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# Rincon DMP and Capital Projects Plan

*Prepared for:*

Doña Ana County Flood Commission
845 North Motel Boulevard
Las Cruces, New Mexico 88007
Project No. 10152 - 10020341

2155 Louisiana Boulevard Northeast
Suite 9500
Albuquerque, NM 87110

# Final Rincon Drainage Master Plan and Capital Projects Plan

**Prepared for:**

Doña Ana County Flood Commission
845 North Motel Boulevard
Las Cruces, New Mexico 88007

**Prepared by:**

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**June 24, 2016**

# Executive Summary

HDR Engineering, Inc., has prepared this Drainage Master Plan (DMP) for the Doña Ana County Flood Commission (DACFC). The Rincon DMP was developed to identifying drainage issues and to recommend both viable and cost-effective solutions to improve drainage in the community. The plan is based on an extensive data collection effort and hydrologic and hydraulic assessment of prevailing conditions in Rincon, New Mexico, located along Interstate 25 approximately 33 miles north of Las Cruces, New Mexico.

To assist in developing the DMP, HDR and DACFC held two public meetings in Rincon at the local community center. Residents had the opportunity to share their concerns about flooding, soil erosion, sediment transport, and site access.

Based on those concerns and the detailed analysis conducted in support of this report, several recommendations were developed for Rincon: regional flood mitigation channels, improved multiuse detention ponds, additional hydraulic structures (including culverts and roadside ditches), and joint partnership projects with the New Mexico Department of Transportation for implementing additional flood control mitigation actions in the region.

# Contents

Executive Summary ..... ii

1.0 Introduction ..... 1

1.1 Study Background ..... 1
1.2 Summary of Information Reviewed ..... 1
1.3 Purpose and Goals ..... 2

2.0 Description of Study Area and Drainage Issues ..... 3

3.0 Data Collection Summary ..... 10

3.1 GIS Data ..... 10
3.2 As-built Documentation ..... 10
3.3 Review of Previous Studies ..... 10
3.4 Field Review ..... 10
3.5 Survey and Mapping ..... 11

4.0 Public Involvement ..... 12

5.0 Federal Emergency Management Agency (FEMA) ..... 13

6.0 Hydrologic and Hydraulic Analysis ..... 14

6.1 Hydrologic Analysis ..... 14
6.1.1 Design Criteria ..... 14
6.1.1.1 Design Criteria Modification ..... 14
6.1.2 Methodology ..... 14
6.1.2.1 Offsite Areas ..... 15
6.1.3 Onsite Areas ..... 18
6.1.3.1 Subbasin Area ..... 19
6.1.3.2 Runoff Coefficient ..... 19
6.1.3.3 Rainfall Intensity ..... 20
6.1.3.4 Offsite Areas ..... 21
6.1.3.5 Onsite Areas ..... 22
6.2 Hydraulics ..... 22
6.2.1 Methodology ..... 23
6.2.1.1 Conveyance Feature Selection ..... 23
6.2.1.2 Evaluation Criterion ..... 23

6.2.2 Hydraulic Analysis ..... 23
6.2.2.1 Closed Conveyance ..... 23
6.2.2.2 Open Channel Conveyance ..... 24
6.2.3 Results ..... 24
6.2.3.1 Closed Conveyance ..... 24
6.2.3.2 Open Channel Conveyance ..... 26
7.0 Capital Projects Plan ..... 28
7.1 Alternatives Development ..... 28
7.1.1 Sediment Storage Basin Alternative (North of I-25) ..... 29
7.1.2 East Channel Alternative ..... 29
7.1.3 West Channel Alternative ..... 31
7.1.4 Onsite Drainage Infrastructure Improvement Alternative ..... 32
7.1.5 NM-140 Roadway Improvements ..... 33
7.1.6 RVC/NM-140 Improvements ..... 33
7.1.7 NMDOT Partner Project ..... 34
7.1.7.1 I-25 Interchange Improvements ..... 34
7.2 Prioritization of Projects ..... 35
7.2.1 Prioritization by Severity of Problems ..... 35
7.2.2 Prioritization by Efficacy of Project ..... 36
7.2.3 Engineering Opinion of Probable Cost ..... 38
8.0 Additional Recommendations ..... 39
9.0 References ..... 40

# List of Tables

Table 1 – Subbasins and Composite Curve Numbers ..... 16
Table 2 – Subbasins and Rational "C" Values ..... 20
Table 3 – Offsite Analysis Results for the 25-year, 24-hour Event ..... 21
Table 4 – Onsite Analysis Results for the 25-year, 24-hour Event ..... 22
Table 5 – Results of the Existing Hydraulics Analysis ..... 25
Table 6 – Proposed Conditions Hydraulic Analysis ..... 26
Table 7 – Existing Normal Depth Conditions for Western Channel ..... 26
Table 8 – Summary of Proposed Conditions Normal Depth Assessment ..... 27
Table 9 – Prioritization by Severity of Problems ..... 36
Table 10 – Prioritization by Efficacy of Project ..... 37
Table 11 – Prioritization by Engineering Opinion of Probable Cost ..... 38

# List of Figures

Figure 1 – Location Map ..... 4
Figure 2 – Vicinity Map ..... 5
Figure 3 – Assessment Limits Map ..... 6
Figure 4 – Foothills Area ..... 7
Figure 5 – Tributary Encroachment ..... 8
Figure 6 – Comparison of Existing Contours and FEMA Flood Zone ..... 13
Figure 7 – Intensity-Depth Duration Curves ..... 21
Figure 8 – East Channel Alternative ..... 30
Figure 9 – West Channel Outfall ..... 32
Figure 10 – NM-140 Roadside Ditches ..... 33
Figure 11 – Silted Inlet adjacent to NM-140 ..... 34
Figure 12 – Damaged Outlet adjacent to NM-140 ..... 35

# List of Appendices

Appendix A. ..... Data Collection
Appendix B. ..... Hydrologic Evaluation
Appendix C. ..... Hydraulic Evaluation
Appendix D. ..... Alternatives Analysis
Appendix E. ..... FEMA Documentation
Appendix F. ..... Improvement Plans
Appendix G. ..... Photolog
Appendix H. ..... Exhibits
Appendix I. ..... Public Meeting Documents
Appendix J. ..... Dona Ana County Meeting Minutes

# Abbreviations and Acronyms

| | |
|---|---|
| AMC | antecedent moisture conditions |
| BNSF | Burlington Northern & Santa Fe |
| CDP | Census-designated place |
| cfs | cubic feet per second |
| CMP | corrugated metal pipe |
| CN | curve number |
| DACFC | Doña Ana County Flood Commission |
| DEM | Digital Elevation Model |
| DMP | Drainage Master Plan |
| DTM | Digital Terrain Model |
| FEMA | Federal Emergency Management Agency |
| FIS | Flood Insurance Study |
| GIS | geographic information system |
| HDR | HDR Engineering, Inc. |
| HSG | Hydrologic Soil Group |
| I-25 | Interstate 25 |
| NM-140 | New Mexico 140 West (Rincon Road) |
| NMDOT | New Mexico Department of Transportation |
| NMSHTD | New Mexico State Highway and Transportation Department |
| NOAA | National Oceanic and Atmospheric Administration |
| NRCS | Natural Resources Conservation Service |
| RBC | reinforced box culvert |
| ROW | right-of-way |
| RVC | Rio Valley Chili |
| SCS | Soil Conservation Service |
| SSURGO | Soil Survey Geographic |

# 1.0 Introduction

## 1.1 Study Background

The community of Rincon is located along Interstate 25 (I-25), approximately 33 miles north of Las Cruces, New Mexico. It is in Township 18S, Range 02W, Section 32, and in Township 19S, Range 02W, Sections 4, 5, 6, 7, 8, and 9. Rincon lies north of the Rincon Arroyo, which contributes runoff to the Rio Grande to the south. I-25 and New Mexico-140 (NM-140) bound Rincon to the north and south, respectively. Currently, many of the drainage crossings underneath I-25 are affected by sedimentation build-up and are partially plugged by debris. The community of Rincon has inadequate flood control infrastructure to mitigate runoff generated from less-frequent return events in the watershed north of I-25. The Rincon Drainage Master Plan (DMP) was developed to provide Doña Ana County Flood Commission (DACFC) with mitigation alternatives to reduce future flooding in the community of Rincon.

The DMP will provide alternatives for flood protection for Rincon's residents and businesses and property owners, supporting Doña Ana County's goal of quantifying and assessing flood potential using sound scientific methodology and industry-tested technology to develop improved protection from flooding. The proposed measures will reduce flood potential during 25-year flood events and support long-term improvement of the quality and value of property within the community.

The DMP efforts included professional services such as data collection, hydrologic and hydraulic analyses, alternatives evaluation, capital improvement plan development, and public meeting outreach.

## 1.2 Summary of Information Reviewed

HDR reviewed the following data and reports in support of developing the Rincon DMP and capital improvement plan:

- Interstate 25 Right-of-Way and As-Builts; New Mexico Department of Transportation (NMDOT) September 1963
- New Mexico 140 Right-of-Way and As-Builts; NMDOT 1946
- Rincon Temporary Housing FEMA – Grading, Drainage, Water, and Wastewater Plans; PBS&J October 2006
- Rincon Wastewater Facilities Collection and Treatment; Easterling and Associates, Inc., February 1999
- Geographic information system (GIS) information, including building footprints and parcel information; Doña Ana County 2014
- GIS information including slope of ground surface, digital elevation model, digital terrain model, township, range, and sections; Doña Ana County 2010
- Rincon resident complaints; Doña Ana County, various date
- Aerial photography; Doña Ana County 2010
- Selected Design Alternative – Harlan Street Design; Doña Ana County 2014

## 1.3 Purpose and Goals

The purpose and goals of the Rincon DMP are summarized as follows:

- Identify future drainage improvement projects to mitigate flooding and aid in sedimentation control,
- Establish a list of alternatives for possible inclusion in the capital improvement plan,
- Involve the public and stakeholders to help prepare effective, sustainable, and preferred solutions,
- Limit ownership displacement or transference or costly right-of-way (ROW) purchase requirements.

