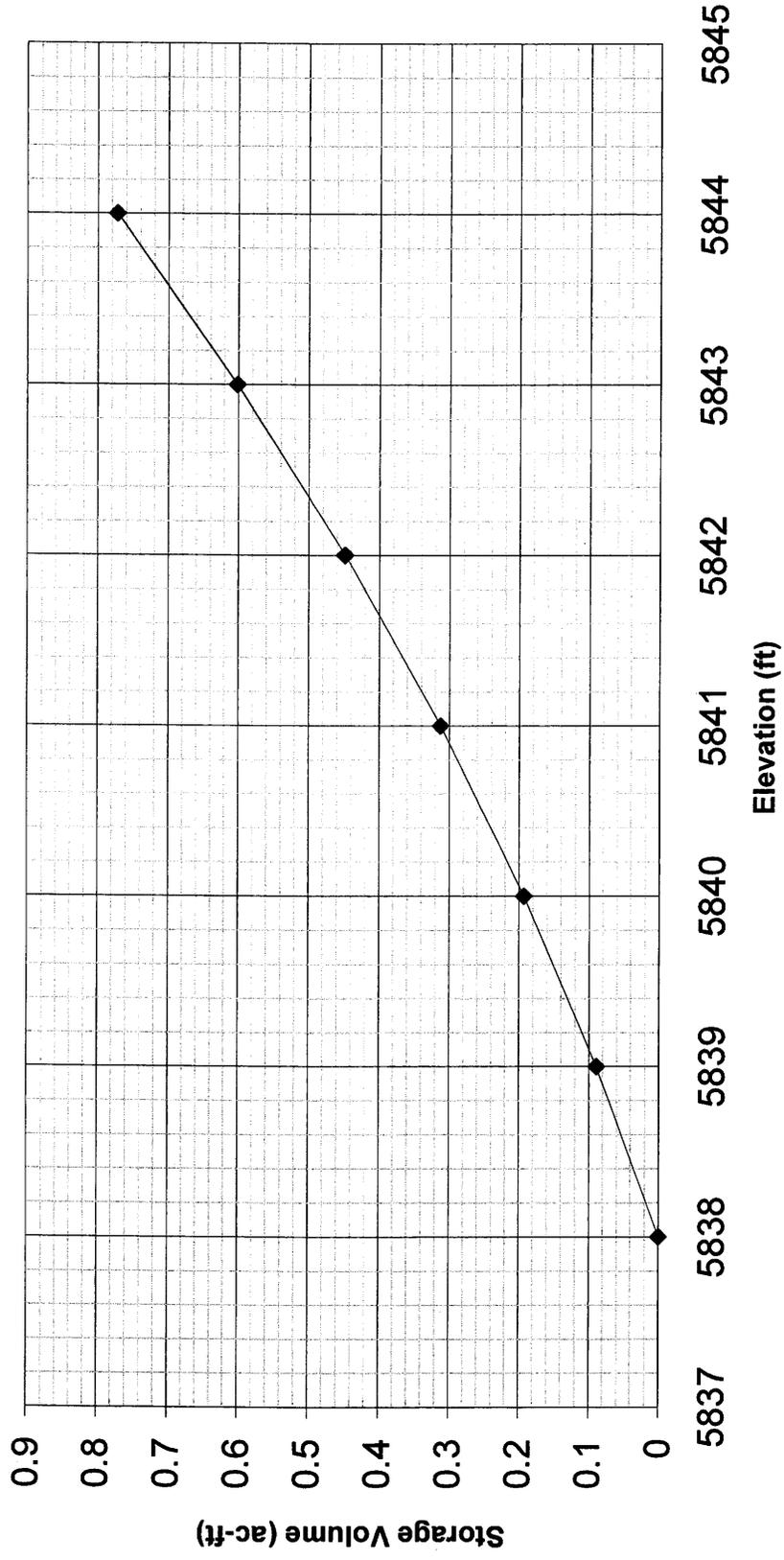


FIGURE 5b. Stage-Volume Curve  
Lila Sediment Pond #2



**Figure 6a. Stage-Discharge Curve  
Lila Sediment Pond #1**

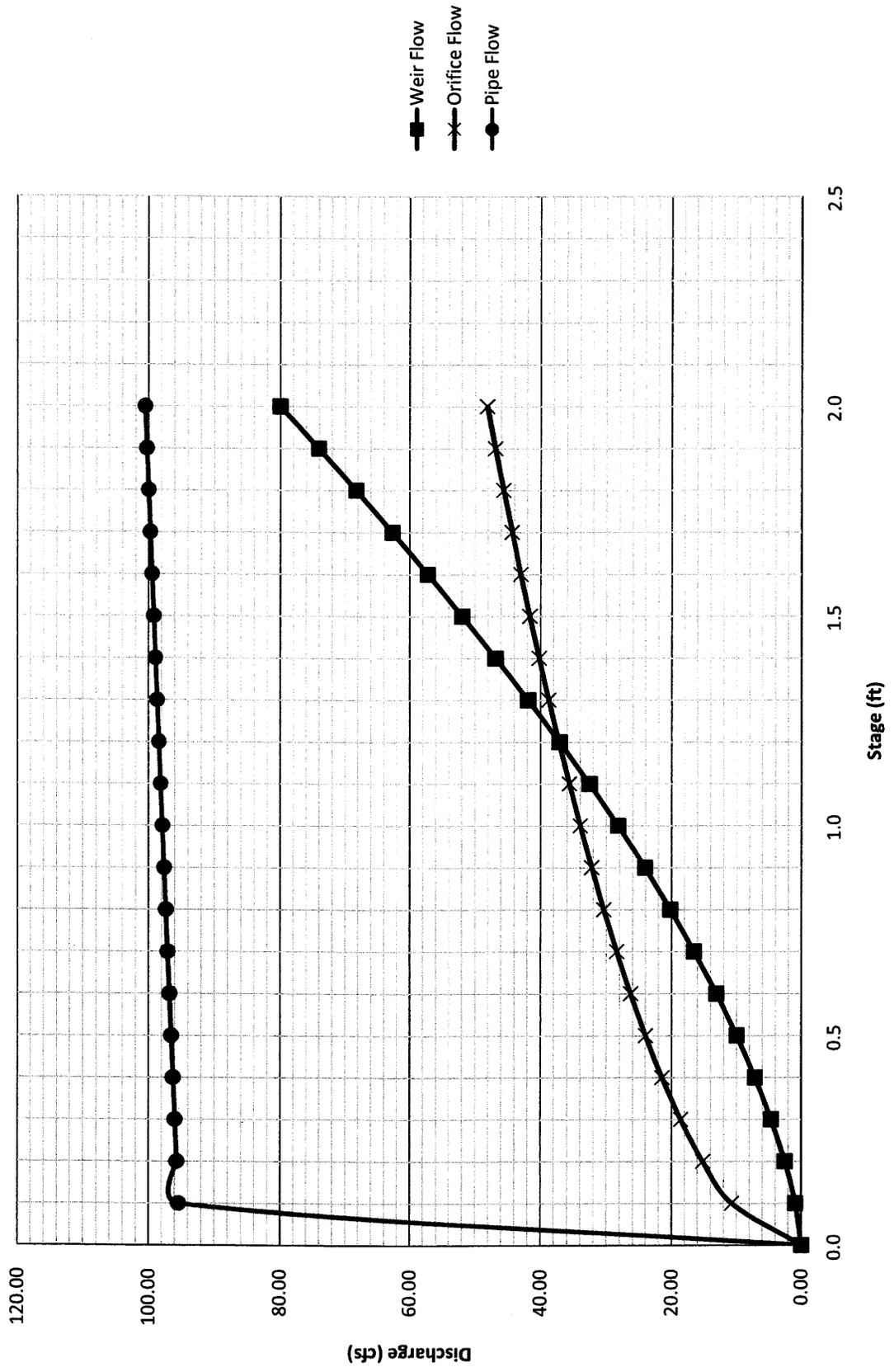
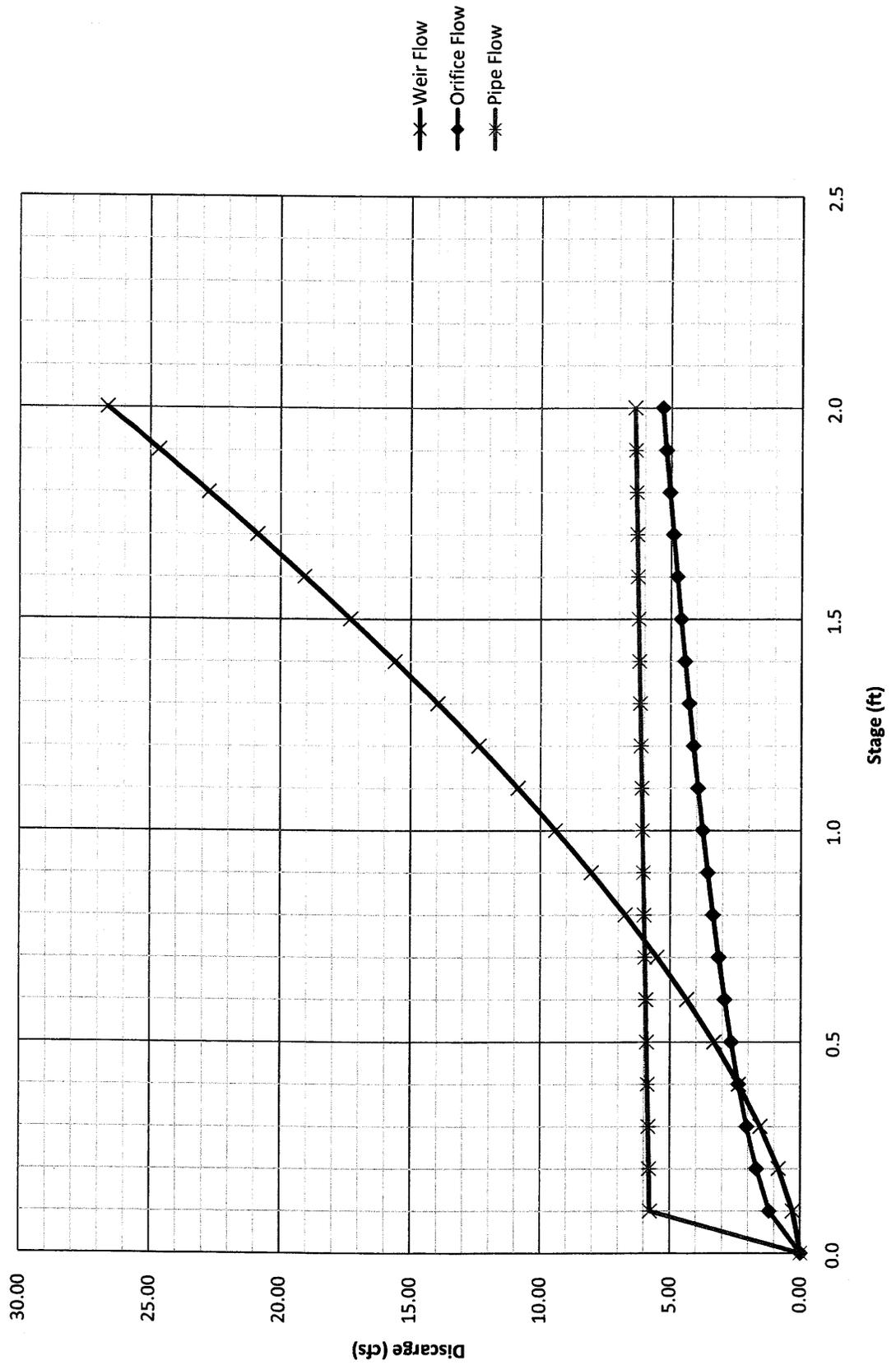


Figure 6b. Stage-Discharge Curve  
Lila Sediment Pond #2



**DESIGN OF DRAINAGE CONTROL STRUCTURES  
FOR  
RECLAMATION**

Reclamation Hydrology:

- 4.1 General
- 4.2 Reclamation Area Drainage Control

Tables:

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

## Reclamation Hydrology

### 4.1 General

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

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

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

### 4.2 Reclamation Area Drainage Control

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

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

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

When the vegetation and sediment contribution levels meet requirements for Phase II Bond Release, a series of at least three straw bale or silt fence barriers will be placed downstream of the sediment pond outlets. All upstream sediment

controls will be removed. Reclaimed ditches RD-1 and RD-2 will also be removed, regraded and reseeded. Culvert UC-1 will be cut off at the location of the principal pond spillway.

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

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

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

The pond embankment will be narrowed to facilitate the even character of the Lila Canyon Road. The 48 inch bypass culvert (UC-1) will be removed to within six feet of the road embankment. A newly formed channel will be constructed at an approximate four percent grade to intercept the inlet of the culvert at its intersection of the road. The road embankment and associated new channel will be armored by the Operator with an underlayment of filter gravel, with  $D_{50}$  -30 inch rip-rap. The new area of disturbance including the newly formed channel will have top soil spread in and around the rip-rap. The Operator will use the same seeding and mulching methods described in Appendix 5-8 will be used on this area as well. See Figures 4 and 7 for a detailed design.

**TABLE 14**

Table 14 Final Reclamation Drainage Areas Contributing to Structures	
Channel	Contributing Watershed/Structure
RD-1	RW-1
RD-2	RW-2
UC-1	UA-1, UA-4, RD-1

**TABLE 15**

Table 15 Final Reclamation Drainage Structure Flow Summary	
Channel	*100/6 Flow (cfs)
RD-1	13.26
RD-2	10.89
UC-1	**72.62

\* CN = 83.