Analysis provided for completion of the DMP is not intended to be used at the final design level or for permitting with local or federal agencies, such as the Federal Emergency Management Agency (FEMA) or NMDOT.

# 2.0 Description of Study Area and Drainage Issues

The DMP study area is in the northwestern portion of Doña Ana County and encompasses approximately 1.618 square miles. Rincon is bounded by I-25 to the north and east, NM-140 to the south, and unoccupied land to the west. The Burlington Northern & Santa Fe (BNSF) railyard is parallel to NM-140 on the southern boundary of Rincon. Figures 1 and 2 show the location and vicinity, respectively.

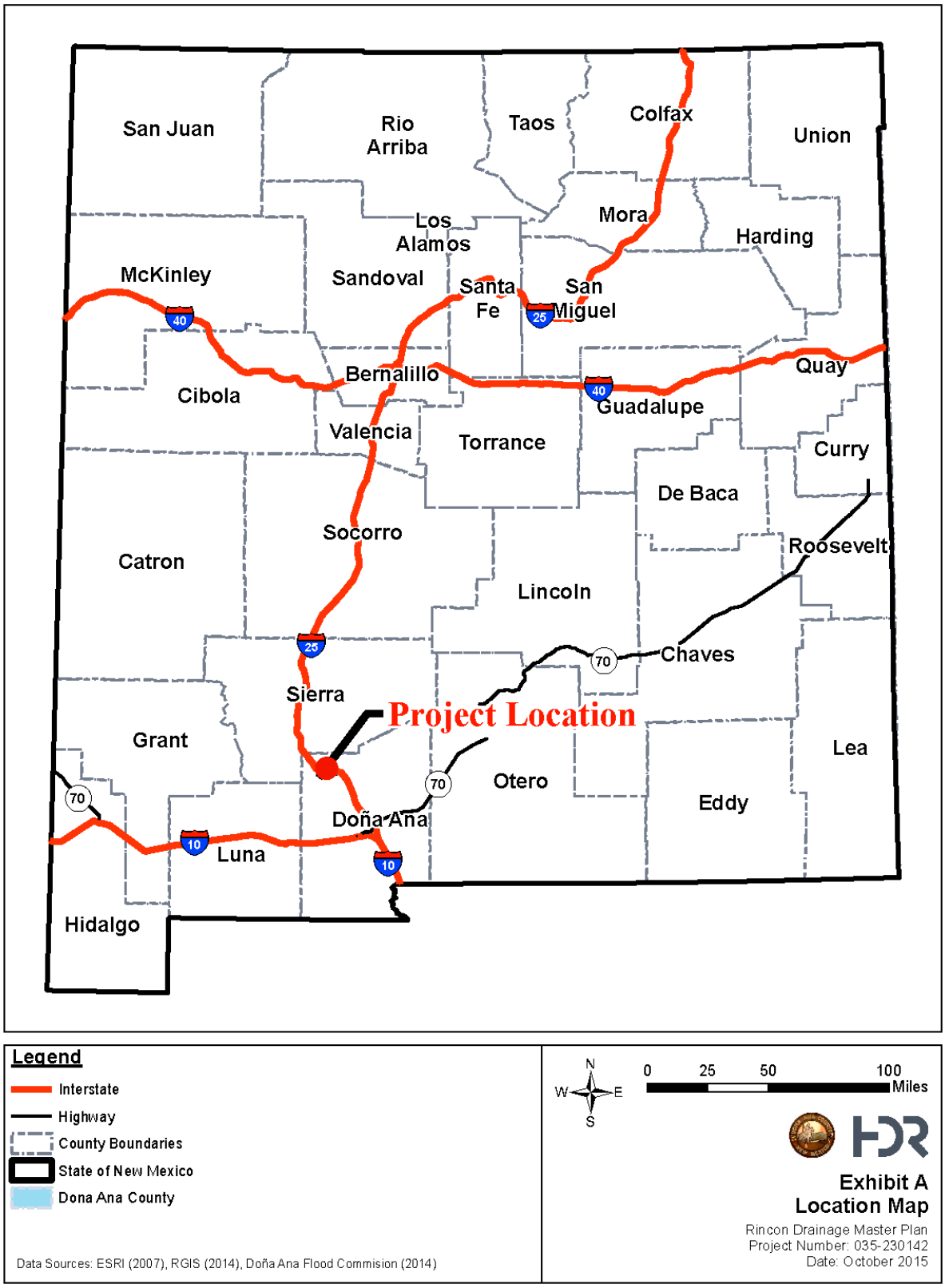



**Figure 1 – Location Map**

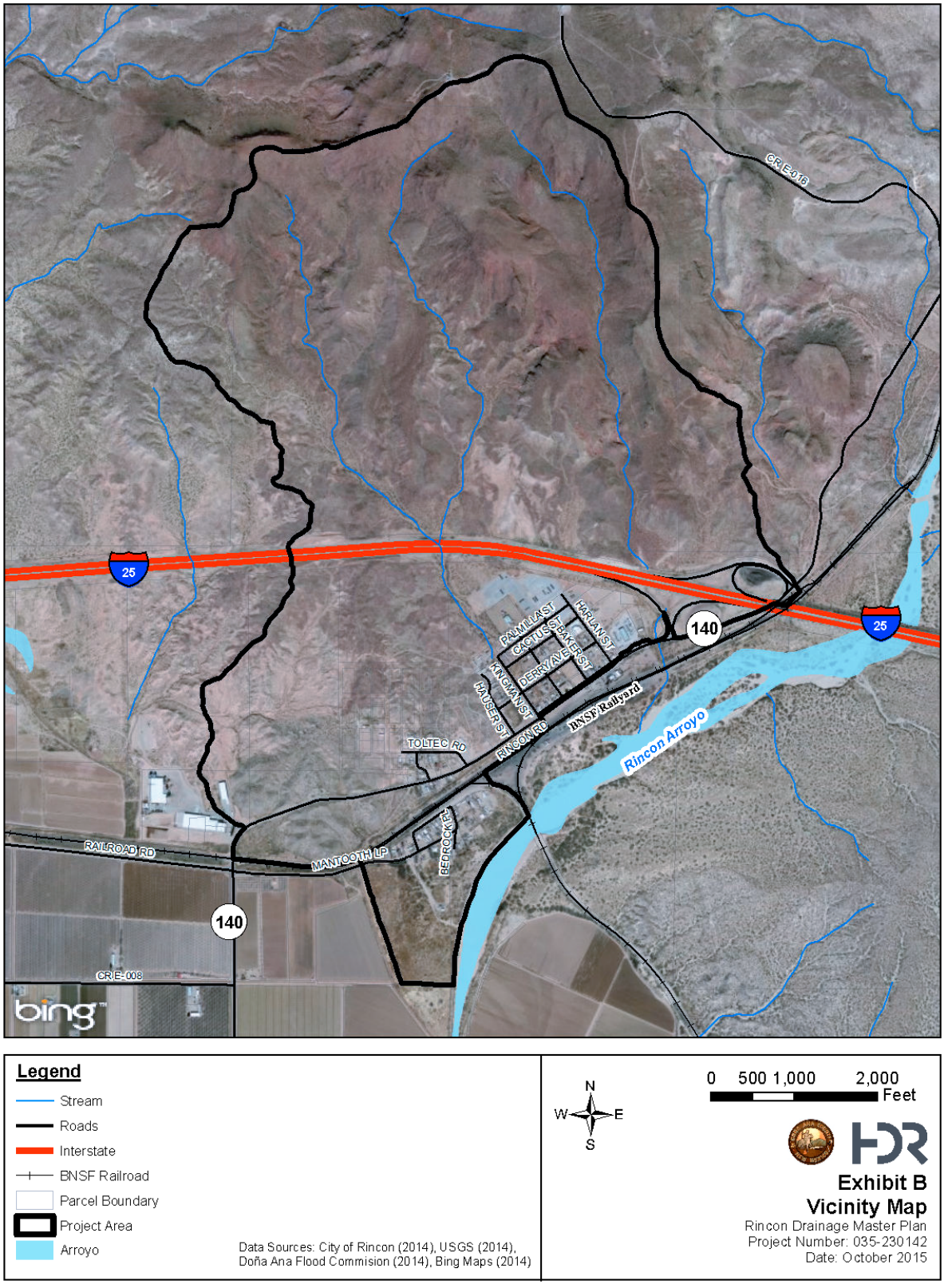



**Figure 2 – Vicinity Map**

Rincon lies within the northeastern limits of the El Paso-Las Cruces watershed, as identified by the Natural Resources Conservation Service (NRCS). The assessment provided in this study extends beyond the limits of the developed areas of Rincon to include areas identified as the Foothills and Offsite drainage areas (see Figure 3). Several areas were identified with specific and individual characteristics that contribute to the overall conditions affecting drainage within the Rincon limits. Each individual region is discussed further in the text that follows.

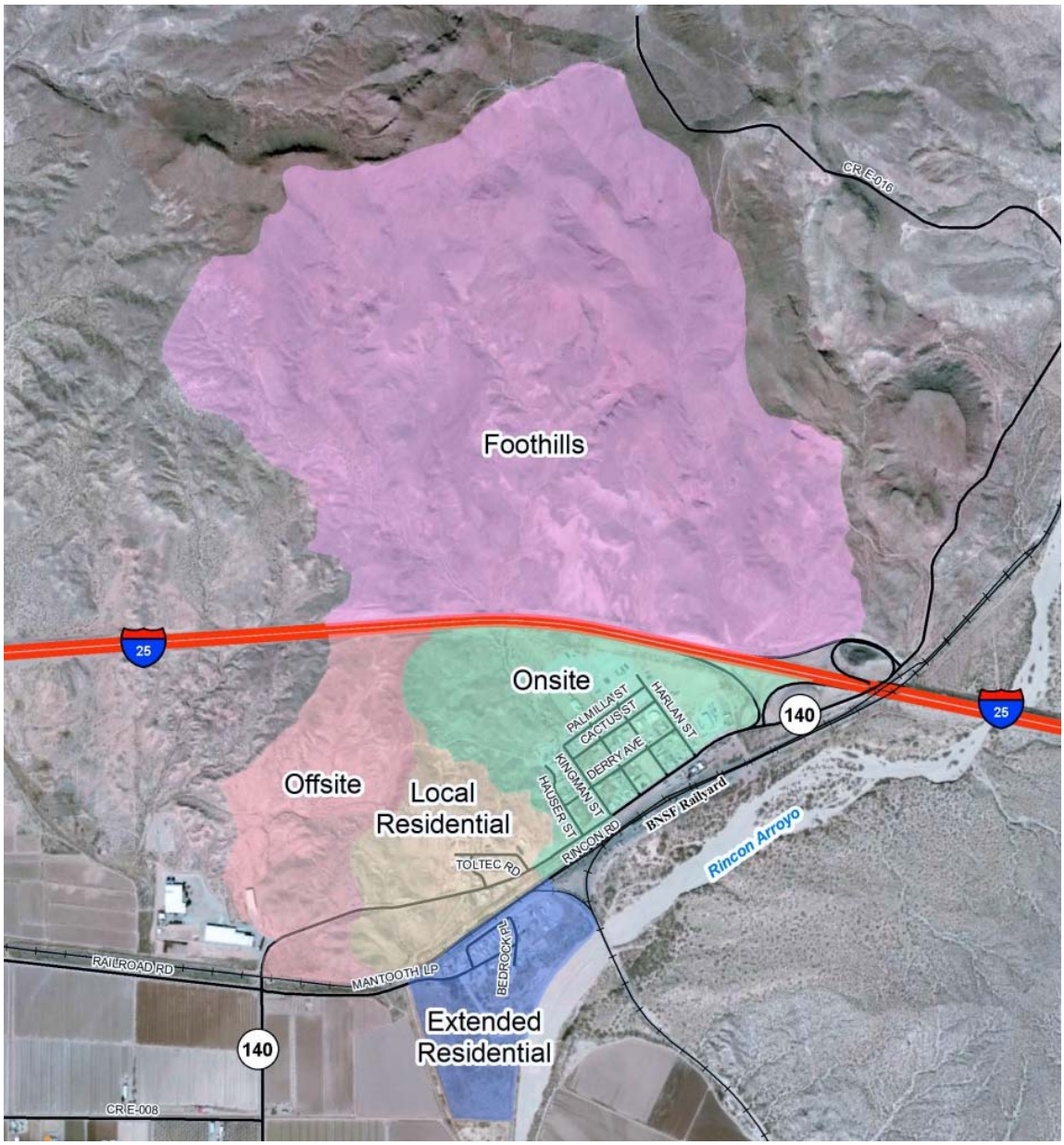



**Figure 3 – Assessment Limits Map**

## *Foothills*

As shown in Figure 4, the Foothills area encompasses the steeper, undeveloped area north of I-25. The farthest upstream portion of the region contains rocky outcroppings on steep slopes that appear to be relatively stable land formations. Slope gradient of the surrounding terrain tends to decrease from north to south. Vegetation in the Foothills area is classified as Desert Shrub, with limited impervious area ranging between 0.2 and 1.9 percent. Flow regimes in the Foothills area are classified as Small Upland Gullies in the upper regions, Shallow Concentrated flow near the hill bases, and Channel/Pipe Flow in the flatter channelized areas just upstream of I-25. Foothills drainage accumulating north of I-25 is conveyed to the south through both box and pipe culverts and enters into the community of Rincon.



**Figure 4 – Foothills Area**

## *Onsite*

Land use in the community of Rincon primarily consists of single-family residences, with two commercial businesses and agricultural fields. Drainage improvements within the community are limited to the culvert installations on private property and two minor retention areas just south of I-25. Several crossing culverts exist under NM-140 at the eastern limits of the Onsite area.

Retention Basin 1, located on private property, collects runoff from a 30-inch-diameter culvert under I-25 and overflows to the west through an abandoned site previously leased to FEMA. Overflow appears to drain to a natural tributary of the Rincon Arroyo along the southwestern limits of the Onsite area. Retention Basin 2 drains to a system of open channels and pipe crossings draining to the southwest through the uninhabited FEMA site. Both the surface and piped flow converge into an existing earthen channel that traverses through several private residential properties. Flows are conveyed to the south and southwest until reaching an existing at-grade crossing at NM-140 and Hauser Street.

The Rincon Arroyo, southeast of the study area, and the existing tributary that parallels Kingman Street are designated FEMA Zone A floodplains. Zone A designated floodplains are defined as areas that are of concern for inundation during a 100-year flood event; however, no water surface elevations are provided. Refer to Section 5.0 for further FEMA information and to **Appendix E** for a copy of the effective FEMA Zone A floodplain delineation. The portion of the Rincon tributary through the community is downstream of a 10-foot rise × 8-foot span reinforced box culvert (RBC). As shown in Figure 5, private development adjacent to the tributary has encroached into the banks of the arroyo and has limited its conveyance capacity. To stabilize scouring, wood pallets, concrete rubble, and tires have been placed along banks near homes and private fences and walls.

The development of Rincon and the removal of the previous DACFC berm has allowed the drainage of the residential area to drain from northeast to southwest, with flows concentrating within street sections as they are conveyed to their outfalls at NM-140.



**Figure 5 – Tributary Encroachment**

## *Local Residential*

Local residential drainage is received from the area west of Hauser Street, south of I-25, north of NM-140, and east of the BNSF and Mantooth Loop bridges. Drainage is conveyed generally from north-to-south through the residential areas north of NM-140, in the vicinity of Inca Street and Toltec Road. The local residential drainage is conveyed—via roadside ditches and natural swales—along NM-140. Drainage is diverted south toward the BNSF rail through a series of culverts including a 36-inch culvert near the intersection of NM-140and Toltec Road, a 36-inch culvert west of Inca Street, and both a 42-inch and 36-inch culvert farther west of the Rincon CDP limits. A levy north of the BNSF railyard protects the railway from flooding and diverts the accumulated flow into an existing drainage channel. The channel conveys flow to the southwest to the existing BNSF bridge located approximately 2,800 feet west of the railyard. All flows from the local residential area are concentrated at the BNSF bridge, conveyed toward an existing diversion channel, and routed to the south to the Rincon Arroyo.

Construction by residents and a lack of maintenance has created drainage issues in the Rincon area. Residents clear and grub the land around their properties to prevent growth of weeds, creating loosely compacted soils that are susceptible to erosion. These activities, along with naturally occurring sediment transport in the surrounding watershed(s), have contributed to a reduced capacity of the drainage infrastructure because of clogged inlets and outlets. Additionally, inadequate maintenance of the swales along NM-140 has led to reduced conveyance capacity and an inability to properly contain and route the developing local peak discharges.

## *Extended Residential*

Extended residential refers to an isolated pocket of residential developments south and west of the BNSF railyard, north of the Rincon Arroyo and east of the existing diversion channel. The northern portion of the extended residential area drains east-to-west through unimproved roadways and concentrates on Mantooth Loop just east of the intersection with Sabertooth Lane. Flows concentrated on Mantooth are then conveyed south toward the Rincon Arroyo. The eastern area naturally drains northeast-to-southwest before it concentrates near the wastewater treatment facility and flows to the south to contribute back into the Rincon Arroyo.

### *Offsite*

Historically the Rio Valley Chili (RVC) plant, west of Rincon, has been affected by offsite drainage developing directly east and northeast of the RVC. The watershed runoff is diverted by a human-made berm extended along on the northeast property boundary of the RVC plant. The berm diverts offsite flows toward a culvert crossing at NM-140. As headwater elevations increase, breached flow is conveyed along the NM-140 roadway edge with additional grading, berms, and culverts at the property access location. The accumulated flows concentrate at the intersection of NM-140 and the BNSF railway, with no clear outfall other than overtopping NM-140 toward the west. Reference Exhibit A, Existing Drainage Features, in **Appendix H**.

# 3.0 Data Collection Summary

Information was obtained from a variety of sources, including (but not limited to) NMDOT, Doña Ana County, and field observations. The information collected includes as-built plans for I-25 and sewer and water infrastructure for Rincon, records of flooding complaints from residents, topographic mapping, and site photographs.

## 3.1 GIS Data

GIS data was provided by Doña Ana County to assist in generating hydrologic and hydraulic models. Information obtained includes:

- Digital Elevation Model (DEM) in GeoTIFF format (2010)
- Digital Terrain Model (DTM) points and breaklines in ASCII format (2010)
- Aerial photography (2010)
- 2-foot topographic contours (2010)
- Building footprints with parcel information such as owner, address, and value (2014)

## 3.2 As-built Documentation

As-builts were obtained through NMDOT for I-25 and NM-140. In addition, ROW plans were collected for determining limits and the original planning intent. As-built information provided existing pipe locations, sizes, and slopes to support the planning-level analysis. Utility as-builts for sewer and water were provided by Doña Ana County. As-builts were not requested for private utilities.

## 3.3 Review of Previous Studies

At the time of this study, previous studies and drainage analyses were not readily available for reference. Future assessment in Rincon should incorporate new elements to complete evaluation and potential impacts on the validity of the preferred alternative(s).

## 3.4 Field Review

In April 2014, a field review was conducted to assess current drainage conditions in Rincon, the foothills, and offsite areas. Photographs of existing drainage features are provided in **Appendix G.** During the field review, drainage issues were identified. Existing flowpaths and points of concentration were also identified.

During field review, it was observed that several residents have placed fill and a variety of different objects in the drainage pathways to either prevent erosion or to redirect floodwaters. In effect, they have altered the flow paths, creating flooding problems for neighboring properties. Various crossing structures constructed by residents for access to homes have limited the natural conveyance capacity as well. Soil deposition was observed within many of the culverts, which serve as drainage conduits for

Doña Ana County, with additional deposits made by residents who have built into and over the channels to access their properties.