\*\* Combined flow for watersheds UA-1, UA-4, and RW-2.

**TABLE 16**

Table 16 Final Reclamation Reclamation Structure Design Parameters					
Channel	Bottom Width (ft.)	Side Slope H:V	Slope %	Reclaimed Depth (ft.)	Manning's No.
RD-1	3	2:1	5.00	1.5	0.035
RD-2	3	2:1	10.00	1.5	0.035
UC-1	48" Diam.	-	5.56	48" Diam.	0.025

**TABLE 17**

Table 17 Final Reclamation Reclamation Structure Flow Calculations			
Channel	RD-1	RD-2	UC-1
100 year - 6 hour event (in.)	1.90	1.90	1.90
Peak Flow (cfs)	13.26	10.89	72.62
Velocity (fps)	5.44	6.52	13.34
Required Area (ft. <sup>2</sup> )	2.44	1.67	5.44
Flow Depth (ft.)	0.58	0.43	1.79

## Alternate Sediment Control for Fan Site and Topsoil Storage Area

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

The outside of the berm will be protected with a silt fence or gravel. The gravel, if used, would help augment the revegetation. Construction details of the silt fence/filter fence are shown in Figure 8.

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

### Run-off Calculations

#### Fan Site

Acreage: 0.716 acres

Design Storm: 10 year/24 hour: 1.90"

CN: 90

S: 1.111

$Q = \frac{(P - 0.25S)^2}{P + 0.8S}$

= 1.01" of runoff

Total run-off = 0.06 acre feet

**Topsoil Storage Area**

Acreage: 2.61 acres

Design Storm: 10 year/24 hour: 1.90"

CN: 90

S: 1.111

$Q = \frac{(P - 0.25S)^2}{P + 0.8S}$

$P + 0.8S = 1.01"$  of runoff

Total run-off = 0.22 acre feet

**Topsoil Storage Area**

Acreage: 2.61 acres

Design Storm: 10 year/24 hour: 1.90"

CN: 90

S: 1.111

$$Q = \frac{(P - 0.25S)^2}{P + 0.8S}$$

$$= 1.01" \text{ of runoff}$$

Total run-off = 0.22 acre feet

**Lila Canyon Mine  
Watershed Calculations**

Project Title = LILA CANYON UA-1 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 75.0

Area = 248.4 acres

Hydraulic length = 5200.00 feet

Elevation change = 1480.0 feet.

Concentration time = 0.27 hours

Unit hydrograph type = Forested

-- Total Area = 248.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 7.02 cfs

Discharge volume = 2.09 acre ft

Project Title = LILA CANYON UA-1 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 75.0

Area = 248.4 acres

Hydraulic length = 5200.00 feet

Elevation change = 1480.0 feet.

Concentration time = 0.27 hours

Unit hydrograph type = Forested

-- Total Area = 248.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 10.31 cfs

Discharge volume = 3.45 acre ft

Project Title = LILA CANYON UA-1 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 75.0

Area = 248.4 acres

Hydraulic length = 5200.00 feet

Elevation change = 1480.0 feet.

Concentration time = 0.27 hours

Unit hydrograph type = Forested

-- Total Area = 248.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 20.48 cfs

Discharge volume = 6.90 acre ft

Project Title = LILA CANYON UA-1 (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 75.0

Area = 248.4 acres

Hydraulic length = 1500.00 feet

Elevation change = 1000.0 feet.

Concentration time = 0.27 hours

Unit hydrograph type = Forested

-- Total Area = 248.4 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour design storm

Peak Discharge = 25.53 cfs

Discharge volume = 6.90 acre ft

Project Title = LILA CANYON UA-2 (10/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 83.0

Area = 10.0 acres

Hydraulic length = 1500.00 feet

Elevation change = 1000.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 10.0 acres

#### -- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.11 cfs

Discharge volume = 0.23 acre ft

Project Title = LILA CANYON UA-2 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 10.0 acres

Hydraulic length = 1500.00 feet

Elevation change = 1000.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 10.0 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 3.11 cfs

Discharge volume = 0.32 acre ft

Project Title = LILA CANYON UA-2 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 10.0 acres

Hydraulic length = 1500.00 feet

Elevation change = 1000.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 10.0 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 5.35 cfs

Discharge volume = 0.52 acre ft

Project Title = LILA CANYON UA-2 (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 83.0

Area = 10.0 acres

Hydraulic length = 1500.00 feet

Elevation change = 1000.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 10.0 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 6.11 cfs

Discharge volume = 0.52 acre ft

Project Title = LILA CANYON UA-4 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 14.1 acres

Hydraulic length = 1950.00 feet

Elevation change = 595.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 14.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 3.14 cfs

Discharge volume = 0.32 acre ft

Project Title = LILA CANYON UA-4 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 14.1 acres

Hydraulic length = 1950.00 feet

Elevation change = 595.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 14.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 4.65 cfs

Discharge volume = 0.44 acre ft

Project Title = LILA CANYON UA-4 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 14.1 acres

Hydraulic length = 1950.00 feet

Elevation change = 595.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 14.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 8.04 cfs

Discharge volume = 0.74 acre ft

Project Title = LILA CANYON UA-4 (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 83.0

Area = 14.1 acres

Hydraulic length = 1950.00 feet

Elevation change = 595.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 14.1 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 9.20 cfs

Discharge volume = 0.74 acre ft

Project Title = LILA CANYON UA-6a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: . Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.5 acres

Hydraulic length = 230.00 feet

Elevation change = 80.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.47 cfs

Discharge volume = 0.06 acre ft

Project Title = LILA CANYON UA-6a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.5 acres

Hydraulic length = 230.00 feet

Elevation change = 80.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.60 cfs

Discharge volume = 0.08 acre ft

Project Title = LILA CANYON UA-6a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.5 acres

Hydraulic length = 230.00 feet

Elevation change = 80.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.88 cfs

Discharge volume = 0.12 acre ft

Project Title = LILA CANYON UA-6a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.5 acres

Hydraulic length = 230.00 feet

Elevation change = 80.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.95 cfs

Discharge volume = 0.12 acre ft

Project Title = LILA CANYON UA-6b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 90.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON UA-6b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 90.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.13 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON UA-6b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 90.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON UA-6b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 90.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.21 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON UA - 7 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type:Null

-- Watershed data for watershed # 1

Curve number = 90.0  
Area = 0.6 acres  
Hydraulic length = 195.0 Feet  
Elevation change = 25.0 feet  
Concentration time = 0.02 hours  
Concentration time type = SCS Upland Curves  
Unit Hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm Data

Total precipitation = 1.3 inches  
Storm type = SCS 6 hour design storm  
Peak Discharge = 0.21 cfs  
Discharge volume = 0.03 acre ft

Project Title = LILA CANYON UA - 7 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type:Null

-- Watershed data for watershed # 1

Curve number = 90.0  
Area = 0.6 acres  
Hydraulic length = 195.0 Feet  
Elevation change = 25.0 feet  
Concentration time = 0.02 hours  
Concentration time type = SCS Upland Curves  
Unit Hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm Data

Total precipitation = 1.5 inches  
Storm type = SCS 6 hour design storm  
Peak Discharge = 0.27 cfs  
Discharge volume = 0.03 acre ft

Project Title = LILA CANYON UA - 7 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type:Null

-- Watershed data for watershed # 1

Curve number = 90.0  
Area = 0.6 acres  
Hydraulic length = 195.0 Feet  
Elevation change = 25.0 feet  
Concentration time = 0.02 hours  
Concentration time type = SCS Upland Curves  
Unit Hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm Data

Total precipitation = 1.9 inches  
Storm type = SCS 6 hour design storm  
Peak Discharge = 0.40 cfs  
Discharge volume = 0.05 acre ft

Project Title = LILA CANYON UA - 7 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type:Null

-- Watershed data for watershed # 1

Curve number = 90.0  
Area = 0.6 acres  
Hydraulic length = 195.0 Feet  
Elevation change = 25.0 feet  
Concentration time = 0.02 hours  
Concentration time type = SCS Upland Curves  
Unit Hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm Data

Total precipitation = 1.9 inches  
Storm type = SCS Type 2 storm, 24 hour storm  
Peak Discharge = 0.43 cfs  
Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-1a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 680.00 feet

Elevation change = 152.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.22 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-1a (25/6)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 680.00 feet

Elevation change = 152.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

#### -- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.26 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-1a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 680.00 feet

Elevation change = 152.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.35 cfs

Discharge volume = 0.04 acre ft

Project Title = LILA CANYON DA-1a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 680.00 feet

Elevation change = 152.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.37 cfs

Discharge volume = 0.04 acre ft

Project Title = LILA CANYON DA-1b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 420.00 feet

Elevation change = 48.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.20 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-1b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 420.00 feet

Elevation change = 48.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.24 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-1b (100/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 420.00 feet

Elevation change = 48.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.32 cfs

Discharge volume = 0.04 acre ft

Project Title = LILA CANYON DA-1b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.3 acres

Hydraulic length = 420.00 feet

Elevation change = 48.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.33 cfs

Discharge volume = 0.04 acre ft

Project Title = LILA CANYON DA-1c (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 225.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.11 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-1c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 225.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.14 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-1c (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 225.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-1c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 225.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-2a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.9 acres

Hydraulic length = 680.00 feet

Elevation change = 162.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.9 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.61 cfs

Discharge volume = 0.06 acre ft

Project Title = LILA CANYON DA-2a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.9 acres

Hydraulic length = 680.00 feet

Elevation change = 162.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.9 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.73 cfs

Discharge volume = 0.08 acre ft

Project Title = LILA CANYON DA-2a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.9 acres

Hydraulic length = 680.00 feet

Elevation change = 162.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.9 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.98 cfs

Discharge volume = 0.11 acre ft

Project Title = LILA CANYON DA-2a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.9 acres

Hydraulic length = 680.00 feet

Elevation change = 162.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.9 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 1.03 cfs

Discharge volume = 0.11 acre ft

Project Title = LILA CANYON DA-2b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 350.00 feet

Elevation change = 36.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.09 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-2b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 350.00 feet

Elevation change = 36.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-2b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 350.00 feet

Elevation change = 36.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.14 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-2b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 350.00 feet

Elevation change = 36.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.15 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-2c (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 106.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.04 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-2c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 106.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.05 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-2c (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 106.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.07 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-2c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 106.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.08 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-3 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 170.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.11 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-3 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 170.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.14 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-3 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 170.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.20 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-3 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 170.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.21 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-4a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.06 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-4a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.08 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-4a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-4a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.11 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-4b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 270.00 feet

Elevation change = 28.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.07 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-4b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 270.00 feet

Elevation change = 28.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.08 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-4b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 270.00 feet

Elevation change = 28.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.11 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-4b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 270.00 feet

Elevation change = 28.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.12 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-4c (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 580.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.42 cfs

Discharge volume = 0.04 acre ft

Project Title = LILA CANYON DA-4c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 580.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.51 cfs

Discharge volume = 0.05 acre ft

Project Title = LILA CANYON DA-4c (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 580.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.68 cfs

Discharge volume = 0.07 acre ft

Project Title = LILA CANYON DA-4c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 580.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.71 cfs

Discharge volume = 0.07 acre ft

Project Title = LILA CANYON DA-5a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 180.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.05 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-5a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 180.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.06 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-5a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 180.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.08 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-5a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 180.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.09 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-5b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 125.00 feet

Elevation change = 14.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.11 cfs

Discharge volume = 0.01 acre ft

Project Title = LILA CANYON DA-5b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 125.00 feet

Elevation change = 14.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.14 cfs

Discharge volume = 0.02 acre ft

Project Title = LILA CANYON DA-5b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 125.00 feet

Elevation change = 14.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.20 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-5b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 125.00 feet

Elevation change = 14.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.21 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-5c (10/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 570.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

#### -- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.29 cfs

Discharge volume = 0.03 acre ft

Project Title = LILA CANYON DA-5c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 570.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.35 cfs

Discharge volume = 0.04 acre ft

Project Title = LILA CANYON DA-5c (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 570.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.47 cfs

Discharge volume = 0.05 acre ft

Project Title = LILA CANYON DA-5c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 570.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.49 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-6a (10/6)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 200.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

#### -- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.09 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-6a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 200.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.12 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-6a (100/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 200.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.17 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-6a (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 200.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.18 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-6b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 3.3 acres

Hydraulic length = 760.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.3 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.60 cfs

Discharge volume = 0.15 acre ft

Project Title = Lila Canyon DA-6b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 3.3 acres

Hydraulic length = 760.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.3 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.06 cfs

Discharge volume = 0.19 acre ft

Project Title = Lila Canyon DA-6b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 3.3 acres

Hydraulic length = 760.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 3.03 cfs

Discharge volume = 0.28 acre ft

Project Title = Lila Canyon DA-6b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 3.3 acres

Hydraulic length = 760.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 3.27 cfs

Discharge volume = 0.28 acre ft

Project Title = Lila Canyon DA-6c (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 2.5 acres

Hydraulic length = 690.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.18 cfs

Discharge volume = 0.11 acre ft

Project Title = Lila Canyon DA-6c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 2.5 acres

Hydraulic length = 690.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.52 cfs

Discharge volume = 0.14 acre ft

Project Title = Lila Canyon DA-6c (100/6)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 90.0

Area = 2.5 acres

Hydraulic length = 690.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.23 cfs

Discharge volume = 0.21 acre ft

Project Title = Lila Canyon DA-6c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 2.5 acres

Hydraulic length = 690.00 feet

Elevation change = 70.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 2.40 cfs

Discharge volume = 0.21 acre ft

Project Title = Lila Canyon DA-7 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.7 acres