Large amounts of sediment deposits were observed within several pipe culverts under I-25 and, therefore, a significant reduction in the conveyance capacity of these drainage features can be expected until sufficient hydraulic upstream head flushes the sediment through the pipe and downstream or until overtopping at the crossing occurs.

## 3.5 Survey and Mapping

Doña Ana County collected and provided 2-foot topographic mapping to assist in the evaluation of the hydrologic watershed, flowpaths, routing, and both natural and human-made channels. The topographic information was provided by Bohannan-Huston, Inc., at a resolution of +/- 1.3 feet horizontal and +/- 1.15 feet vertical from LiDAR. The data provided by Doña Ana County additionally include GIS surface model data such as the DEM, DTM, and slope of the ground surface in the surrounding area.

# 4.0 Public Involvement

To assist in the development of the DMP and Capital Projects Plan, HDR and DACFC held two public meetings at the Rincon Community Center. Meetings were conducted on May 28 and November 12, 2014. Study details were provided by the team, and residents had the opportunity to share their concerns about flooding, soil erosion, sediment transport, and site access. Three residents attended the meetings. Verbal comments were collected. The following are comments/concerns identified by meeting attendees:

- Ponding occurs at the intersections of Baker Street/Derry Avenue, Baker Street/ NM-140, and Corea Street/ NM-140.
- The existing natural channel along the southern side of NM-140from Harlan Street to Kingman Street is filled with sediment.
- Overtopping occurs along the natural channel between Cactus Street and Derry Avenue, along the eastern side of Kingman Street.
- Flooding occurs at the property on the northeastern corner of Derry Avenue and Corea Street.
- During storm events, the natural channel floods NM-140 east of the Hauser Street intersection, hindering access. Recurring maintenance is needed to remove debris and sediment deposited on NM-140 ROW.
- Roadway culverts need to be cleared because they are full of debris.
- Concern with maintenance of existing culverts under NM-140. Most are silted in and some are crushed.

Input from the public assisted HDR in identifying critical “slab on-grade” properties and locations of concern that were considered during the alternatives investigations of the DMP.

Refer to **Appendix I** for copies of the public involvement maps, record of public comments, and the resulting action items incorporated into this DMP.

# 5.0 Federal Emergency Management Agency (FEMA)

The community of Rincon is reflected in published results for "Incorporated Areas" of Doña Ana County, Community Number 350012, of the existing Flood Insurance Study (FIS). Rincon is within the effective Flood Insurance Rate Map 0250E. The initial National Flood Insurance Program date for the community of Rincon was January 3, 1975. The effective FIS date is September 27, 1991.

The unnamed natural channel adjacent to Kingman Street was identified as Zone A from I-25 to the crossing at NM-140. The Rincon Arroyo and the mapped area north to the BNSF railyard are also classified as an effective FEMA Zone A floodplain. Zone A refers to a flood zone where the 100-year floodplain is determined through approximate methods. As a result of this approach, flood elevations are not provided. The floodplain along the natural channel is an extension of the Zone A identified at the Rincon Arroyo. The approximate analysis does not account for the existing flood control berm on the right bank of the Rincon Arroyo, downstream of the rail bridge and directly adjacent to the extended residential area.

As shown in Figure 6, the Zone A delineation does not accurately reflect the existing floodplain corridor from both a topographic and aerial assessment.

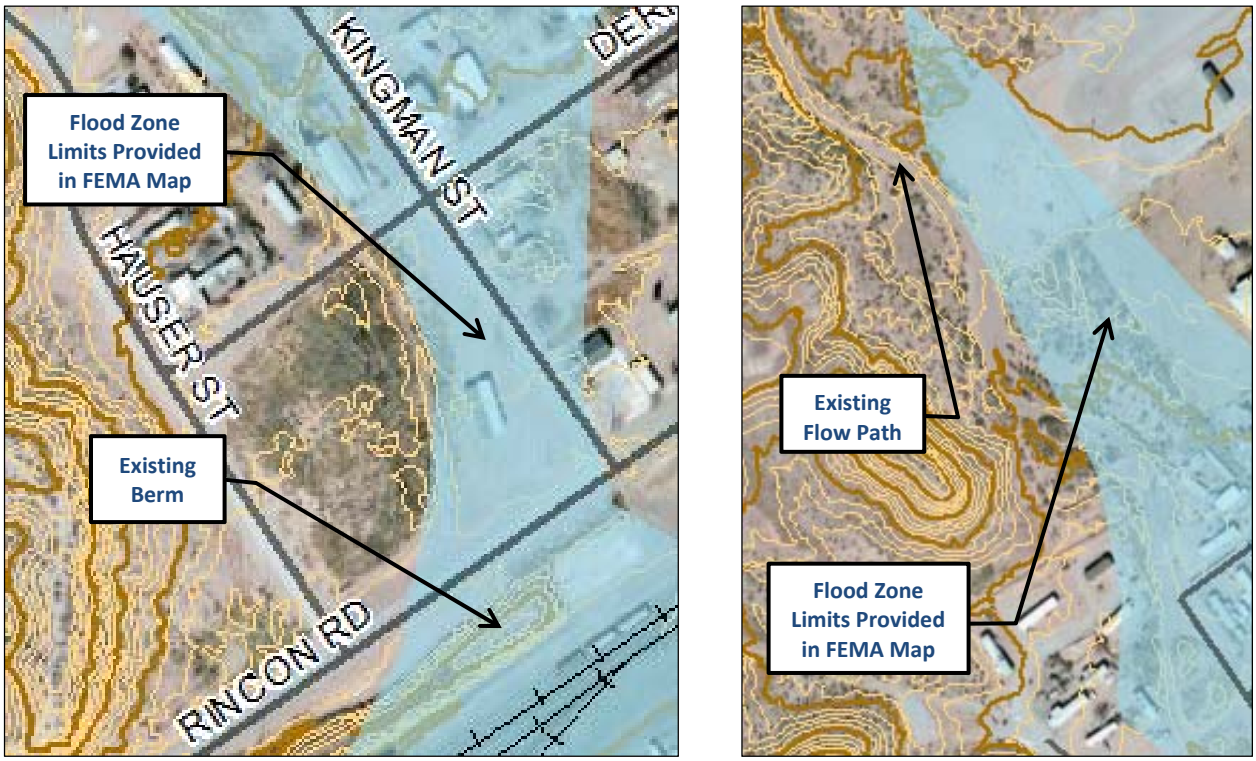



**Figure 6 – Comparison of Existing Contours and FEMA Flood Zone**

# 6.0 Hydrologic and Hydraulic Analysis

## 6.1 Hydrologic Analysis

Hydrologic analysis of the study area was conducted to provide an understanding of the existing runoff conditions for both the Offsite and Onsite areas. The analysis results were used within the hydraulic analysis to influence the development of proposed DMP elements discussed in later sections of this document.

### 6.1.1 Design Criteria

Table 2A of the NMDOT Drainage Design Criteria (NMDOT, 2007) specifies that collection and conveyance systems within all Interstate Highway and Primary Arterials are to be designed and checked for the 50- and 100-year recurrence interval storm events, respectively.

An initial analysis of the 50- and 100- year storm events and their respective impacts on the community was conducted. Results were presented to County staff, and a follow-up meeting was conducted.

#### *6.1.1.1 Design Criteria Modification*

A meeting was held with County staff on the June 25, 2014, to inform staff of the analysis results. During this meeting, resultant discharge values for the study area under the antecedent moisture conditions (AMC) II and III model scenarios were presented as well as comparisons of point precipitation data from the National Oceanic and Atmospheric Administration (NOAA) 14 Atlas. Upon review of these materials, the County provided the study team with direction to proceed with all subsequent hydraulic evaluations using the hydrology developed under the AMC II model scenario. The 25-year, 24-hour storm was designated as the design storm event. See **Appendix J** for excerpts from the meetings and results of the AMC II and III model comparisons.

### 6.1.2 Methodology

A hydrologic evaluation of the study area was employed to assess runoff conditions for all areas contributing runoff to the study area. Specifically, the analyses were developed to obtain both peak discharge rates and volumes associated with the 25-year, 24-hour recurrence interval storm event.

All hydrologic analyses were performed in accordance with the New Mexico State Highway and Transportation Department (NMSHTD) Drainage Manual (NMSHTD, 1995). Based on the small subbasin size, the rational method was chosen as the hydrologic method for all “Onsite” areas. The Soil Conservation Service (SCS) Unit Hydrograph method was found to be the most applicable hydrologic method for evaluating the “Offsite” areas. The following sections describe the methodology and assumptions pertaining to the two types of hydrologic analyses mentioned above.

#### *6.1.2.1 Offsite Areas*

As stated previously, the hydrologic analysis method chosen for the Offsite areas of the study area is the SCS Unit Hydrograph Method. The SCS curve number (CN) method and upland method were selected as the rainfall loss and hydrograph transformation methods, respectively.

Generation of the offsite hydrology for the existing condition was completed by developing a hydrologic model using the Hydrologic Engineering Center's Hydrologic Modeling System Version 3.4 (HEC-HMS) software, using the calculation methodologies discussed above. Specifically, the hydrologic model components consist of a "basin model" to describe the physical characteristics of the watershed, a "meteorologic model" to describe the characteristics of the selected rainfall data, and "control specifications" to define the temporal (duration and time step) elements of the model. The sections below describe the data collection, analysis, and assumptions associated with the development of each of these model components.

##### 6.1.2.1.1 Basin Model

The basin model generated for this study consisted of contributing drainage areas (subbasins), hydraulic conveyance features (routes), locations of flow confluence (junctions), storage areas (reservoirs), and outlets (sinks). This model has been prepared to reflect the 25-year, 24-hour storm event for consistency with the design standard. The ArcGIS Version 10.1 software was used to pre-process the physical data describing each subbasin. The initially developed model was refined by reviewing recent studies and site reconnaissance.

###### *6.1.2.1.1.1 Rainfall Loss*

For all subbasins, the SCS CN method was used as the rainfall loss method. Subbasin losses were calculated by generating representative values for CN and percentage impervious coverage. Generation of these values first required developing a land use dataset, which was completed using the ArcGIS software platform, because no previously developed GIS land use data were available. Through observation of available aerial imagery within the ArcGIS software environment, land cover in the study area was identified as primarily agricultural, residential, and commercial. In addition, data describing the Offsite area soils was obtained from the Soil Survey Geographic (SSURGO) database for Doña Ana County, New Mexico (NRCS, 2014). Soils within the study area were found to consist of Hydrologic Soil Groups (HSGs) A, B, and D. In **Appendix H,** Exhibit C (Soils Map) displays the extent of each HSG within the study area.

CN values were determined using Tables 3-1 and 3-4 of the NMSHTD Drainage Manual. To establish CNs for areas considered "Arid and Semiarid Rangeland," the "Hydrologic Soil – Cover Complexes and Associated Curve Numbers" (Figure 3-8 of the NMSHTD Drainage Manual) was used. The dominant cover type for the study area was the "Desert Shrub" classification. Using the relationships provided in the figure mentioned above, equations were developed to establish a representative CN value for this cover type per a given percentage ground cover and HSG.

To determine the composite CNs to be used within the HMS model, the directly connected impervious portion of each subbasin was extracted. This value includes all roadway surfaces as well as a portion of the residential areas within each subbasin that is considered as directly connected impervious area. For all urban areas, CN values were derived directly from Table 3-4. The observed land use category cover descriptions within the study area, along with their associated CN values, are presented in Table 1. Composite CN values were calculated for each subbasin.

**Table 1 – Subbasins and Composite Curve Numbers**

| Subbasin | Composite Curve Number | Subbasin | Composite Curve Number |
|---|---|---|---|
| F1 | 86 | R7 | 85 |
| F2 | 89 | R8 | 85 |
| F3 | 87 | R9 | 85 |
| F4 | 90 | R10 | 81 |
| F5 | 91 | R11 | 81 |
| F6 | 82 | R12 | 82 |
| F7 | 89 | R13 | 82 |
| F8 | 82 | R14 | 82 |
| F9 | 82 | R15 | 82 |
| R1 | 74 | R16 | 68 |
| R2 | 78 | R17 | 81 |
| R3 | 82 | R18 | 82 |
| R4 | 80 | R19 | 73 |
| R5 | 79 | R20 | 68 |
| R6 | 79 | R21 | 69 |

**Note: Results for AMC II Conditions**

Conservatively, the initial abstraction value was set to 0 inches for all subbasins within the model. This determination was made in consideration of the peak runoff being calculated during the wet season, and assumes the initial abstraction potential of the soil to be satisfied through antecedent rainfall events. **Appendix B** contains calculations for developing the composite CNs.

#### *6.1.2.1.1.2 Hydrograph Transformation*

For all subbasins, the upland method was used as the hydrograph transform method. To develop a representative unit hydrograph for each subbasin, the time of concentration and associated lag time were calculated as a scaling factor for the general hydrograph.

Calculations for time of concentration were completed using the upland method for sheet flow and shallow concentrated flow types. For channel flow, time of concentration was calculated using the stream hydraulic method. These methods were chosen based on the recommended methods for use with the unit hydrograph method as specified in Section 3.3.1.4 of the NMSHTD Drainage Manual (NMSHTD, 1995).

Flow paths extending from the most downstream point of the subbasin to the most hydraulically remote upstream point were developed through review of the available topographic data within the ArcGIS software. Flow segments were then delineated based on the criterion specified within the manual referenced above and review of the available aerial imagery. The dominant flow types found in the study area consisted of sheet flow, shallow concentrated flow, or channel flow. Determination of the flow type within each flow path was based on the overall length, changes in gradient, and aerial imagery.

Sheet flow was limited to a maximum length of 300 feet in accordance with the NMSHTD Drainage Manual. Shallow concentrated flow was determined to be the subsequent flow type for most subbasins. Channel flow was observed as either the secondary or tertiary flow type within subbasins where a defined conveyance was found to exist.

Velocity calculations for sheet flow and shallow concentrated flow types were completed using Figure 3-10 of the NMSHTD Drainage Manual. Specifically, this figure was used to build relationships for the "Fallow or Minimum Tillage Cultivation," Nearly Bare and Untilled," and "Paved Areas" ground cover conditions. Velocity calculations for this flow type were conducted using Manning's equation. Based on review of available aerial imagery, a Manning's roughness coefficient of 0.033 was attributed to all open channel conveyance elements, indicative of an "excavated or dredged channel with short grass, few weeds" (Chow, 1959).

Studies conducted by SCS have found that, for most cases, the subbasin lag time can be approximated as 60 percent of the calculated time of concentration. Thus, for this analysis, values have been calculated under that assumption. All documentation and supporting calculations for the development of the time of concentration values for each subbasin are provided in **Appendix B**.

#### *6.1.2.1.1.3 Hydraulic Conveyance (Routing)*

To represent the hydraulic conveyance features (river, stream, or ditch) within the study area, HEC-HMS "route" elements were introduced into the model to properly define the potential "throttling" of the discharge hydrograph as it travels through the system. A route naming convention was chosen to communicate the direction of flow throughout the system. Thus, all route names contain the downstream receiving model subbasin or node name appended to the upstream model subbasin or node name where flow within the route originates.

The Muskingum-Cunge hydrologic routing methodology was chosen for this portion of the analysis. ArcGIS was used to calculate the input data required to implement this method, consisting of total reach length and average reach slope.

An eight-point cross section was derived within the ArcGIS software using the available topographic data to provide the channel geometry necessary for hydraulic representation of each element. Additionally, average reach Manning's roughness values representative of the channel and left and right banks were estimated using the available aerial imagery and site reconnaissance photographs.

Locations of identified congregation of flows were represented within the model through a "junction" element. Inflow hydrographs from all upstream contributing model elements are collectively added at these locations and an outflow hydrograph is generated.

#### 6.1.2.1.2 Meteorological Model

Upon development of the model, a comparative analysis was conducted between the County-provided SCS Type-II, 75 modified rainfall distribution and the available distribution from NOAA Atlas 14 partial-duration rainfall data for the study area. The results from the analysis showed the peak flow estimates using the SCS modified rainfall distribution to be significantly greater than those values generated using the available NOAA rainfall data for the study area. Based on consideration of the proximity of the rain gages to the study area as well as the more recent data used to develop the NOAA data, it was recommended that the study use the NOAA duration-precipitation-depth-data for the study hydrologic evaluation. This information, along with the results from the analysis described above, was shared with the client, and the determination was made to modify the representation of magnitude and temporal distribution of rainfall within the model.

The meteorological model was developed using the "Frequency Storm" method. This model type produces a synthetic storm from statistical precipitation data. Specifically, partial-duration rainfall data for the 5- and 15-minute, as well as the 1-, 2-, 3-, 6-, and 12-hour durations associated with the study area were used. The storm intensity position was set at 50 percent, with the storm area assumed to be the entire study area of 1.618 square miles.

#### 6.1.2.1.3 Control Specifications

Control specifications were developed to ensure proper simulation of each model scenario. Specifically, the specifications were constructed to provide consistent simulation of the meteorological model discussed in the previous section.

To provide consistency with the selected storm duration of 24 hours, the control specification generated for use with this meteorological model was set to provide a model simulation of 24 hours. The time interval used for the simulation was 1 minute.

### 6.1.3 Onsite Areas

As discussed previously, the rational method was used to conduct the hydrologic evaluations of select Onsite areas where a higher level of resolution was desired. The methodology for conducting the evaluation follows the procedures defined within Section 3.3.2 of the NMSHTD Drainage Manual. Calculating runoff using the rational method consists of three input parameters: subbasin area (in acres), dimensionless runoff coefficient ("C"), and rainfall intensity (in inches per hour). Development of the input parameters discussed above is provided in the following sections.

#### 6.1.3.1 Subbasin Area

Delineation of the subbasin areas associated with this analysis was conducted using the same methodologies as for the Offsite areas analysis, as described in Section 6.1.2.1.

#### 6.1.3.2 Runoff Coefficient

Development of rational "C" coefficient values was completed in accordance with the methodology prescribed within the NMSHTD Drainage Manual, Section 3.3.2, Figures 3-11 to 3-16. For this analysis, cover types were categorized as either "Upland Rangeland "(Grass & Brush)" or "Developed Watersheds." Thus, Figures 3-11 and 3-16 were used to determine values for the study area.

The rainfall depth associated with the 100-year recurrence interval storm event with a partial duration of 1 hour is required to make the determination of a representative "C" value for both cover type categories. To establish this value, point-precipitation-frequency data were obtained from NOAA Atlas 14, Volume 1, Version 5. The 100-year, 1-hour rainfall depth for the project area was found to be 2.27 inches. NOAA Atlas 14 data are provided in **Appendix B**.

For the portions of each subbasin considered to be within the "Upland Rangeland "(Grass & Brush)" subbasin location category, "C" values were determined through reading a value from Figure 3-11 upon establishing the intersection between the 100-year, 1-hour rainfall depth and the representative curve for a specified combination of HSG and percentage ground cover. Using the relationships defined in Figure 3-11, equations were developed to define "C" values for combinations for which the value is not provided.

For areas within the "Developed Watersheds" subbasin location category, "C" values were determined in a similar manner as described above, but using Figure 3-14. Specifically, a "C" value was determined upon establishing the intersection between the 100-year, 1-hour rainfall depth and the representative curve for a specified type of development.

The composite "C" value for each subbasin was then developed by calculating a weighted average of all values and associated areas represented within each subbasin. Table 2 summarizes the rational method "C" values as developed within this report. All documentation and supporting calculations for developing the rational "C" coefficient values for each subbasin are provided in **Appendix B**.