Hydraulic length = 630.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.98 cfs

Discharge volume = 0.19 acre ft

Project Title = Lila Canyon DA-7 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.7 acres

Hydraulic length = 630.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.39 cfs

Discharge volume = 0.23 acre ft

Project Title = Lila Canyon DA-7 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.7 acres

Hydraulic length = 630.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 3.22 cfs

Discharge volume = 0.31 acre ft

Project Title = Lila Canyon DA-7 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.7 acres

Hydraulic length = 630.00 feet

Elevation change = 30.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 3.36 cfs

Discharge volume = 0.31 acre ft

Project Title = Lila Canyon DA-8a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 284.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-8a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 284.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.12 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-8a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 284.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.18 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-8a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.3 acres

Hydraulic length = 284.00 feet

Elevation change = 54.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-8b (10/6)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.8 acres

Hydraulic length = 670.00 feet

Elevation change = 52.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

#### -- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.36 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-8b (25/6)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.8 acres

Hydraulic length = 670.00 feet

Elevation change = 52.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

#### -- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.47 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-8b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.8 acres

Hydraulic length = 670.00 feet

Elevation change = 52.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.68 cfs

Discharge volume = 0.06 acre ft

Project Title = Lila Canyon DA-8b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.8 acres

Hydraulic length = 670.00 feet

Elevation change = 52.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.74 cfs

Discharge volume = 0.06 acre ft

Project Title = Lila Canyon DA-8c (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.0 acres

Hydraulic length = 410.00 feet

Elevation change = 42.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.40 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-8c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.0 acres

Hydraulic length = 410.00 feet

Elevation change = 42.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.52 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-8c (100/6)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.0 acres

Hydraulic length = 410.00 feet

Elevation change = 42.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.76 cfs

Discharge volume = 0.08 acre ft

Project Title = Lila Canyon DA-8c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 1.0 acres

Hydraulic length = 410.00 feet

Elevation change = 42.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.81 cfs

Discharge volume = 0.08 acre ft

Project Title = Lila Canyon DA-9 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 50.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.04 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-9 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 50.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.05 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-9 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 50.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.06 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-9 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 50.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.07 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-10 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.9 acres

Hydraulic length = 700.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.08 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.9 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.19 cfs

Discharge volume = 0.20 acre ft

Project Title = Lila Canyon DA-10 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.9 acres

Hydraulic length = 700.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.08 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.9 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.65 cfs

Discharge volume = 0.24 acre ft

Project Title = Lila Canyon DA-10 (100/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.9 acres

Hydraulic length = 700.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.08 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.9 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 3.57 cfs

Discharge volume = 0.33 acre ft

Project Title = Lila Canyon DA-10 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.9 acres

Hydraulic length = 700.00 feet

Elevation change = 20.0 feet.

Concentration time = 0.08 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.9 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 3.73 cfs

Discharge volume = 0.33 acre ft

Project Title = Lila Canyon DA-11 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 340.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.52 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-11 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 340.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.63 cfs

Discharge volume = 0.07 acre ft

Project Title = Lila Canyon DA-11 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 340.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.85 cfs

Discharge volume = 0.09 acre ft

Project Title = Lila Canyon DA-11 (10/24)

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 340.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.89 cfs

Discharge volume = 0.09 acre ft

Project Title = Lila Canyon DA-13a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.0 acres

Hydraulic length = 470.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.46 cfs

Discharge volume = 0.14 acre ft

Project Title = Lila Canyon DA-13a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.0 acres

Hydraulic length = 470.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.76 cfs

Discharge volume = 0.17 acre ft

Project Title = Lila Canyon DA-13a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.0 acres

Hydraulic length = 470.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 2.37 cfs

Discharge volume = 0.23 acre ft

Project Title = Lila Canyon DA-13a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 2.0 acres

Hydraulic length = 470.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 2.47 cfs

Discharge volume = 0.23 acre ft

Project Title = Lila Canyon DA-13b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.5 acres

Hydraulic length = 280.00 feet

Elevation change = 4.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.5 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.23 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-13b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.5 acres

Hydraulic length = 280.00 feet

Elevation change = 4.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.5 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.30 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-13b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.5 acres

Hydraulic length = 280.00 feet

Elevation change = 4.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.5 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.44 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-13b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.5 acres

Hydraulic length = 280.00 feet

Elevation change = 4.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.5 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.47 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-13c (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 460.00 feet

Elevation change = 22.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-13c (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 460.00 feet

Elevation change = 22.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.24 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-13c (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 460.00 feet

Elevation change = 22.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.35 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-13c (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 90.0

Area = 0.4 acres

Hydraulic length = 460.00 feet

Elevation change = 22.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.38 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-14a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 390.00 feet

Elevation change = 34.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.23 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-14a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 390.00 feet

Elevation change = 34.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.28 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-14a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 390.00 feet

Elevation change = 34.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.38 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-14a (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 390.00 feet

Elevation change = 34.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.39 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-14b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 540.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.56 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-14b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 540.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.67 cfs

Discharge volume = 0.06 acre ft

Project Title = Lila Canyon DA-14b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 540.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.91 cfs

Discharge volume = 0.09 acre ft

Project Title = Lila Canyon DA-14b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.8 acres

Hydraulic length = 540.00 feet

Elevation change = 16.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.95 cfs

Discharge volume = 0.09 acre ft

Project Title = Lila Canyon DA-15a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 525.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.26 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-15a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 525.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.31 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-15a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 525.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.42 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-15a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 525.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.04 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.44 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-15b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 270.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.40 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-15b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 270.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.48 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-15b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 270.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.64 cfs

Discharge volume = 0.07 acre ft

Project Title = Lila Canyon DA-15b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.6 acres

Hydraulic length = 270.00 feet

Elevation change = 12.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.67 cfs

Discharge volume = 0.07 acre ft

Project Title = Lila Canyon DA-16a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 370.00 feet

Elevation change = 10.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.11 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-16a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 370.00 feet

Elevation change = 10.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.14 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-16a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 370.00 feet

Elevation change = 10.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-16a (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.2 acres

Hydraulic length = 370.00 feet

Elevation change = 10.0 feet.

Concentration time = 0.05 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.19 cfs

Discharge volume = 0.02 acre ft

Project Title = Lila Canyon DA-16b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 210.00 feet

Elevation change = 13.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.06 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-16b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 210.00 feet

Elevation change = 13.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.07 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-16b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 210.00 feet

Elevation change = 13.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-16b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 210.00 feet

Elevation change = 13.0 feet.

Concentration time = 0.02 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-17a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 610.00 feet

Elevation change = 19.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.31 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-17a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 610.00 feet

Elevation change = 19.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.38 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-17a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 610.00 feet

Elevation change = 19.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.51 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-17a (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 610.00 feet

Elevation change = 19.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.53 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-17b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 5.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.05 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-17b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 5.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.06 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-17b (100/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 5.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.08 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-17b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 100.00 feet

Elevation change = 5.0 feet.

Concentration time = 0.01 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.09 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-18a (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 175.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.06 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-18a (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 175.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.07 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-18a (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 175.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-18a (10/24)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.1 acres

Hydraulic length = 175.00 feet

Elevation change = 6.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.1 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.10 cfs

Discharge volume = 0.01 acre ft

Project Title = Lila Canyon DA-18b (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 650.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.33 cfs

Discharge volume = 0.03 acre ft

Project Title = Lila Canyon DA-18b (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 650.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.40 cfs

Discharge volume = 0.04 acre ft

Project Title = Lila Canyon DA-18b (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 650.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.53 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon DA-18b (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 0.4 acres

Hydraulic length = 650.00 feet

Elevation change = 24.0 feet.

Concentration time = 0.07 hours

Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 0.56 cfs

Discharge volume = 0.05 acre ft

Project Title = Lila Canyon TS-1 (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 3.0 acres

Hydraulic length = 660.00 feet

Elevation change = 38.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.65 cfs

Discharge volume = 0.07 acre ft

Project Title = Lila Canyon TS-1 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 3.0 acres

Hydraulic length = 660.00 feet

Elevation change = 38.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.96 cfs

Discharge volume = 0.09 acre ft

Project Title = Lila Canyon TS-1 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 3.0 acres

Hydraulic length = 660.00 feet

Elevation change = 38.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.66 cfs

Discharge volume = 0.15 acre ft

Project Title = Lila Canyon TS-1 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 3.0 acres

Hydraulic length = 660.00 feet

Elevation change = 38.0 feet.

Concentration time = 0.06 hours

Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 1.90 cfs

Discharge volume = 0.15 acre ft

Project Title = Lila Canyon Pond 1 (10/6)

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 95.0

Area = 1.9 acres

Hydraulic length = 380.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.9 acres

#### -- Storm data

Total precipitation = 1.3 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.18 cfs

Discharge volume = 0.13 acre ft

Project Title = Lila Canyon Pond 1 (25/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 1.9 acres

Hydraulic length = 380.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.9 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.42 cfs

Discharge volume = 0.16 acre ft

Project Title = Lila Canyon Pond 1 (100/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 1.9 acres

Hydraulic length = 380.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.9 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 1.91 cfs

Discharge volume = 0.22 acre ft

Project Title = Lila Canyon Pond 1 (10/24)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 95.0

Area = 1.9 acres

Hydraulic length = 380.00 feet

Elevation change = 50.0 feet.

Concentration time = 0.03 hours

Unit hydrograph type = Disturbed

-- Total Area = 1.9 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 1.99 cfs

Discharge volume = 0.22 acre ft

Project Title = Lila Site - RW-1 - 100/6

### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 83.0

Area = 23.5 acres

Hydraulic length = 1970.00 feet

Elevation change = 325.0 feet.

Concentration time = 0.09 hours

Unit hydrograph type = Disturbed

-- Total Area = 23.5 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 13.26 cfs

Discharge volume = 1.23 acre ft

Project Title = Lila Site - RW-2 - 100/6

#### WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

#### -- Watershed data for watershed # 1

Curve number = 83.0

Area = 19.1 acres

Hydraulic length = 2430.00 feet

Elevation change = 655.0 feet.

Concentration time = 0.09 hours

Unit hydrograph type = Disturbed

-- Total Area = 19.1 acres

#### -- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 10.89 cfs

Discharge volume = 1.00 acre ft

Project Title = Lila Site - UC-1 - 100/6

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 83.0

Area = 281.6 acres

Hydraulic length = 5200.00 feet

Elevation change = 1480.0 feet.

Concentration time = 0.15 hours

Unit hydrograph type = Forested

-- Total Area = 281.6 acres

-- Storm data

Total precipitation = 1.9 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 72.62 cfs

Discharge volume = 14.73 acre ft

**Lila Canyon Mine  
Ditch Calculations**

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-1a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.114 ft/ft
	200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Slope	
Discharge	0.22 cfs

---

## Results

---

Depth	0.20 ft
Flow Area	0.08 ft <sup>2</sup>
Wetted Perimeter	0.88 ft
Top Width	0.79 ft
Critical Depth	0.24 ft
Critical Slope	0.042153 ft/ft
Velocity	2.84 ft/s
Velocity	0.13 ft
Head	
Specific Energy	0.32 ft
Froude Number	1.60
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

**Project Description**

---

Worksheet	DD-1a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

**Input Data**

---

Mannings Coefficient	0.035
Slope	0.114 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.37 cfs

---

**Results**

---

Depth	0.24 ft
Flow Area	0.11 ft <sup>2</sup>
Wetted Perimeter	1.07 ft
Top Width	0.96 ft
Critical Depth	0.29 ft
Critical Slope	0.039331 ft/ft
Velocity	3.23 ft/s
Velocity Head	0.16 ft
Specific Energy	0.40 ft
Froude Number	1.65
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-1b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.112 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.52 cfs

---

## Results

---

Depth	0.27 ft
Flow Area	0.15 ft <sup>2</sup>
Wetted Perimeter	1.22 ft
Top Width	1.09 ft
Critical Depth	0.33 ft
Critical Slope	0.037586 ft/ft
Velocity	3.49 ft/s
Velocity Head	0.19 ft
Specific Energy	0.46 ft
Froude Number	1.67
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

**Project Description**

---

Worksheet	DD-1b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

**Input Data**

---

Mannings Coefficient	0.035
Slope	0.112 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.91 cfs

---

**Results**

---

Depth	0.34 ft
Flow Area	0.23 ft <sup>2</sup>
Wetted Perimeter	1.50 ft
Top Width	1.35 ft
Critical Depth	0.42 ft
Critical Slope	0.034884 ft/ft
Velocity	4.02 ft/s
Velocity Head	0.25 ft
Specific Energy	0.59 ft
Froude Number	1.73
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-1c
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.100 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.63 cfs

---

## Results

---

Depth	0.30 ft
Flow Area	0.18 ft <sup>2</sup>
Wetted Perimeter	1.34 ft
Top Width	1.20 ft
Critical Depth	0.36 ft
Critical Slope	0.036639 ft/ft
Velocity	3.51 ft/s
Velocity Head	0.19 ft
Specific Energy	0.49 ft
Froude Number	1.60
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-1c
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.100 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	1.10 cfs

---

### Results

---

Depth	0.37 ft
Flow Area	0.27 ft <sup>2</sup>
Wetted Perimeter	1.65 ft
Top Width	1.48 ft
Critical Depth	0.45 ft
Critical Slope	0.034013 ft/ft
Velocity	4.04 ft/s
Velocity Head	0.25 ft
Specific Energy	0.62 ft
Froude Number	1.66
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

**Project Description**

---

Worksheet	DD-2a
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

**Input Data**

---

Mannings Coefficient	0.035
Slope	0.120 ft/ft
	600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	2.72 cfs