**Table 2 – Subbasins and Rational "C" Values**

| Subbasin | "C" Value | Subbasin | "C" Value |
|---|---|---|---|
| RN1 | 0.44 | RN15 | 0.60 |
| RN2 | 0.56 | RN16 | 0.68 |
| RN3 | 0.50 | RN17 | 0.61 |
| RN4 | 0.47 | RN18 | 0.60 |
| RN5 | 0.44 | RN19 | 0.60 |
| RN6 | 0.88 | RN20 | 0.62 |
| RN7 | 0.69 | RN21 | 0.62 |
| RN8 | 0.49 | RN22 | 0.61 |
| RN9 | 0.51 | RN23 | 0.47 |
| RN10 | 0.52 | RN24 | 0.61 |
| RN11 | 0.57 | RN25 | 0.58 |
| RN12 | 0.68 | RN26 | 0.19 |
| RN13 | 0.61 | RN27 | 0.31 |
| RN14 | 0.51 | RN28 | 0.25 |

#### *6.1.3.3 Rainfall Intensity*

Developing the rainfall intensity parameter required generating intensity-duration-frequency curves for the 5-, 10-, 25-, 50-, and 100-year recurrence interval storm events. Generation of each curve used the NOAA Atlas 14 partial duration point precipitation frequency estimate values for partial storm durations of 5, 10, 15, 30, and 60 minutes. The curves developed for the recurrence interval storms mentioned above are provided in Figure 7. The logarithmic trend was found to provide the best fit to the data, and was therefore fit to each data set to provide a representative equation to be used in calculating representative rainfall intensity values. Ultimately, time of concentration values were entered into each of the equations discussed above to produce the rainfall intensity values used in the calculation for discharge values for each subbasin.

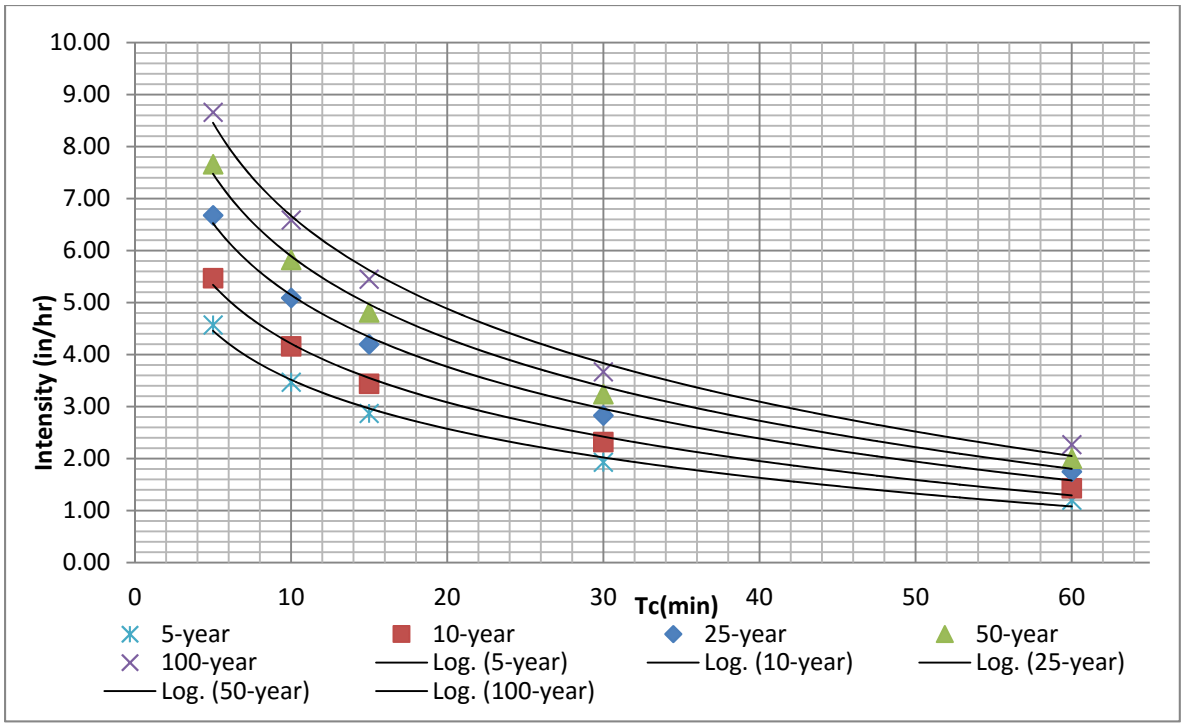



**Figure 7 – Intensity-Depth Duration Curves**

### *6.1.3.4 Offsite Areas*

Resulting subbasin peak discharge and associated volume values for Offsite areas are provided in Table 3. All basin peak discharges are based on an AMC II condition. See **Appendix B** for output results from the HMS modeling.

**Table 3 – Offsite Analysis Results for the 25-year, 24-hour Event**

| Basin | Drainage Area (square miles) | Peak Discharge (cubic feet per second) | Time to Peak (hours) | Volume (acre-feet) |
|---|---|---|---|---|
| F1 | 0.374 | 397 | 12:22 | 26.9 |
| F2 | 0.241 | 293 | 12:22 | 20.1 |
| F3 | 0.026 | 47 | 12:10 | 2.0 |
| F4 | 0.063 | 123 | 12:10 | 5.6 |
| F5 | 0.232 | 254 | 12:29 | 21.4 |
| F6 | 0.012 | 21 | 12:05 | 0.7 |
| F7 | 0.100 | 167 | 12:13 | 8.3 |
| F8 | 0.141 | 90 | 12:35 | 8.4 |
| F9 | 0.026 | 33 | 12:11 | 1.5 |

#### 6.1.3.5 *Onsite Areas*

Resulting subbasin peak discharge and associated volume values for designated Onsite areas are provided in Table 4.

**Table 4 – Onsite Analysis Results for the 25-year, 24-hour Event**

| Basin | Drainage Area (square miles) | Peak Discharge (cubic feet per second) | Time to Peak (hours) | Volume (acre-feet) |
|---|---|---|---|---|
| R1 | 0.007 | 10 | 12:06 | 0.4 |
| R2 | 0.008 | 10 | 12:09 | 0.5 |
| R3 | 0.076 | 102 | 12:10 | 4.5 |
| R4 | 0.022 | 21 | 12:17 | 1.3 |
| R5 | 0.007 | 9 | 12:08 | 0.4 |
| R6 | 0.011 | 20 | 12:06 | 0.7 |
| R7 | 0.014 | 26 | 12:09 | 1.1 |
| R8 | 0.005 | 10 | 12:08 | 0.4 |
| R9 | 0.004 | 7 | 12:09 | 0.3 |
| R10 | 0.013 | 26 | 12:05 | 0.9 |
| R11 | 0.023 | 26 | 12:13 | 1.3 |
| R12 | 0.011 | 19 | 12:06 | 0.6 |
| R13 | 0.023 | 34 | 12:10 | 1.5 |
| R14 | 0.032 | 38 | 12:13 | 1.9 |
| R15 | 0.016 | 26 | 12:07 | 0.9 |
| R16 | 0.008 | 6 | 12:05 | 0.2 |
| R17 | 0.014 | 19 | 12:09 | 0.8 |
| R18 | 0.015 | 21 | 12:09 | 0.9 |
| R19 | 0.025 | 15 | 12:24 | 1.2 |
| R20 | 0.030 | 8 | 12:38 | 0.9 |
| R21 | 0.039 | 6 | 13:15 | 1.0 |

## 6.2 Hydraulics

A hydraulic assessment of select open and closed conveyance features within the study area was conducted to provide an understanding of the system's hydraulic constraints and deficiencies under existing conditions for both the Onsite and Offsite areas. Specifically, the analysis was developed to evaluate the specific conveyance features for their ability to convey the 25-year recurrence interval design storm event. All analyses were conducted in accordance with Doña Ana County Design Storm Criteria Guidelines for Commercial and Residential Sites (2014), with Custom variances as approved in writing by the Commission (2015).

The following sections provide a discussion of the methodology, analysis, and results from the hydraulic evaluation discussed above.

### 6.2.1 Methodology

#### *6.2.1.1 Conveyance Feature Selection*

Existing conveyance features were selected for evaluation based on their level of functionality within the system and ownership. Specifically, all features conveying flow from the Offsite portion of the study area (north of I-25) to the Onsite portion were evaluated. Additionally, several open and closed conveyances—considered to be significant conveyance components of the system—were evaluated. Privately owned conveyance features were not included in this evaluation. Exhibit A (Existing Drainage Features Map) in **Appendix H** displays the hydraulic features and associated identification for which capacity evaluations were conducted.

#### *6.2.1.2 Evaluation Criterion*

All conveyance features discussed above were evaluated to assess their ability to convey the peak discharge associated with the 25-year, 24-hour recurrence interval storm.

### 6.2.2 Hydraulic Analysis

#### *6.2.2.1 Closed Conveyance*

Closed conveyance features included in this evaluation consisted of box culverts, circular culverts, and underground conveyance pipe. Eighteen closed conveyance features were evaluated. Specifically, nine features are in the Offsite area and the other nine are in the Onsite area.

##### 6.2.2.1.1 Model Development

Hydraulic evaluation of all closed conveyance features was conducted using the HY-8 version 7.1 software. Input parameter categories consisted of the following data types: discharge, tailwater, roadway, culvert, and site.

Input parameters for the discharge data consisted of a minimum, design, and maximum flowrate. According to the direction of County staff, the design discharge values used for the analysis resulted from the hydrologic analysis from the AMC II model scenario. Minimum and maximum discharge values were estimated at 80 and 120 percent of the design discharge, respectively.

Tailwater input data consisted of specifying the downstream channel type and geometry. The downstream channel type was specified as irregular for all models. Representative channel cross section geometry was constructed by reviewing the best available topographic data and site reconnaissance photos.