---

**Results**

---

Depth	0.23 ft
Flow Area	0.56 ft <sup>2</sup>
Wetted Perimeter	3.03 ft
Top Width	2.92 ft
Critical Depth	0.34 ft
Critical Slope	0.029303 ft/ft
Velocity	4.81 ft/s
Velocity Head	0.36 ft
Specific Energy	0.59 ft
Froude Number	1.93
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-2a
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.120 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	7.14 cfs

---

### Results

---

Depth	0.39 ft
Flow Area	1.10 ft <sup>2</sup>
Wetted Perimeter	3.76 ft
Top Width	3.58 ft
Critical Depth	0.60 ft
Critical Slope	0.025602 ft/ft
Velocity	6.49 ft/s
Velocity Head	0.66 ft
Specific Energy	1.05 ft
Froude Number	2.06
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-2b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.102 ft/ft 900
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	2.81 cfs

---

### Results

---

Depth	0.24 ft
Flow Area	0.61 ft <sup>2</sup>
Wetted Perimeter	3.09 ft
Top Width	2.98 ft
Critical Depth	0.35 ft
Critical Slope	0.029163 ft/ft
Velocity	4.61 ft/s
Velocity Head	0.33 ft
Specific Energy	0.58 ft
Froude Number	1.80
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

Project Description	
Worksheet	DD-2b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035
Slope	0.102 ft/ft 900
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	7.29 cfs

Results	
Depth	0.42 ft
Flow Area	1.18 ft <sup>2</sup>
Wetted Perimeter	3.86 ft
Top Width	3.67 ft
Critical Depth	0.60 ft
Critical Slope	0.025530 ft/ft
Velocity	6.18 ft/s
Head	0.59 ft
Specific Energy	1.01 ft
Froude Number	1.92
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-2c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.142 ft/ft 900
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	2.85 cfs

---

### Results

---

Depth	0.22 ft
Flow Area	0.55 ft <sup>2</sup>
Wetted Perimeter	3.01 ft
Top Width	2.90 ft
Critical Depth	0.35 ft
Critical Slope	0.029103 ft/ft
Velocity	5.18 ft/s
Velocity Head	0.42 ft
Specific Energy	0.64 ft
Froude Number	2.09
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-2c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.142 ft/ft 900
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	7.37 cfs

---

### Results

---

Depth	0.38 ft
Flow Area	1.06 ft <sup>2</sup>
Wetted Perimeter	3.71 ft
Top Width	3.53 ft
Critical Depth	0.61 ft
Critical Slope	0.025493 ft/ft
Velocity	6.96 ft/s
Velocity Head	0.75 ft
Specific Energy	1.14 ft
Froude Number	2.24
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-3
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.006 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.11 cfs

---

## Results

---

Depth	0.26 ft
Flow Area	0.14 ft <sup>2</sup>
Wetted Perimeter	1.18 ft
Top Width	1.05 ft
Critical Depth	0.18 ft
Critical Slope	0.046236 ft/ft
Velocity	0.79 ft/s
Velocity Head	0.01 ft
Specific Energy	0.27 ft
Froude Number	0.38
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-3
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.006 ft/ft
	000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.21 cfs

---

### Results

Depth	0.34 ft
Flow Area	0.23 ft <sup>2</sup>
Wetted Perimeter	1.50 ft
Top Width	1.34 ft
Critical Depth	0.23 ft
Critical Slope	0.042415 ft/ft
Velocity	0.93 ft/s
Velocity Head	0.01 ft
Specific Energy	0.35 ft
Froude Number	0.40
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-4a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.110 ft/ft
	000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.06 cfs

---

## Results

---

Depth	0.12 ft
Flow Area	0.03 ft <sup>2</sup>
Wetted Perimeter	0.54 ft
Top Width	0.49 ft
Critical Depth	0.14 ft
Critical Slope	0.050132 ft/ft
Velocity	2.02 ft/s
Head	0.06 ft
Specific Energy	0.19 ft
Froude Number	1.45
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-4a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.110 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.11 cfs

---

## Results

---

Depth	0.15 ft
Flow Area	0.05 ft <sup>2</sup>
Wetted Perimeter	0.68 ft
Top Width	0.61 ft
Critical Depth	0.18 ft
Critical Slope	0.046233 ft/ft
Velocity	2.35 ft/s
Velocity Head	0.09 ft
Specific Energy	0.24 ft
Froude Number	1.50
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-4b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.102 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.24 cfs

---

## Results

---

Depth	0.21 ft
Flow Area	0.09 ft <sup>2</sup>
Wetted Perimeter	0.93 ft
Top Width	0.83 ft
Critical Depth	0.25 ft
Critical Slope	0.041670 ft/ft
Velocity	2.79 ft/s
Velocity Head	0.12 ft
Specific Energy	0.33 ft
Froude Number	1.53
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

Project Description	
Worksheet	DD-4b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

---

Input Data	
Mannings Coefficient	0.035
Slope	0.102 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.44 cfs

---

---

Results	
Depth	0.26 ft
Flow Area	0.14 ft <sup>2</sup>
Wetted Perimeter	1.16 ft
Top Width	1.04 ft
Critical Depth	0.31 ft
Critical Slope	0.038435 ft/ft
Velocity	3.24 ft/s
Velocity Head	0.16 ft
Specific Energy	0.42 ft
Froude Number	1.58
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-4c
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.100 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.66 cfs

---

### Results

---

Depth	0.30 ft
Flow Area	0.19 ft <sup>2</sup>
Wetted Perimeter	1.36 ft
Top Width	1.22 ft
Critical Depth	0.37 ft
Critical Slope	0.036412 ft/ft
Velocity	3.55 ft/s
Head	0.20 ft
Specific Energy	0.50 ft
Froude Number	1.61
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

Project Description	
Worksheet	DD-4c
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

Input Data	
Mannings Coefficient	0.035
Slope	0.100 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	1.15 cfs

---

Results	
Depth	0.38 ft
Flow Area	0.28 ft <sup>2</sup>
Wetted Perimeter	1.68 ft
Top Width	1.50 ft
Critical Depth	0.46 ft
Critical Slope	0.033812 ft/ft
Velocity	4.08 ft/s
Velocity Head	0.26 ft
Specific Energy	0.63 ft
Froude Number	1.66
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-5a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.131 ft/ft
	100
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.05 cfs

---

### Results

---

Depth	0.11 ft
Flow Area	0.02 ft <sup>2</sup>
Wetted Perimeter	0.49 ft
Top Width	0.44 ft
Critical Depth	0.13 ft
Critical Slope	0.051359 ft/ft
Velocity	2.06 ft/s
Velocity Head	0.07 ft
Specific Energy	0.18 ft
Froude Number	1.55
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-5a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.131 ft/ft 100
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.09 cfs

---

### Results

---

Depth	0.14 ft
Flow Area	0.04 ft <sup>2</sup>
Wetted Perimeter	0.61 ft
Top Width	0.55 ft
Critical Depth	0.17 ft
Critical Slope	0.047489 ft/ft
Velocity	2.39 ft/s
Velocity Head	0.09 ft
Specific Energy	0.23 ft
Froude Number	1.61
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-5b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.111 ft/ft 100
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.16 cfs

---

### Results

---

Depth	0.18 ft
Flow Area	0.06 ft <sup>2</sup>
Wetted Perimeter	0.79 ft
Top Width	0.70 ft
Critical Depth	0.21 ft
Critical Slope	0.043980 ft/ft
Velocity	2.59 ft/s
Velocity Head	0.10 ft
Specific Energy	0.28 ft
Froude Number	1.54
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-5b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.111 ft/ft 100
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.30 cfs

---

## Results

---

Depth	0.22 ft
Flow Area	0.10 ft <sup>2</sup>
Wetted Perimeter	0.99 ft
Top Width	0.89 ft
Critical Depth	0.27 ft
Critical Slope	0.040446 ft/ft
Velocity	3.04 ft/s
Velocity Head	0.14 ft
Specific Energy	0.37 ft
Froude Number	1.61
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

**Project Description**

---

Worksheet	DD-5c
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

**Input Data**

---

Mannings Coefficient	0.035
Slope	0.095 ft/ft
	200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.45 cfs

---

**Results**

---

Depth	0.27 ft
Flow Area	0.14 ft <sup>2</sup>
Wetted Perimeter	1.19 ft
Top Width	1.07 ft
Critical Depth	0.32 ft
Critical Slope	0.038319 ft/ft
Velocity	3.17 ft/s
Velocity Head	0.16 ft
Specific Energy	0.42 ft
Froude Number	1.53
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-5c
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.095 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.79 cfs

---

## Results

---

Depth	0.33 ft
Flow Area	0.22 ft <sup>2</sup>
Wetted Perimeter	1.47 ft
Top Width	1.32 ft
Critical Depth	0.40 ft
Critical Slope	0.035549 ft/ft
Velocity	3.65 ft/s
Velocity	0.21 ft
Head Specific Energy	0.54 ft
Froude Number	1.59
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-6a
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.040
Slope	0.180 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	2.94 cfs

---

### Results

---

Depth	0.19 ft
Flow Area	0.62 ft <sup>2</sup>
Wetted Perimeter	3.83 ft
Top Width	3.74 ft
Critical Depth	0.29 ft
Critical Slope	0.038670 ft/ft
Velocity	4.71 ft/s
Velocity Head	0.34 ft
Specific Energy	0.53 ft
Froude Number	2.03
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-6a
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.040
Slope	0.180 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	7.55 cfs

---

## Results

---

Depth	0.32 ft
Flow Area	1.17 ft <sup>2</sup>
Wetted Perimeter	4.43 ft
Top Width	4.28 ft
Critical Depth	0.52 ft
Critical Slope	0.033399 ft/ft
Velocity	6.47 ft/s
Velocity Head	0.65 ft
Specific Energy	0.97 ft
Froude Number	2.19
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-6b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.025 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	4.54 cfs

---

### Results

Depth	0.60 ft
Flow Area	1.32 ft <sup>2</sup>
Wetted Perimeter	3.69 ft
Top Width	3.40 ft
Critical Depth	0.59 ft
Critical Slope	0.027318 ft/ft
Velocity	3.43 ft/s
Velocity Head	0.18 ft
Specific Energy	0.78 ft
Froude Number	0.97
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-6b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.025 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	10.82 cfs

---

## Results

---

Depth	0.90 ft
Flow Area	2.52 ft <sup>2</sup>
Wetted Perimeter	5.03 ft
Top Width	4.60 ft
Critical Depth	0.91 ft
Critical Slope	0.024474 ft/ft
Velocity	4.29 ft/s
Velocity Head	0.29 ft
Specific Energy	1.19 ft
Froude Number	1.02
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-6c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.033 ft/ft
	800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	1.18 cfs

---

### Results

---

Depth	0.28 ft
Flow Area	0.45 ft <sup>2</sup>
Wetted Perimeter	2.27 ft
Top Width	2.14 ft
Critical Depth	0.29 ft
Critical Slope	0.032550 ft/ft
Velocity	2.64 ft/s
Head	0.11 ft
Specific Energy	0.39 ft
Froude Number	1.02
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-6c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.033 ft/ft 800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	2.40 cfs

---

## Results

---

Depth	0.41 ft
Flow Area	0.75 ft <sup>2</sup>
Wetted Perimeter	2.84 ft
Top Width	2.64 ft
Critical Depth	0.42 ft
Critical Slope	0.029643 ft/ft
Velocity	3.21 ft/s
Velocity Head	0.16 ft
Specific Energy	0.57 ft
Froude Number	1.06
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.010 ft/ft 800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	2.45 cfs

---

### Results

Depth	0.55 ft
Flow Area	1.15 ft <sup>2</sup>
Wetted Perimeter	3.46 ft
Top Width	3.20 ft
Critical Depth	0.43 ft
Critical Slope	0.029564 ft/ft
Velocity	2.12 ft/s
Velocity Head	0.07 ft
Specific Energy	0.62 ft
Froude Number	0.62
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.010 ft/ft 800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	4.31 cfs

---

## Results

---

Depth	0.72 ft
Flow Area	1.75 ft <sup>2</sup>
Wetted Perimeter	4.22 ft
Top Width	3.88 ft
Critical Depth	0.58 ft
Critical Slope	0.027500 ft/ft
Velocity	2.46 ft/s
Velocity Head	0.09 ft
Specific Energy	0.81 ft
Froude Number	0.64
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-8a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.204 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.10 cfs

---

### Results

Depth	0.13 ft
Flow Area	0.03 ft <sup>2</sup>
Wetted Perimeter	0.59 ft
Top Width	0.53 ft
Critical Depth	0.17 ft
Critical Slope	0.046828 ft/ft
Velocity	2.90 ft/s
Velocity Head	0.13 ft
Specific Energy	0.26 ft
Froude Number	1.99
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-8a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.204 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.19 cfs

---

## Results

---

Depth	0.17 ft
Flow Area	0.06 ft <sup>2</sup>
Wetted Perimeter	0.75 ft
Top Width	0.67 ft
Critical Depth	0.22 ft
Critical Slope	0.042986 ft/ft
Velocity	3.40 ft/s
Velocity Head	0.18 ft
Specific Energy	0.35 ft
Froude Number	2.08
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-8b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.078 ft/ft
	100
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	2.91 cfs

---

### Results

Depth	0.37 ft
Flow Area	0.63 ft <sup>2</sup>
Wetted Perimeter	2.64 ft
Top Width	2.46 ft
Critical Depth	0.47 ft
Critical Slope	0.028916 ft/ft
Velocity	4.59 ft/s
Velocity Head	0.33 ft
Specific Energy	0.69 ft
Froude Number	1.59
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-8b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.078 ft/ft
	100
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	5.24 cfs

---

### Results

---

Depth	0.49 ft
Flow Area	0.98 ft <sup>2</sup>
Wetted Perimeter	3.20 ft
Top Width	2.97 ft
Critical Depth	0.64 ft
Critical Slope	0.026826 ft/ft
Velocity	5.37 ft/s
Velocity Head	0.45 ft
Specific Energy	0.94 ft
Froude Number	1.65
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-8c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.040
Slope	0.103 ft/ft 400
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	6.12 cfs

---

### Results

---

Depth	0.41 ft
Flow Area	1.14 ft <sup>2</sup>
Wetted Perimeter	3.82 ft
Top Width	3.63 ft
Critical Depth	0.55 ft
Critical Slope	0.034142 ft/ft
Velocity	5.35 ft/s
Velocity Head	0.44 ft
Specific Energy	0.85 ft
Froude Number	1.68
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-8c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.040
Slope	0.103 ft/ft 400
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	2.00 ft
Discharge	14.03 cfs

---

### Results

---

Depth	0.63 ft
Flow Area	2.07 ft <sup>2</sup>
Wetted Perimeter	4.83 ft
Top Width	4.53 ft
Critical Depth	0.86 ft
Critical Slope	0.030599 ft/ft
Velocity	6.78 ft/s
Velocity Head	0.72 ft
Specific Energy	1.35 ft
Froude Number	1.77
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-9
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.100 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.04 cfs

---

## Results

---

Depth	0.11 ft
Flow Area	0.02 ft <sup>2</sup>
Wetted Perimeter	0.48 ft
Top Width	0.43 ft
Critical Depth	0.12 ft
Critical Slope	0.052913 ft/ft
Velocity	1.76 ft/s
Velocity Head	0.05 ft
Specific Energy	0.15 ft
Froude Number	1.35
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-9
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.100 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.07 cfs

---

## Results

---

Depth	0.13 ft
Flow Area	0.03 ft <sup>2</sup>
Wetted Perimeter	0.59 ft
Top Width	0.53 ft
Critical Depth	0.15 ft
Critical Slope	0.049110 ft/ft
Velocity	2.03 ft/s
Velocity Head	0.06 ft
Specific Energy	0.20 ft
Froude Number	1.40
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-10
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.030 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	2.19 cfs

---

## Results

---

Depth	0.40 ft
Flow Area	0.73 ft <sup>2</sup>
Wetted Perimeter	2.80 ft
Top Width	2.61 ft
Critical Depth	0.40 ft
Critical Slope	0.029996 ft/ft
Velocity	3.00 ft/s
Velocity Head	0.14 ft
Specific Energy	0.54 ft
Froude Number	1.00
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-10
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.030 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	3.73 cfs

---

### Results

---

Depth	0.53 ft
Flow Area	1.08 ft <sup>2</sup>
Wetted Perimeter	3.35 ft
Top Width	3.10 ft
Critical Depth	0.53 ft
Critical Slope	0.028011 ft/ft
Velocity	3.46 ft/s
Velocity Head	0.19 ft
Specific Energy	0.71 ft
Froude Number	1.04
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-11
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.050 ft/ft
	600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.52 cfs

---

## Results

---

Depth	0.32 ft
Flow Area	0.20 ft <sup>2</sup>
Wetted Perimeter	1.42 ft
Top Width	1.27 ft
Critical Depth	0.33 ft
Critical Slope	0.037587 ft/ft
Velocity	2.59 ft/s
Velocity Head	0.10 ft
Specific Energy	0.42 ft
Froude Number	1.15
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-11
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.050 ft/ft
	600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.89 cfs

---

### Results

---

Depth	0.39 ft
Flow Area	0.30 ft <sup>2</sup>
Wetted Perimeter	1.73 ft
Top Width	1.55 ft
Critical Depth	0.42 ft
Critical Slope	0.034988 ft/ft
Velocity	2.97 ft/s
Velocity Head	0.14 ft
Specific Energy	0.52 ft
Froude Number	1.19
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-13a
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.025 ft/ft 300
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	3.06 cfs

---

### Results

Depth	0.50 ft
Flow Area	0.99 ft <sup>2</sup>
Wetted Perimeter	3.23 ft
Top Width	2.99 ft
Critical Depth	0.48 ft
Critical Slope	0.028730 ft/ft
Velocity	3.08 ft/s
Velocity Head	0.15 ft
Specific Energy	0.65 ft
Froude Number	0.94
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-13a
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.025 ft/ft
	300
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	5.27 cfs

---

## Results

---

Depth	0.65 ft
Flow Area	1.48 ft <sup>2</sup>
Wetted Perimeter	3.89 ft
Top Width	3.59 ft
Critical Depth	0.64 ft
Critical Slope	0.026806 ft/ft
Velocity	3.55 ft/s
Head	0.20 ft
Specific Energy	0.84 ft
Froude Number	0.97
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-13b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.032 ft/ft 300
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	3.58 cfs

---

### Results

---

Depth	0.51 ft
Flow Area	1.02 ft <sup>2</sup>
Wetted Perimeter	3.26 ft
Top Width	3.03 ft
Critical Depth	0.52 ft
Critical Slope	0.028158 ft/ft
Velocity	3.51 ft/s
Velocity Head	0.19 ft
Specific Energy	0.70 ft
Froude Number	1.07
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-13b
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.032 ft/ft 300
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	6.16 cfs

---

### Results

---

Depth	0.66 ft
Flow Area	1.52 ft <sup>2</sup>
Wetted Perimeter	3.94 ft
Top Width	3.63 ft
Critical Depth	0.69 ft
Critical Slope	0.026281 ft/ft
Velocity	4.05 ft/s
Velocity Head	0.25 ft
Specific Energy	0.91 ft
Froude Number	1.10
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-13c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.033 ft/ft
	000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	5.77 cfs

---

## Results

---

Depth	0.63 ft
Flow Area	1.44 ft <sup>2</sup>
Wetted Perimeter	3.84 ft
Top Width	3.54 ft
Critical Depth	0.67 ft
Critical Slope	0.026500 ft/ft
Velocity	4.01 ft/s
Velocity Head	0.25 ft
Specific Energy	0.88 ft
Froude Number	1.11
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-13c
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.033 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	1.00 ft
Discharge	9.89 cfs

---

### Results

Depth	0.82 ft
Flow Area	2.15 ft <sup>2</sup>
Wetted Perimeter	4.65 ft
Top Width	4.26 ft
Critical Depth	0.87 ft
Critical Slope	0.024753 ft/ft
Velocity	4.61 ft/s
Velocity Head	0.33 ft
Specific Energy	1.15 ft
Froude Number	1.14
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-13d
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.012 ft/ft
	500
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	6.35 cfs

---

### Results

---

Depth	0.57 ft
Flow Area	2.36 ft <sup>2</sup>
Wetted Perimeter	5.55 ft
Top Width	5.28 ft
Critical Depth	0.46 ft
Critical Slope	0.026236 ft/ft
Velocity	2.69 ft/s
Velocity Head	0.11 ft
Specific Energy	0.68 ft
Froude Number	0.71
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-13d
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.012 ft/ft
	500
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	14.50 cfs

---

## Results

---

Depth	0.89 ft
Flow Area	4.25 ft <sup>2</sup>
Wetted Perimeter	6.98 ft
Top Width	6.56 ft
Critical Depth	0.75 ft
Critical Slope	0.023311 ft/ft
Velocity	3.41 ft/s
Velocity Head	0.18 ft
Specific Energy	1.07 ft
Froude Number	0.75
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-13e
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.047 ft/ft 800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	6.54 cfs

---

## Results

---

Depth	0.40 ft
Flow Area	1.52 ft <sup>2</sup>
Wetted Perimeter	4.79 ft
Top Width	4.60 ft
Critical Depth	0.47 ft
Critical Slope	0.026120 ft/ft
Velocity	4.31 ft/s
Velocity Head	0.29 ft
Specific Energy	0.69 ft
Froude Number	1.32
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-13e
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.047 ft/ft
	800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	14.88 cfs

---

### Results

Depth	0.63 ft
Flow Area	2.68 ft <sup>2</sup>
Wetted Perimeter	5.82 ft
Top Width	5.52 ft
Critical Depth	0.77 ft
Critical Slope	0.023228 ft/ft
Velocity	5.54 ft/s
Head	0.48 ft
Specific Energy	1.11 ft
Froude Number	1.40
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-14a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.087 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.23 cfs

---

### Results

---

Depth	0.21 ft
Flow Area	0.09 ft <sup>2</sup>
Wetted Perimeter	0.94 ft
Top Width	0.84 ft
Critical Depth	0.24 ft
Critical Slope	0.041908 ft/ft
Velocity	2.59 ft/s
Velocity Head	0.10 ft
Specific Energy	0.32 ft
Froude Number	1.41
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-14a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.087 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.39 cfs

---

### Results

Depth	0.26 ft
Flow Area	0.13 ft <sup>2</sup>
Wetted Perimeter	1.15 ft
Top Width	1.03 ft
Critical Depth	0.30 ft
Critical Slope	0.039057 ft/ft
Velocity	2.96 ft/s
Velocity Head	0.14 ft
Specific Energy	0.39 ft
Froude Number	1.46
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

**Project Description**

---

Worksheet	DD-14b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

**Input Data**

---

Mannings Coefficient	0.035
Slope	0.031 ft/ft
	500
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.56 cfs

---

**Results**

---

Depth	0.36 ft
Flow Area	0.25 ft <sup>2</sup>
Wetted Perimeter	1.59 ft
Top Width	1.42 ft
Critical Depth	0.34 ft
Critical Slope	0.037217 ft/ft
Velocity	2.21 ft/s
Velocity Head	0.08 ft
Specific Energy	0.43 ft
Froude Number	0.92
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

Project Description	
Worksheet	DD-14b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035
Slope	0.031 ft/ft 500
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.95 cfs

Results	
Depth	0.43 ft
Flow Area	0.38 ft <sup>2</sup>
Wetted Perimeter	1.94 ft
Top Width	1.73 ft
Critical Depth	0.43 ft
Critical Slope	0.034685 ft/ft
Velocity	2.52 ft/s
Velocity Head	0.10 ft
Specific Energy	0.53 ft
Froude Number	0.96
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-15a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.097 ft/ft
	000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.26 cfs

---

### Results

---

Depth	0.22 ft
Flow Area	0.09 ft <sup>2</sup>
Wetted Perimeter	0.97 ft
Top Width	0.86 ft
Critical Depth	0.25 ft
Critical Slope	0.041227 ft/ft
Velocity	2.78 ft/s
Head	0.12 ft
Specific Energy	0.34 ft
Froude Number	1.49
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-15a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.097 ft/ft 000
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.44 cfs

---

### Results

Depth	0.26 ft
Flow Area	0.14 ft <sup>2</sup>
Wetted Perimeter	1.18 ft
Top Width	1.05 ft
Critical Depth	0.31 ft
Critical Slope	0.038434 ft/ft
Velocity	3.18 ft/s
Velocity Head	0.16 ft
Specific Energy	0.42 ft
Froude Number	1.54
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-15b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.040 ft/ft 700
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.66 cfs

---

## Results

---

Depth	0.36 ft
Flow Area	0.26 ft <sup>2</sup>
Wetted Perimeter	1.61 ft
Top Width	1.44 ft
Critical Depth	0.37 ft
Critical Slope	0.036411 ft/ft
Velocity	2.54 ft/s
Velocity Head	0.10 ft
Specific Energy	0.46 ft
Froude Number	1.05
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-15b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.040 ft/ft 700
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	1.11 cfs

---

## Results

---

Depth	0.44 ft
Flow Area	0.38 ft <sup>2</sup>
Wetted Perimeter	1.96 ft
Top Width	1.75 ft
Critical Depth	0.45 ft
Critical Slope	0.033973 ft/ft
Velocity	2.89 ft/s
Velocity Head	0.13 ft
Specific Energy	0.57 ft
Froude Number	1.09
Flow Type	Supercritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-16a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.029 ft/ft
	700
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Slope	
Discharge	0.11 cfs

---

### Results

---

Depth	0.20 ft
Flow Area	0.08 ft <sup>2</sup>
Wetted Perimeter	0.87 ft
Top Width	0.78 ft
Critical Depth	0.18 ft
Critical Slope	0.046236 ft/ft
Velocity	1.44 ft/s
Velocity Head	0.03 ft
Head	
Specific Energy	0.23 ft
Froude Number	0.81
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

Worksheet	DD-16a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

Mannings Coefficient	0.035
Slope	0.029 ft/ft
	700
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.19 cfs

---

## Results

Depth	0.24 ft
Flow Area	0.12 ft <sup>2</sup>
Wetted Perimeter	1.07 ft
Top Width	0.96 ft
Critical Depth	0.22 ft
Critical Slope	0.042985 ft/ft
Velocity	1.65 ft/s
Velocity Head	0.04 ft
Specific Energy	0.28 ft
Froude Number	0.84
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

---

### Project Description

Worksheet	DD-16b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.035
Slope	0.060 ft/ft
	600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.17 cfs

---

### Results

Depth	0.20 ft
Flow Area	0.08 ft <sup>2</sup>
Wetted Perimeter	0.90 ft
Top Width	0.80 ft
Critical Depth	0.21 ft
Critical Slope	0.043629 ft/ft
Velocity	2.10 ft/s
Velocity Head	0.07 ft
Specific Energy	0.27 ft
Froude Number	1.17
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-16b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.060 ft/ft
	600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.29 cfs