Roadway input consisted of roadway elevation, crest length, crest elevation, surface type, and top width. Representative roadway data were obtained through review of the available as-built information and supplemented with the best available topographic data and aerial imagery within GIS.

Culvert input data consisted of shape, material, diameter, embedment depth, roughness coefficient, inlet type, and inlet edge condition. Representative culvert data were acquired through review of available as-built information and documentation (photos and data) generated during site reconnaissance.

Input for the "Site" category consisted of inlet station, outlet station, inlet elevation, outlet elevation, and number of barrels. Specifically, the inlet and outlet station are entered to define the length of the culvert. Available as-built information, site reconnaissance photos, and topographic GIS data were reviewed to develop the input data described above.

All input data are provided within the hydraulic calculations; see **Appendix C** for further details.

#### *6.2.2.2 Open Channel Conveyance*

All features evaluated were within the specified Onsite portion of the study area.

##### 6.2.2.2.1 Model Development

Hydraulic evaluation of all open channel conveyance features was conducted using the Bentley FlowMaster V8i software. Similar to the closed conveyance features, various input parameters were required to develop the hydraulic model for each feature. Specifically, the input parameters consisted of the following data: channel geometry, main channel roughness coefficient, left and right overbank roughness coefficient, and channel slope.

All features discussed above were included in the HMS model. Thus, input data for these features were taken directly from the associated route data inputs for the HMS model. All input data described above are provided in **Appendix C**.

### 6.2.3 Results

The following sections provide the results from hydraulic analyses performed for the study. Specifically, results from the open and closed conveyance evaluations conducted are discussed.

#### *6.2.3.1 Closed Conveyance*

Tables displaying results for total discharge, culvert discharge, headwater elevation, inlet control depth, flow type, normal depth, critical depth, outlet depth, tailwater depth, outlet velocity, and tailwater velocity for each of the closed conveyance features discussed above are provided in **Appendix C**. In addition, a plot showing the performance curve for each feature is provided in the associated table. Table 5 on the following page summarizes the results from the existing hydraulic analysis.

**Table 5 – Results of the Existing Hydraulics Analysis**

| Culvert | Description | Inlet Invert (feet) | Outlet Invert (feet) | HW (feet) | HW/ D | Road Crown (feet) | Velocity Out (feet/ second) | Overtop Road[1] | Overtop Road (Sediment)[2] |
|---|---|---|---|---|---|---|---|---|---|
| 59 | 24 inch | 4101.15 | 4100.00 | 4103.25 | 1.05 | 4112.00 | 5.27 | No | No |
| 57 | 30 inch | 4092.72 | 4088.90 | 4094.32 | 0.64 | 4102.00 | 4.94 | No | No |
| 56 | 36 inch | 4088.50 | 4084.98 | 4101.2 | 4.23 | 4101.00 | 9.84 | Yes | Yes |
| 55 | 54 inch | 4092.08 | 4087.80 | 4093.98 | 0.42 | 4099.00 | 5.52 | No | No |
| 54 | 54 inch | 4092.52 | 4090.74 | 4099.25 | 1.50 | 4099.00 | 9.39 | Yes | Yes |
| 60 | 42 inch | 4092.83 | 4090.74 | 4100.13 | 2.09 | 4100.00 | 8.98 | Yes | Yes |
| 61 | 30 inch | 4095.08 | 4091.80 | 4100.06 | 1.99 | 4100.00 | 7.53 | Yes | Yes |
| 62 | 30 inch | 4097.98 | 4090.92 | 4110.35 | 4.95 | 4110.00 | 9.94 | Yes | Yes |
| 63 | 8×10 RCB | 4098.18 | 4094.65 | 4103.83 | 0.71 | 4115.00 | 18.42 | No | No |
| 53 | 3-6×3 RCB | 4080.50 | 4080.31 | 4083.52 | 0.50 | 4085.00 | 5.66 | No | Yes |
| 52 | 3-6×3 RCB | 4076.00 | 4075.50 | 4078.96 | 0.49 | 4081.00 | 10.30 | No | Yes |
| 58 | 24 inch | 4080.12 | 4080.00 | 4084.78 | 2.33 | 4085.00 | 6.80 | No | No |
| 66 | 36 inch | 4074.08 | 4073.15 | 4078.86 | 1.59 | 4078.50 | 9.56 | Yes | Yes |
| 70 | 36 inch | 4060.53 | 4057.50 | 4062.77 | 0.75 | 4068.00 | 14.38 | No | No |
| 75 | 36 inch | 4059.67 | 4055.72 | 4062.50 | 0.94 | 4066.00 | 16.51 | No | No |
| 76 | 42 inch | 4061.05 | 4056.71 | 4063.82 | 0.79 | 4072.00 | 16.40 | No | No |
| 78 | 36 inch | 4066.06 | 4063.24 | 4068.46 | 0.80 | 4084.00 | 13.81 | No | No |

**Notes: 1) Modeled without sediment**
**2) Modeled with sediment up to elevation as indicated from field survey**

For all proposed conditions HY8 models were developed to ascertain hydraulic performance including freeboard, velocities, and efficiency. Table 6 on the following page summarizes the results. For additional results and input parameters, reference **Appendix D**.

**Table 6 – Proposed Conditions Hydraulic Analysis**

| Culvert | Description | Inlet Invert (feet) | Outlet Invert (feet) | HW (feet) | HW/D | Road Crown (feet) | Velocity Out (feet/ second) | Overtop Road[1] |
|---|---|---|---|---|---|---|---|---|
| **Modified 58** | **2-24 inch** | **4079.00** | **4078.63** | **4080.93** | **0.96** | **4082.00** | **4.35** | No |
| **Factory – under NM-140** | **3-36 inch** | **4046.00** | **4045.50** | **4049.25** | **1.08** | **4050.00** | **4.45** | No |
| **West Channel** | **3-10X4 RCBs** | **4059.00** | **4058.55** | **4063.04** | **1.01** | **4064.00** | **5.47** | No |

**Note: 1) Modeled without sediment**

#### *6.2.3.2 Open Channel Conveyance*

Tables displaying results for discharge, flow area, wetted perimeter, hydraulic radius, top width, normal depth, critical depth, critical slope, velocity, Froude number, and flow type for each of the open channel conveyance features discussed above are provided in **Appendix C**. In addition, a plot showing the rating curve for each feature is provided in the associated table. Results of the analysis of the open channel conveyance features discussed above are provided in **Appendix C**

Table 7 summarizes the existing channel conditions for the western channel.

**Table 7 – Existing Normal Depth Conditions for Western Channel**

| Channel | ID | Dimensions | Flow (cubic feet per second) | Slope (foot/foot) | Depth (feet)[1] | Velocity (feet/sec) |
|---|---|---|---|---|---|---|
| **West Channel** | **11+05** | **Natural** | **731** | **0.0114** | **1.96** | **5.12** |
| | **7+40** | **Natural** | **731** | **0.0174** | **0.71** | **4.42** |
| | **5+55** | **Natural** | **731** | **0.0174** | **2.54** | **7.21** |
| | **2+88** | **Natural** | **731** | **0.0174** | **1.34** | **3.62** |
| | **D/S of NM-140[1]** | **Natural** | **150** | **0.0080** | **2.00** | **4.17** |

**Note: 1) Maximum depth before overtopping**

Table 8 summarizes all proposed features were modeled to assess proposed conditions and recommendations for erosion protection and/or other hydraulic features.

**Table 8 – Summary of Proposed Conditions Normal Depth Assessment**

| Channel | Cross Section ID | Bottom Width (feet) | Side Slopes | Depth (feet) | Flow (cubic feet per second) | Slope (foot/foot) | Flow depth (feet) | Velocity (feet/second) |
|---|---|---|---|---|---|---|---|---|
| West Channel | 11+05 | 40 | 6:1 | 3.00 | 650 | 0.0154 | 2.12 | 5.83 |
| | 7+40 | 35 | 6:1 | 2.62 | 650 | 0.0154 | 2.25 | 5.93 |
| | 5+55 | 25 | 4:1 | 3.47 | 650 | 0.0154 | 2.71 | 6.59 |
| | 2+88 | 30 | 6:1 | 3.58 | 650 | 0.0154 | 2.40 | 6.05 |
| | D/S of NM-140 | 20 | 4:1 | 4.00 | 618[1] | 0.0050 | 3.42 | 5.37 |
| East Channel | 1 | 20 | 4:1 | 7.00 | 47 | 0.0030 | 1.21 | 1.56 |
| | 2 | 20 | 4:1 | 36.13 | 170 | 0.0030 | 2.68 | 2.07 |
| | 3 | 15 | 4:1 | 5.04 | 170 | 0.0030 | 3.00 | 1.90 |
| | 4 | 15 | 3:1 | 9.52 | 170 | 0.0030 | 3.18 | 2.17 |
| | 5 | 15 | 2:1 | 13.93 | 170 | 0.0030 | 3.27 | 2.41 |
| | 6 | 15 | 2:1 | 11.24 | 170 | 0.0030 | 3.28 | 2.44 |
| | 7 | 15 | 2:1 | 10.87 | 170 | 0.0030 | 3.27 | 2.41 |
| | 8 | 15 | 2:1 | 5.10 | 170 | 0.0030 | 2.36 | 2.90 |
| | 9[2] | — | — | — | 338 | 0.0030 | 2.97 | 3.54 |
| Roadside Ditch | I-25 on-ramp | — | 2:1 | 1.50 | 10 | 0.0165 | 1.18 | 3.57 |
| | I-25 on-ramp | — | 2:1 | 1.00 | 6 | 0.0400 | 0.80 | 4.64 |
| | North of NM-140 | — | 2:1 | 2.50 | 40 | 0.0060 | 2.41 | 3.45 |
| | Factory | — | 2:1 | 3.50 | 90 | 0.0067 | 3.20 | 4.40 |

**Note: 1) Assumes attenuation in proposed detention basin upstream of NM-140**
**2) Existing cross section at upstream side of culvert under NM-140**