---

## Results

---

Depth	0.25 ft
Flow Area	0.12 ft <sup>2</sup>
Wetted Perimeter	1.10 ft
Top Width	0.98 ft
Critical Depth	0.27 ft
Critical Slope	0.040630 ft/ft
Velocity	2.40 ft/s
Velocity Head	0.09 ft
Specific Energy	0.34 ft
Froude Number	1.21
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-17a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.026 ft/ft 800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.31 cfs

---

## Results

---

Depth	0.29 ft
Flow Area	0.17 ft <sup>2</sup>
Wetted Perimeter	1.31 ft
Top Width	1.18 ft
Critical Depth	0.27 ft
Critical Slope	0.040270 ft/ft
Velocity	1.80 ft/s
Velocity Head	0.05 ft
Specific Energy	0.34 ft
Froude Number	0.83
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-17a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.026 ft/ft
	800
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.53 cfs

---

## Results

---

Depth	0.36 ft
Flow Area	0.26 ft <sup>2</sup>
Wetted Perimeter	1.61 ft
Top Width	1.44 ft
Critical Depth	0.34 ft
Critical Slope	0.037490 ft/ft
Velocity	2.05 ft/s
Velocity Head	0.07 ft
Specific Energy	0.42 ft
Froude Number	0.85
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-17b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.041 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	1.15 cfs

---

## Results

---

Depth	0.44 ft
Flow Area	0.39 ft <sup>2</sup>
Wetted Perimeter	1.98 ft
Top Width	1.77 ft
Critical Depth	0.46 ft
Critical Slope	0.033813 ft/ft
Velocity	2.93 ft/s
Velocity Head	0.13 ft
Specific Energy	0.58 ft
Froude Number	1.10
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-17b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.041 ft/ft 200
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	1.96 cfs

---

## Results

---

Depth	0.54 ft
Flow Area	0.59 ft <sup>2</sup>
Wetted Perimeter	2.42 ft
Top Width	2.16 ft
Critical Depth	0.57 ft
Critical Slope	0.031492 ft/ft
Velocity	3.35 ft/s
Velocity Head	0.17 ft
Specific Energy	0.72 ft
Froude Number	1.13
Flow Type	Supercritical

# Flow Depth Calculation Worksheet

---

## Project Description

---

Worksheet	DD-18a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.028 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.06 cfs

---

## Results

---

Depth	0.16 ft
Flow Area	0.05 ft <sup>2</sup>
Wetted Perimeter	0.70 ft
Top Width	0.63 ft
Critical Depth	0.14 ft
Critical Slope	0.050132 ft/ft
Velocity	1.22 ft/s
Velocity Head	0.02 ft
Specific Energy	0.18 ft
Froude Number	0.77
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

Project Description	
Worksheet	DD-18a
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

Input Data	
Mannings Coefficient	0.035
Slope	0.028 ft/ft 600
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.10 cfs

---

Results	
Depth	0.19 ft
Flow Area	0.07 ft <sup>2</sup>
Wetted Perimeter	0.85 ft
Top Width	0.76 ft
Critical Depth	0.17 ft
Critical Slope	0.046828 ft/ft
Velocity	1.39 ft/s
Velocity Head	0.03 ft
Specific Energy	0.22 ft
Froude Number	0.79
Flow Type	Subcritical

## Flow Depth Calculation Worksheet

---

### Project Description

---

Worksheet	DD-18b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.035
Slope	0.035 ft/ft 400
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.39 cfs

---

### Results

---

Depth	0.30 ft
Flow Area	0.18 ft <sup>2</sup>
Wetted Perimeter	1.36 ft
Top Width	1.22 ft
Critical Depth	0.30 ft
Critical Slope	0.039056 ft/ft
Velocity	2.11 ft/s
Velocity Head	0.07 ft
Specific Energy	0.37 ft
Froude Number	0.95
Flow Type	Subcritical

# Flow Depth Calculation Worksheet

---

## Project Description

Worksheet	DD-18b
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

Mannings Coefficient	0.035
Slope	0.035 ft/ft 400
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Discharge	0.66 cfs

---

## Results

Depth	0.37 ft
Flow Area	0.27 ft <sup>2</sup>
Wetted Perimeter	1.66 ft
Top Width	1.48 ft
Critical Depth	0.37 ft
Critical Slope	0.036411 ft/ft
Velocity	2.41 ft/s
Velocity Head	0.09 ft
Specific Energy	0.46 ft
Froude Number	0.99
Flow Type	Subcritical

# Channel Depth Worksheet for Trapezoidal Channel

---

## Project Description

---

Worksheet	RD-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.050000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	13.26 cfs

---

## Results

---

Depth	0.58 ft
Flow Area	2.44 ft <sup>2</sup>
Wetted Perimeter	5.61 ft
Top Width	5.34 ft
Critical Depth	0.72 ft
Critical Slope	0.023600 ft/ft
Velocity	5.44 ft/s
Velocity Head	0.46 ft
Specific Energy	1.04 ft
Froude Number	1.42
Flow Type	Supercritical

# Channel Depth Worksheet for Trapezoidal Channel

---

## Project Description

---

Worksheet	RD-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.035
Slope	0.100000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	10.89 cfs

---

## Results

---

Depth	0.43 ft
Flow Area	1.67 ft <sup>2</sup>
Wetted Perimeter	4.93 ft
Top Width	4.73 ft
Critical Depth	0.64 ft
Critical Slope	0.024259 ft/ft
Velocity	6.52 ft/s
Head	0.66 ft
Specific Energy	1.09 ft
Froude Number	1.93
Flow Type	Supercritical

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## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-1
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.024
Slope	0.133300 ft/ft
Diameter	18 in
Discharge	7.29 cfs

---

### Results

---

Depth	0.61 ft
Flow Area	0.68 ft <sup>2</sup>
Wetted Perimeter	2.08 ft
Top Width	1.47 ft
Critical Depth	1.05 ft
Percent Full	40.9 %
Critical Slope	0.023666 ft/ft
Velocity	10.72 ft/s
Velocity Head	1.79 ft
Specific Energy	2.40 ft
Froude Number	2.78
Maximum Discharge	22.35 cfs
Discharge Full	20.77 cfs
Slope Full	0.016417 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.107 ft/ft
	700
Diameter	18 in
Discharge	0.91 cfs

---

### Results

---

Depth	0.23 ft
Flow Area	0.17 ft <sup>2</sup>
Wetted Perimeter	1.21 ft
Top Width	1.08 ft
Critical Depth	0.36 ft
Percent Full	15.3 %
Critical Slope	0.018323 ft/ft
Velocity	5.31 ft/s
Velocity Head	0.44 ft
Specific Energy	0.67 ft
Froude Number	2.35
Maximum Discharge	19.28 cfs
Discharge Full	17.92 cfs
Slope Full	0.000278 ft/ft
Flow Type	Supercritical

# Flow Velocity Calculation Worksheet

---

## Project Description

---

Worksheet	DC-3
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

## Input Data

---

Mannings Coefficient	0.025
Slope	0.030 ft/ft
	300
Diameter	18 in
Discharge	7.37 cfs

---

## Results

---

Depth	0.99 ft
Flow Area	1.24 ft <sup>2</sup>
Wetted Perimeter	2.85 ft
Top Width	1.42 ft
Critical Depth	1.05 ft
Percent Full	66.1 %
Critical Slope	0.025868 ft/ft
Velocity	5.94 ft/s
Velocity Head	0.55 ft
Specific Energy	1.54 ft
Froude Number	1.12
Maximum Discharge	10.23 cfs
Discharge Full	9.51 cfs
Slope Full	0.018207 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

Worksheet	DC-4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.025
Slope	0.215 ft/ft 000
Diameter	18 in
Discharge	0.21 cfs

---

### Results

Depth	0.10 ft
Flow Area	0.05 ft <sup>2</sup>
Wetted Perimeter	0.77 ft
Top Width	0.74 ft
Critical Depth	0.17 ft
Percent Full	6.5 %
Critical Slope	0.020771 ft/ft
Velocity	4.35 ft/s
Velocity Head	0.29 ft
Specific Energy	0.39 ft
Froude Number	3.00
Maximum Discharge	27.24 cfs
Discharge Full	25.33 cfs
Slope Full	0.000015 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-5
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth
Input Data	
Mannings Coefficient	0.025
Slope	0.120 ft/ft 000
Diameter	18 in
Discharge	0.30 cfs
Results	
Depth	0.13 ft
Flow Area	0.08 ft <sup>2</sup>
Wetted Perimeter	0.90 ft
Top Width	0.85 ft
Critical Depth	0.20 ft
Percent Full	8.8 %
Critical Slope	0.019986 ft/ft
Velocity	3.95 ft/s
Velocity Head	0.24 ft
Specific Energy	0.37 ft
Froude Number	2.33
Maximum Discharge	20.35 cfs
Discharge Full	18.92 cfs
Slope Full	0.000030 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-6
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.050 ft/ft
	000
Diameter	18 in
Discharge	7.55 cfs

---

### Results

---

Depth	0.85 ft
Flow Area	1.04 ft <sup>2</sup>
Wetted Perimeter	2.56 ft
Top Width	1.49 ft
Critical Depth	1.06 ft
Percent Full	56.9 %
Critical Slope	0.026305 ft/ft
Velocity	7.27 ft/s
Velocity Head	0.82 ft
Specific Energy	1.68 ft
Froude Number	1.53
Maximum Discharge	13.14 cfs
Discharge Full	12.21 cfs
Slope Full	0.019107 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-7
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.464 ft/ft
Diameter	18 in
Discharge	4.31 cfs

---

### Results

---

Depth	0.34 ft
Flow Area	0.31 ft <sup>2</sup>
Wetted Perimeter	1.50 ft
Top Width	1.26 ft
Critical Depth	0.80 ft
Percent Full	23.0 %
Critical Slope	0.020400 ft/ft
Velocity	14.05 ft/s
Velocity Head	3.07 ft
Specific Energy	3.41 ft
Froude Number	5.03
Maximum Discharge	40.02 cfs
Discharge Full	37.21 cfs
Slope Full	0.006227 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-8
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Slope	0.388 ft/ft 000
Diameter	24 in
Discharge	13.22 cfs

Results	
Depth	0.58 ft
Flow Area	0.75 ft <sup>2</sup>
Wetted Perimeter	2.26 ft
Top Width	1.81 ft
Critical Depth	1.31 ft
Percent Full	28.8 %
Critical Slope	0.021657 ft/ft
Velocity	17.69 ft/s
Velocity Head	4.86 ft
Specific Energy	5.44 ft
Froude Number	4.85
Maximum Discharge	78.82 cfs
Discharge Full	73.27 cfs
Slope Full	0.012631 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-9
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth
Input Data	
Mannings Coefficient	0.025
Slope	0.057 ft/ft
Diameter	18 in
Discharge	1.15 cfs
Results	
Depth	0.30 ft
Flow Area	0.25 ft <sup>2</sup>
Wetted Perimeter	1.39 ft
Top Width	1.20 ft
Critical Depth	0.40 ft
Percent Full	20.1 %
Critical Slope	0.018135 ft/ft
Velocity	4.55 ft/s
Velocity Head	0.32 ft
Specific Energy	0.62 ft
Froude Number	1.75
Maximum Discharge	14.03 cfs
Discharge Full	13.04 cfs
Slope Full	0.000443 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-10
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.142 ft/ft
	500
Diameter	18 in
Discharge	1.94 cfs

---

### Results

---

Depth	0.31 ft
Flow Area	0.26 ft <sup>2</sup>
Wetted Perimeter	1.42 ft
Top Width	1.22 ft
Critical Depth	0.52 ft
Percent Full	20.7 %
Critical Slope	0.018269 ft/ft
Velocity	7.33 ft/s
Velocity Head	0.83 ft
Specific Energy	1.15 ft
Froude Number	2.77
Maximum Discharge	22.18 cfs
Discharge Full	20.62 cfs
Slope Full	0.001262 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-11
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.046 ft/ft
Diameter	18 in
Discharge	2.80 cfs

---

### Results

---

Depth	0.50 ft
Flow Area	0.51 ft <sup>2</sup>
Wetted Perimeter	1.84 ft
Top Width	1.41 ft
Critical Depth	0.64 ft
Percent Full	33.3 %
Critical Slope	0.018804 ft/ft
Velocity	5.44 ft/s
Velocity Head	0.46 ft
Specific Energy	0.96 ft
Froude Number	1.59
Maximum Discharge	12.60 cfs
Discharge Full	11.71 cfs
Slope Full	0.002628 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-12
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth
Input Data	
Mannings Coefficient	0.025
Slope	0.040 ft/ft 000
Diameter	18 in
Discharge	3.73 cfs
Results	
Depth	0.60 ft
Flow Area	0.67 ft <sup>2</sup>
Wetted Perimeter	2.06 ft
Top Width	1.47 ft
Critical Depth	0.74 ft
Percent Full	40.3 %
Critical Slope	0.019705 ft/ft
Velocity	5.60 ft/s
Velocity Head	0.49 ft
Specific Energy	1.09 ft
Froude Number	1.47
Maximum Discharge	11.75 cfs
Discharge Full	10.92 cfs
Slope Full	0.004664 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-12
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Slope	0.033 ft/ft 300
Diameter	24 in
Discharge	14.50 cfs

Results	
Depth	1.20 ft
Flow Area	1.98 ft <sup>2</sup>
Wetted Perimeter	3.55 ft
Top Width	1.96 ft
Critical Depth	1.37 ft
Percent Full	60.2 %
Critical Slope	0.022857 ft/ft
Velocity	7.34 ft/s
Velocity Head	0.84 ft
Specific Energy	2.04 ft
Froude Number	1.29
Maximum Discharge	23.09 cfs
Discharge Full	21.47 cfs
Slope Full	0.015195 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-14
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.033 ft/ft
	300
Diameter	18 in
Discharge	1.34 cfs

---

### Results

---

Depth	0.37 ft
Flow Area	0.34 ft <sup>2</sup>
Wetted Perimeter	1.56 ft
Top Width	1.29 ft
Critical Depth	0.43 ft
Percent Full	24.8 %
Critical Slope	0.018114 ft/ft
Velocity	3.93 ft/s
Velocity Head	0.24 ft
Specific Energy	0.61 ft
Froude Number	1.35
Maximum Discharge	10.72 cfs
Discharge Full	9.97 cfs
Slope Full	0.000602 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-15
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth
Input Data	
Mannings Coefficient	0.025
Slope	0.033 ft/ft 300
Diameter	18 in
Discharge	0.19 cfs
Results	
Depth	0.14 ft
Flow Area	0.09 ft <sup>2</sup>
Wetted Perimeter	0.94 ft
Top Width	0.88 ft
Critical Depth	0.16 ft
Percent Full	9.6 %
Critical Slope	0.020905 ft/ft
Velocity	2.20 ft/s
Velocity Head	0.08 ft
Specific Energy	0.22 ft
Froude Number	1.24
Maximum Discharge	10.72 cfs
Discharge Full	9.97 cfs
Slope Full	0.000012 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

Project Description	
Worksheet	DC-16
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth
Input Data	
Mannings Coefficient	0.025
Slope	0.033 ft/ft
	300
Diameter	18 in
Discharge	0.53 cfs
Results	
Depth	0.24 ft
Flow Area	0.18 ft <sup>2</sup>
Wetted Perimeter	1.22 ft
Top Width	1.09 ft
Critical Depth	0.27 ft
Percent Full	15.7 %
Critical Slope	0.018890 ft/ft
Velocity	2.99 ft/s
Velocity Head	0.14 ft
Specific Energy	0.37 ft
Froude Number	1.31
Maximum Discharge	10.72 cfs
Discharge Full	9.97 cfs
Slope Full	0.000094 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-17
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.040 ft/ft
	000
Diameter	18 in
Discharge	2.25 cfs

---

### Results

---

Depth	0.46 ft
Flow Area	0.46 ft <sup>2</sup>
Wetted Perimeter	1.76 ft
Top Width	1.38 ft
Critical Depth	0.57 ft
Percent Full	30.8 %
Critical Slope	0.018367 ft/ft
Velocity	4.87 ft/s
Velocity Head	0.37 ft
Specific Energy	0.83 ft
Froude Number	1.49
Maximum Discharge	11.75 cfs
Discharge Full	10.92 cfs
Slope Full	0.001697 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-18
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.057 ft/ft 000
Diameter	18 in
Discharge	0.10 cfs

---

### Results

---

Depth	0.09 ft
Flow Area	0.05 ft <sup>2</sup>
Wetted Perimeter	0.76 ft
Top Width	0.72 ft
Critical Depth	0.12 ft
Percent Full	6.2 %
Critical Slope	0.022852 ft/ft
Velocity	2.19 ft/s
Velocity Head	0.07 ft
Specific Energy	0.17 ft
Froude Number	1.53
Maximum Discharge	14.03 cfs
Discharge Full	13.04 cfs
Slope Full	0.000003 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	DC-19
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.025 ft/ft 000
Diameter	18 in
Discharge	1.11 cfs

---

### Results

---

Depth	0.36 ft
Flow Area	0.33 ft <sup>2</sup>
Wetted Perimeter	1.54 ft
Top Width	1.29 ft
Critical Depth	0.39 ft
Percent Full	24.2 %
Critical Slope	0.018124 ft/ft
Velocity	3.36 ft/s
Velocity Head	0.18 ft
Specific Energy	0.54 ft
Froude Number	1.17
Maximum Discharge	9.29 cfs
Discharge Full	8.64 cfs
Slope Full	0.000413 ft/ft
Flow Type	Supercritical

## Flow Velocity Calculation Worksheet

---

### Project Description

---

Worksheet	UC-1
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

---

Mannings Coefficient	0.025
Slope	0.045 ft/ft
	800
Diameter	60 in
Discharge	52.32 cfs

---

### Results

---

Depth	1.44 ft
Flow Area	4.67 ft <sup>2</sup>
Wetted Perimeter	5.66 ft
Top Width	4.53 ft
Critical Depth	2.03 ft
Percent Full	28.8 %
Critical Slope	0.012470 ft/ft
Velocity	11.19 ft/s
Velocity Head	1.95 ft
Specific Energy	3.39 ft
Froude Number	1.94
Maximum Discharge	311.76 cfs
Discharge Full	289.82 cfs
Slope Full	0.001493 ft/ft
Flow Type	Supercritical

**Lila Canyon Mine**  
**APPENDIX 1 - Culvert Outlet Rip-Rap Apron Flow Velocity Calculations**

## Lila Canyon Worksheet for Circular Channel

Project Description	
Worksheet	UC-1 - Outlet Velocity - (100/6)
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.025	
Slope	0.00500	ft/ft
Diameter	48	in
Discharge	52.32	cfs

Results		
Depth	3.25	ft
Flow Area	10.92	ft <sup>2</sup>
Wetted Perimeter	8.97	ft
Top Width	3.13	ft
Critical Depth	2.17	ft
Percent Full	81.1	%
Critical Slope	0.014895	ft/ft
Velocity	4.79	ft/s
Velocity Head	0.36	ft
Specific Energy	3.60	ft
Froude Number	0.45	
Maximum Discharge	56.81	cfs
Discharge Full	52.81	cfs
Slope Full	0.004907	ft/ft
Flow Type	Subcritical	

## Lila Canyon Worksheet for Trapezoidal Channel

---

Project Description	
Worksheet	UC-1 - Apron Outlet - (100/6)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

Input Data		
Mannings Coefficient	0.045	
Slope	0.001000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	9.00	ft
Discharge	52.32	cfs

---

Results		
Depth	2.49	ft
Flow Area	34.79	ft <sup>2</sup>
Wetted Perimeter	20.13	ft
Top Width	18.96	ft
Critical Depth	0.94	ft
Critical Slope	0.033208	ft/ft
Velocity	1.50	ft/s
Velocity Head	0.04	ft
Specific Energy	2.52	ft
Froude Number	0.20	
Flow Type	Subcritical	

**Appendix 8-1**  
**Reclamation Cost Estimates**

Bonding Calculations  
Horse Canyon MineC/007/013  
Lila Canyon Section

Bond Summary

Direct Costs

Subtotal Demolition and Removal	\$525,849.00	
Subtotal Backfilling and Grading	\$417,838.00	
Subtotal Revegetation	\$340,586.00	
Direct Costs	\$1,284,273.00	

Indirect Costs

Mob/Demob	\$128,427.00	10.0%
Contingency	\$64,214.00	5.0%
Engineering Redesign	\$32,107.00	2.5%
Main Office Expense	\$87,331.00	6.8%
Project Mainagement Fee	\$32,107.00	2.5%
Subtotal Indirect Costs	\$344,186.00	26.8%

Total Cost \$1,628,459.00

Escalation factor	0.0444
Number of years	3
Escalation	\$226,684.00

Reclamation Cost \$1,855,143.00

Bond Amount (rounded to nearest \$1,000)  
2008 Dollars \$1,855,000.00

Bond Posted Up to May 2007 \$1,686,000.00

Difference Between Cost Estimate and Bond	-\$169,000.00
Percent Difference	-9.11%



Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Office Bathroom																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF		150	100	15								FT	0.3	225000	CF	45000	
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	ECDC	ECDC	35/TON									480			lb/cf		600	ton	21000	69000
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	Concrete/Demo1	3.97/CF		150	100	1								FT		556	CY	2207	
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39/CF																	
	Transportation Cost	13 CY (16 Ton) Dump Truck 1/2 mi.	02315 430 0220	3.44/CF																	
	Disposal Costs	On site disposal	02220 240 5550	7.8/CF																	
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				77194



Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Security Shack																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished	Steel Bld. Large	02220 110 0012	0.2/CF	CF	20	10	8										1600	CF	320	
	Rubble's Weight (excludes steel)																	0.3	18	CY	
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	EGDC	EGDC	35/TON	TON								480								140
																					460
	Equipment's Disposal Cost																				
	Disposal Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY	CY	20	10	0.25													
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 624 1300	1.39/CY	CY																
	Transportation Cost	12 CY (16 TON) Dump Truck 12 mi. On site disposal	02315 460 0320	3.44/CY	CY																
	Disposal Costs		02220 240 5550	7.5/CY	CY																
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				505

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Mine Substation																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Costs																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Underground Power Lines																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				left in place

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Water Treatment Plant																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF	CF						1800						0.3	1800/CF		360	
	Structure's Vol. Demolished																	20	CY		
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel	ECDC	ECDC	35/TON	TON									480		lb/cf		5	ton	175	
	Subtotal																				635
	Equipment's Disposal Cost																				
	Dismantling Cost	3000 gal. to 5000 gal. tank	02115 200 0110	545/Ea.	Ea.																545
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs	3000 gal. to 5000 gal. tank	02115 200 1023	690/Ea.	Ea.																690
	Subtotal																				1235
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY	CY	15	15	0.5													16
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39/CY	CY																7
	Transportation Cost	1/2 CY (16 ton) Dump Truck 1/2 mi.	02315 450 0320	3.44/CY	CY																17
	Disposal Costs	On site disposal	02220 240 0350	7.9/CY	CY																38
	Subtotal																				78
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				1843

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Potable Water Tank																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF				20	15							FT	0.3	3534	CF	707	
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	ECDC	ECDC	35/TON									480			lb/cf				9 ton	1022
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY		15	15	0.5								FT					
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39/CY																	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. r	02315 490 0320	3.44/CY																	
	Disposal Costs	On site disposal	02220 240 5550	7.6/CY																	
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				1100

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Process Water Tank																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.27/CF				20	15							FT	0.3	3534	CF	707	
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal		ECDC		351/TON								480			lb/cf					315
																					1022
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY		15	15	0.5								FT					16
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39/CY																	4
	Transportation Cost	12 CY (18 Ton) Dump Truck 1/2 mi.	02314 460 0320	3.44/CY																	7
	Disposal Costs	On site disposal	02220 240 5550	7.0/CY																	38
	Subtotal																				78
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				1100

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Sewer Tank																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Remove Tank	3000 gal. to 5000 gal. tank	02115 200 0110	545 Ea.	1 EA																545
	Remove Sludge	3000 gal. to 5000 gal. tank	02115 200 0300	186 Ea.	1 EA																186
	Disposal Costs	3000 gal. to 5000 gal. tank	02115 200 1023	690 Ea.	1 EA																690
	Subtotal																				1421
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				1421

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swall Factor	Quantity	Unit	Cost	
	Drain Field																				
	Structure's Demolition Cost	will remain in place at reclamation																			
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				left in place

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Ventilation Fan																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost		15055 300 3500	805/ton								10			4	ton					32200
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				32200
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Equipment's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Equipment's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Equipment's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				52340

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Conveyor Tunnels to Coal Stockpile																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF	CF	810	6	20									0.3	97200	CF	19440	
	Structure's Vol. Demolished																	1080	CY		
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non-Steel Truck																				
	Transportation Cost Non-Steel Drive																				
	Disposal Cost Non-Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel	ECDC	ECDC	35/TON	TON								480					259	ton	9065	28505
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY	CY						15										
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 024 1309	1.39	CY																
	Transportation Cost	13 CY (16 Tons) Dump Truck 1/2 mi.	02315 460 0320	3.44	CY																
	Disposal Costs	On site disposal	02220 240 5550	7.6	CY																
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				28814

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor ROM Stockpile to Crusher																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF	CF	675	5	10								FT	0.3	33750	CF	6750
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal	EODC	EODC	35/TON	TON								480			lb/cf		90	ton	3150
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Leasing Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY	CY						15							15	CY	60
	Leasing Cost																			
	Transportation Cost	Front end loader 3 CY	03116 024 1300	1.39/CY	CY															
	Disposal Costs	12 CY (16 Ton) Dump Truck 1/2 mi. On site disposal	02318 060 0320	3.4/CY	CY															
	Subtotal		02220 240 5550	7.8/CY	CY															
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Leasing Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Leasing Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			10209

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Conveyor Crusher to Loudout Bin																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF	CF	230	5	20								FT	0.3	23000	CF	4600	
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal		EEDC		35/TON								480			lb/cf				2135	6735
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo 1	3.97/CY	CY						15										
	Concrete's Vol. Demolished																				
	Transportation Cost	Front end loader 3 CY	03314 424 1300	1.30/CY	CY																
	Disposal Cost	12 CY (16 Ton) Dump Truck 12 m. r	02312 490 1300	3.44/CY	CY																
	Subtotal	On site disposal	02220 240 5550	7.8/CY	CY																
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				7044

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Conveyor Loudout Bin Truck Loudout																				
	Structure's Demolition Cost	Steel Bid, Large	02220 110 0012	0.2/CF	CF	5	5	20									0.3	500 CF	100		
	Structure's Vol. Demolished																	6 CY			
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	ECDC	ECDC	35/TON	TON								480						1 ton		35
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	Concrete/Demol	3.97/CY	CY						15										
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				
																					444

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Reclaim Escape Tunnel Fan Fan House																				
	Currugated Steel	Steel Bld. Large	02220 110 0012	0.2/CF	CF						26880							26880	CF	5376	
	Escape Tunnel	Steel Bld. Large	02220 110 0012	0.2/CF	CF						1257							1257	CF	251	
	Fan House	Steel Bld. Large	02220 110 0012	0.2/CF	CF						64							64	CF	13	
	Structure's Vol. Demolished	Steel Bld. Large	02220 110 0012	0.2/CF	CF						512						0.3	319	CF	102	
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	ECDC	ECDC	35/TON									480			lb/cf		77	ton	2695	
																					8437
	Excavation and Backfill																				
	Excavation Bulk Bank 2 CY (3226)	Excavation Bulk Bank 2 CY (3226)	02315 424 0260	1.7/CF	CF	350	14	10													
	Backfill Tunnel	Backfill Tunnel Minimal Fill 2 1/4 CY (02315 610 3080)	02315 610 3080	1.33/CF	CF																
	Excavation Bulk Bank 2 CY (3226)	Excavation Bulk Bank 2 CY (3226)	02315 424 0260	1.7/CF	CF	325	4	10													
	Backfill Tunnel	Backfill Tunnel Minimal Fill 2 1/4 CY (02315 610 3080)	02315 610 3080	1.33/CF	CF																
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CF	CF						20										
	Concrete's Vol. Demolished																				
	Loading Cost	Front and loader 3 CY	02315 424 1300	1.39/CF	CF																
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi.	02315 480 0320	3.44/CF	CF																
	Disposal Costs	On site disposal	02220 240 5550	7.6/CF	CF																
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				16256

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swall Factor	Quantity	Unit	Cost	
	ConveyorStoragePileStakingTub																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF				80	20							FT		25133	CF	5027	
	Structure's Vol. Demolished																	0.3	279	CY	
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	EGDC	EGDC		351/TON								480			lb/cf				2345	7372
	Equipment's Disposal Cost																				
	Remaining Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transportation Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97/CY		25	25	3								FT					
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39/CY																	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi.	02315 490 0320	3.44/CY																	
	Disposal Costs	On site disposal	02220 240 5550	7.6/CY																	
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				8765

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Crusher Screen Plant																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF	CF						12000						0.3	12000	CF	2400	
	Structure's Vol. Demolished																	133	CY		
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal	ECDC	ECDC	35/TON									480								1120
	Equipment's Disposal Cost																				3520
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	Concrete/Demo 1	3.97/CY							20										
	Concrete's Vol. Demolished																	1.3	20	CY	79
	Loading Cost	Front end loader 3 CY	02314 424 1300	1.38/CY																	
	Transportation Cost	12 CY (16 Ton) Dump Truck 12 mi.	02518 460 1300	3.44/CY																	
	Disposal Costs	On site disposal	02220 240 5550	7.8/CY																	
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				3922

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Truck Scale to Loadout																			
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2/CF	CF						18850						0.3	18850	CF	3770
	Structure's Vol. Demolished																	209	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal	EGDC	EGDC	35/TON									480							1750
																				5520
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	Concrete/Demo 1	3.97/CY							34									135
	Concrete's Vol. Demolished																			
	Loading Cost	Front end loader 3 CY	03318 424 1300	1.38/CY																61
	Transportation Cost	12 CY (16 Ton) Dump Truck 12 mi.	03318 490 6520	3.44/CY																151
	Disposal Costs	On site disposal	02220 240 5550	7.8/CY																334
	Subtotal																			681
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			6201

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Coal Storage Bin																				
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2 /CF	CF						10000						0.3	10000/CF		2000	
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel	ECDC	ECDC	35 /TON	TON									480							945
	Subtotal																				2945
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost	Concrete demolition	Concrete/Demo1	3.97 /CY	CY						15										60
	Concrete's Vol. Demolished																				
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39 /CY	CY																28
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi.	02315 410 0220	3.44 /CY	CY																69
	Disposal Costs	On site disposal	02220 240 5550	7.8 /CY	CY																152
	Subtotal																				309
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				3254

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Guard Rail																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				18088
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Costs																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Costs																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Costs																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				18088

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Underground Pipes	will remain in place at reclamation																			
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				Left in Place

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Chain Link Fence																				
	Structure's Demolition Cost	Chain link remove 8'-10"	02220 220 1700	2.92/LF	LF	1500												1500	FT	4380	
	Structure's Vol. Demolished																				
	Rubble's Weight (excludes steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				4380
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				4380

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Mine Facilities Rd Truck Loadout Rd																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Facilities Road																				
	Asphalt Demolition																				
	Demolition Cost																				
	Asphalt's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Pavement Removal 4-6"		02220 250 5050	6.55 /SY	SY	1750	24	4.00										4667	SY	30569	
	16.5 CY Dump Trailer 10 mi. rtd. trip		02315 490 1120	9.75 /CY	CY/Ton									1				674	CY	25590	
	ECDC		ECDC	35/TON																	54159
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Total																				54159

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Office Bathroom Warehouse Parking Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismanling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismanling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Office Area																				
	Asphalt Demolition																				
	Demolition Cost																				
	Asphalt's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismanling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Dismanling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Total																				91896

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Mine Parking																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Equipment's Disposal Cost																			
	Dismantling Cost																			
	Equipment's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Parking Lot																			
	Asphalt Demolition																			
	Demolition Cost																			
	Asphalt's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Fuel Tanks																				
	Structure's Demolition Cost																				
	Structure's Vol. Demolished																				
	Rubble's Weight (exclude steel)																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Disposal Cost Non Steel																				
	Steel's Weight																				
	Truck's Capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				
	Equipment's Disposal Cost																				
	Removal Tanks	3000 gal. to 5000 gal. tank	02115 200 0110	580/Ea.																	
	Remove sludge water products	3000 gal. to 5000 gal. tank	02115 200 0300	168/Ea.																	
	Recycle tank recycle center	3000 gal. to 5000 gal. tank	02115 200 1023	690/Ea.																	
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				4368

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Powder and Cap Magazine Structure's Demolition Cost	Mechanical equipment heavy	15055-307-3600	805/ton	TON							4				TON		4	TON	3220	
	Structure's Vol. Demolished																				
	Structure's Weight (excludes steel)																				
	Truck's capacity																				
	Trucks																				
	Transportation Cost Non Steel Truck																				
	Transportation Cost Non Steel Drive																				
	Steel Cost Non Steel																				
	Stack's Weight																				
	Truck's capacity																				
	Haulage																				
	Transportation Cost Steel Truck																				
	Transportation Cost Steel Truck Drive																				
	Disposal Cost Steel																				
	Subtotal																				3220
	Equipment's Disposal Cost																				
	Dismantling Cost																				
	Equipment's Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				3220

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swall Factor	Quantity	Unit	Cost	
	Culverts																				
DC-5	Excavation Bulk Bank 2 CY (322BL)	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7 /CY	1.7 /CY	40	1.5	3								FT		7	CY	12	
	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	02315 610 3080	1.53 /CY	1.53 /CY	40	1.5	3								FT		7	CY	11	
DC-6	Excavation Bulk Bank 2 CY (322BL)	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7 /CY	1.7 /CY	60	2	3								FT		13	CY	22	
	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	02315 610 3080	1.53 /CY	1.53 /CY	60	2	3								FT		13	CY	20	
DC-7	Excavation Bulk Bank 2 CY (322BL)	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7 /CY	1.7 /CY	40	2	3								FT		9	CY	15	
	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	02315 610 3080	1.53 /CY	1.53 /CY	40	2	3								FT		9	CY	14	
DC-8	Excavation Bulk Bank 2 CY (322BL)	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7 /CY	1.7 /CY	40	1.5	3								FT		7	CY	12	
	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	02315 610 3080	1.53 /CY	1.53 /CY	40	1.5	3								FT		7	CY	11	
DC-9	Excavation Bulk Bank 2 CY (322BL)	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7 /CY	1.7 /CY	40	1.5	3								FT		7	CY	12	
	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	02315 610 3080	1.53 /CY	1.53 /CY	40	1.5	3								FT		7	CY	11	
UC-1	Excavation Bulk Bank 2 CY (322BL)	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7 /CY	1.7 /CY	530	5	6								FT		589	CY	1001	
	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	Backfill Trench Minimal Haul 2 1/4 CY (322BL)	02315 610 3080	1.53 /CY	1.53 /CY	530	5	6								FT		589	CY	901	
	Subtotal																			2042	
	Equipment & Disposal Cost																				
	Dismantling Cost																				
	Equipment & Vol. Demolished																				
	Loading Costs																				
	Transport Costs																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Concrete Demolition																				
	Demolition Cost																				
	Concrete's Vol. Demolished																				
	Loading Cost																				
	Transportation Cost																				
	Disposal Costs																				
	Subtotal																				
	Total																				2042





	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Est. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Horse Canyon Mine Lila Canyon Project															
Leaving															
631G (9-51) (2nd/0A)	19145	19145	0.1	52	267.14	3	801.42 \$/HR		28928 CY		393 CY/HR		73.6 HR		58985
DAR Semi-U EROPS (9-54) (2HD4)	17115	72.3	0.1	52	238.5	1	238.5 \$/HR						73.6 HR		17554
Subtotal															76529
Spread and Compact Material															
Assume 4 passes @ 10 ft. lift															
DAR Semi-U EROPS (9-54) (2HD4)	17115	72.3	0.1	52	238.5	1	238.5 \$/HR						73.6 HR		17554
825G (6-13) (4200)	12825	43.5	0.1	47.15	175.16	1	175.16 \$/HR						73.6 HR		12892
Subtotal															30446
Upper Road Area															
765D (20-11) (1004)	10520	40.4	0.1	42	152.19	1	152.19 \$/HR		5000 CY		288 CY/HR		17.3 HR		2633
888G EROPS (9-38) (3003)	8010	40.05	0.1	52	152.37	4	609.48 \$/HR						17.3 HR		10544
CAT 325BL (10-21) (2nd/0A)	9170	35.55	0.1	52	148.42	1	148.42 \$/HR						17.3 HR		13177
Subtotal	17115	72.3	0.1	52	238.5	1	238.5 \$/HR		5000		120 CY/HR		41.7 HR		8945
DAR Semi-U EROPS (9-54) (2HD4)															8945
Subtotal															18890
Total															140052

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dls.	Units	Cost
Horse Canyon Mine Lila Canyon Project															
Grading															
Load and Haul Topsoil															
631G (9-5) (2nd04)	19145	19145	0.1	52	267.14	3	801.42\$/HR		56000 CY		393 CY/HR		142.5 HR		114202
63R Semi-U EROPS (9-54) (2H04)	17115	72.3	0.1	52	238.5	1	238.5\$/HR						142.5 HR		33886
Subtotal															148188
769D (9-11) (10R4)	10520	40.4	0.1	42	152.19	1	152.19\$/HR		10000 CY		289 CY/HR		34.6 HR		5266
688C EROPS (9-38) (3003)	9010	41.05	0.1	55	145.27	4	581.08\$/HR						34.6 HR		2709
CAT 345BL (10-21) (2nd04)	8170	35.55	0.1	52	146.42	1	146.42\$/HR						34.6 HR		5135
Subtotal															31499
															62979
Total															211166

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Horse Canyon Mine Lila Canyon Project															
Grading															
Support															
5000 gal H <sub>2</sub> O Truck Diesel (20-17) (C004)	4725	28.05	0.1	42	102.39	1	102.39 \$/HR						384.2	HR	39338
Backup Truck Crew 4x4 1 Ton (20-17) (2004)	820	7.8	0.1	0	8.71	1	13.71 \$/HR						384.2	HR	5267
Foreman Average Outside					37.3	1	37.3 \$/HR						384.2	HR	22015
															66620
<b>Total</b>															<b>66620</b>

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swall Factor	Quantity	Unit	Cost	
	Vegetation																				
	Ground Preparation																				
	See Chapter 5 Page 95-96 Sec. 553.230																				
	Soil to be tipped	75 HP Dozer/wscarifiers	M029107103100	3.87/MSF	MSF						34					AC		1481	MSF	5731	
	Grading/rocking																				
	Assume 340 C/Y/AC																				
	Subtotal	Excavation Bulk Bank 2 CY (322BL)	M023154240280	1.7/CY	CY						34					AC		11560	CY	19852	
																					25363
	Seeding																				
	Fertilize Material	Fertilizer Hytron Spread Mat. Only	Reveg005	8.74/MSF	MSF						34					AC		1481	MSF	12900	
	Fertilize Application	Hydro Spreader (Equip. & labor) E-81 80MG	Reveg002	18.13/MSF	MSF						34					AC		1481	MSF	26332	
	Seeding Materials	Seeds for Lila Canyon	Unit0731	14.83/MSF	MSF						34					AC		34	AC	2772	
	Seeding Materials	Seeds for Lila Canyon	Unit0732	92.2/AC	AC						34					AC		34	AC	3177	
	Seeding Materials	Seeds for Lila Canyon	Unit0733	106.4/AC	AC						34					AC		34	AC	3619	
	Mulch Application	Hydro Spreader (Equip. & labor) E-81 80MG	Reveg002	19.43/MSF	MSF						34					AC		1481	MSF	26332	
	Mulch Materials	Hydro Spreader (Equip. & labor) E-81 80MG	Reveg001	18.13/MSF	MSF						34					AC		1481	MSF	100708	
	Mulch Application	Hydro Spreader (Equip. & labor) E-81 80MG	Reveg002	18.13/MSF	MSF						34					AC		1481	MSF	26332	
	Subtotal																				210135
	Reseeding																				
	Assume 50% reseeding rate																				105068
	Subtotal																				105068
	Total																				340596