# 7.0 Capital Projects Plan

## 7.1 Alternatives Development

Analysis prepared within the DMP has been developed to support mitigating existing drainage system deficiencies while developing a prioritized capital storm drainage improvement projects for by DACFC here-in known as the Capital Projects Plan of Rincon. Therefore, the recommendations in this report are not limited to the Rincon CDP limits. HDR has identified several potential projects that, when developed in conjunction with the recommended future projects for the Capital Projects Plan, could provide a holistic approach toward flood mitigation within the region and strive to maintain safe passage along the NM-140 corridor. Items identified and further investigated within the confines of this report include the following:

- Regional Conveyance Channels – As stated previously, multiple cross culverts exist along the I-25 corridor. These discharge directly toward Rincon. Improved drainage channels could provide a mechanism for capturing and conveying the discharge to predetermined outfalls. Proper control of the oncoming stormwater could provide mitigation of flooding within the Rincon CDP limits and reduce ponded discharge which develops along NM-140.
- Regional Detention Facilities – Based on a comparison of the volume of developing stormwater versus available land parcels, insufficient ROW footprints are available for retention or attenuation of the developing runoff. However, initial modeling indicates that relatively small detention facilities could be used for hydraulic efficiency and sediment removal. These facilities could additionally serve as multiuse facilities for the community.
- Hydraulic Structures – To improve the conditions along the NM-140 corridor, additional hydraulic structures are required to provide a 25-year level of flood mitigation.
- Onsite Drainage Infrastructure – As discussed earlier in this report, there are currently no designated onsite drainage facilities in Rincon CDP limits. A system of conveyance features could be developed to contain and convey stormwater discharge within Rincon CDP limits.
- Joint Project with NMDOT – Drainage infrastructure along the NM-140 corridor has been identified as insufficient, with a history of flooding to the point of being impassable. Additionally, the on and off ramps along the southern ROW of I-25 appear to experience overtopping because of a lack of maintenance and the insufficient capacity of the existing structures. A joint venture project with NMDOT has been identified as an opportunity for a coordinated effort between DACFC and NMDOT which can lead to improved drainage infrastructure in the region and ultimately improve conditions for the Rincon residents and emergency services.

The following sections describe the recommended improvement projects, features, and locations as identified through the analysis described in this report. The recommendations were reviewed based on their feasibility, operations and maintenance requirements, and long-term stability as a solution for mitigating floodwaters developing within the community and surrounding region. Recommendations that meet those requirements are carried forward in the Rincon Capital Projects Plan through the

following sections. Recommendations requiring coordination with additional agencies or that are outside of the developed Rincon CDP limits are listed as additional opportunities to improve the overall DMP of the community and surrounding region. See **Appendix F,** Exhibit F (Proposed Conditions Map) which relates the vision of the drainage infrastructure through a graphical representation of proposed features and projects identified within this study.

### 7.1.1 Sediment Storage Basin Alternative (North of I-25)

Multiple sediment basins north of I-25 were considered as a mechanism for flood retardation and stormwater impact reductions. Based on the subbasin delineations contained in this report, there is an unnamed wash conveyed beneath I-25 by a 10-foot × 8-foot RCB approximately 4,300 feet west of the I-25/ NM-140 interchange. The 0.37-square-mile watershed contributes the largest offsite flow through the region, approximately 397 cubic feet per second (cfs) for the 25-year, 24-hour event. The provided contour data indicate that if a basin or dam were constructed upstream of the existing RBC, the needed storage area could be available to attenuate oncoming peak discharge and acts as a sediment trap for entrained particles within the bedload.

However, based on a review of all proposed facilities, it was determined that a significant likely hood of each facility to be classified as a dam exists and which would require additional design for a principal spillway and emergency spillway. Additional challenges for ROW, access easements, and long term safety were raised. These particular types of structures would require regular operations and maintenance attention to ensure its functionality. Based on discussions with DACFC, the alternative was not carried forward as a preferred alternative and was discontinued for further investigation.

### 7.1.2 East Channel Alternative

In existing conditions, a series of culverts along the I-25 corridor discharge directly toward the Rincon CDP limits. Two existing private retention basins capture oncoming stormwater. However, it was noted in field observations that both basins are heavily sediment-laden and not available for use by DACFC, no agreement for use exists at this time. Furthermore, based on the calculated volume of flow entering the basins and the reduced capacity, they are not sufficient to provide retention of the 25-year, 24-year event.

To reduce the potential flooding of properties south of the private retention basins, it is recommended that a channel, extending approximately 1,600 feet from the southbound I-25 off ramp to the existing 30-inch CMP, be constructed to divert discharge in an eastern direction toward the existing triple barrel 6-foot × 3-foot RBC, which conveys discharge beneath NM-140 and ultimately to the Rincon Arroyo. Based on hydraulic analysis, a 15- to 20-foot bottom width trapezoidal channel with variable side slopes has the capacity to convey the I-25 culvert discharges. Analysis indicates the channel would sustain depths of approximately 3 to 4 feet, with average velocities in the range of 2 to 3 feet per second. Engineered check dams periodically located along the flow line would maintain velocities at a range to support mitigating against erosion of the side slopes.

A 4.77-acre feet multiuse basin is proposed at the outfall of the proposed east channel alternative which would provide not only hydraulic efficiency at the outfall, but additionally serves as a means of sediment capture and point of removal as well. Additionally, it is recommended that the southern bank of the ditch be developed with an adjacent path to provide pedestrian access to Rincon and NM-140. See **Appendix F**, Exhibit G (East Channel Alternative) for a depiction of the proposed facility. Refer to **Appendix D** for the proposed conditions analysis.

It should be noted that prior to entering the Rincon Arroyo, the discharge from the triple-barrel RBC is routed through a BNSF bridge approximately 300 feet southeast of NM-140. During final design, additional coordination and analysis will be required to ensure no adverse impacts are created downstream at the railroad crossing. It is recommended that additional survey and modeling be conducted to document pre- versus post-conditions. Lateral weirs or other hydraulic mechanisms could be used in the proposed basin to provide a means of throttling discharge out of the detention facility before discharging to the rail bridge. Figure 8 provides an aerial depiction of the proposed facility.

Exhibit A, Existing Drainage Features Map, provides an illustration of the approximate locations of existing drainage features.

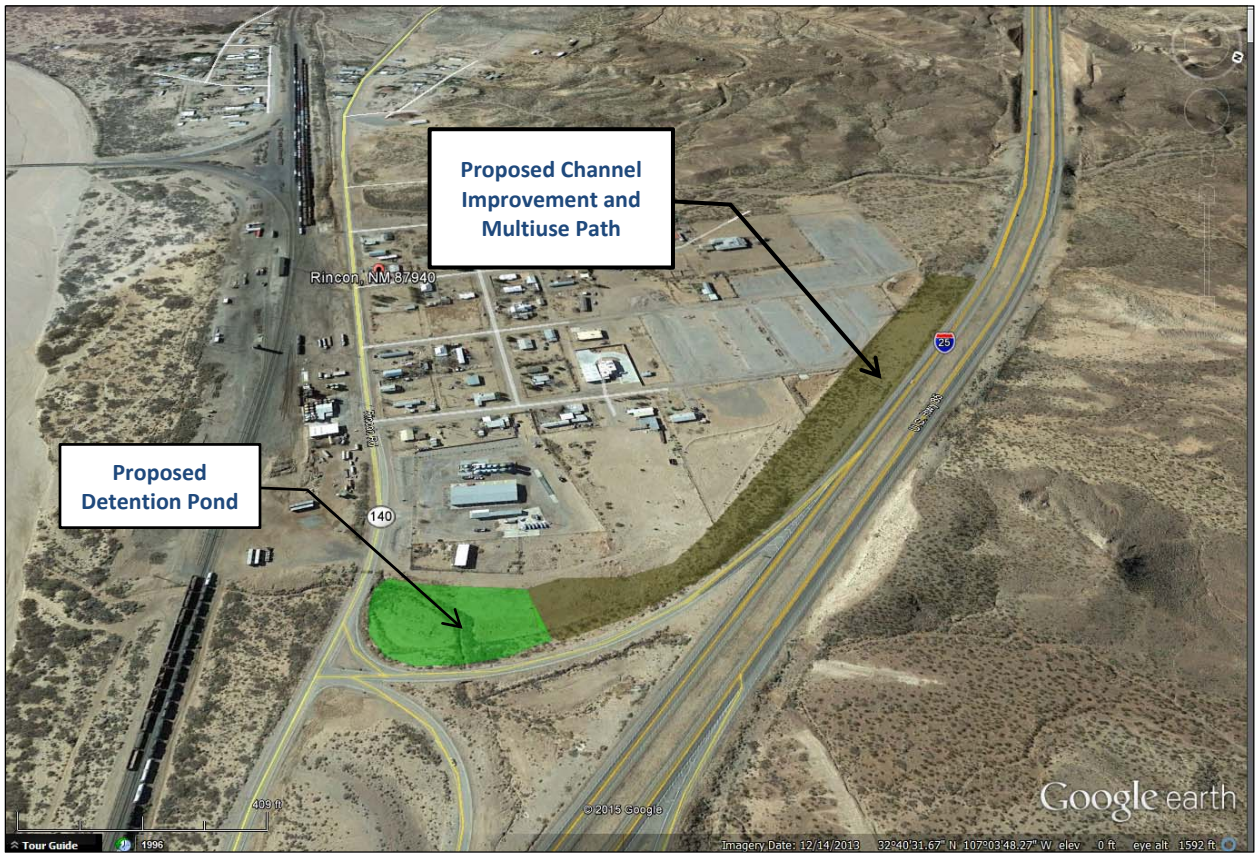



**Figure 8 – East Channel Alternative**

### 7.1.3 West Channel Alternative

As identified with this report, the largest contribution of stormwater runoff occurs at the 10-foot × 8-foot RBC west of the I-25/ NM-140 interchange. As shown in Exhibit E, Subbasin F1 contributes a peak 25-year concentrated discharge of 397 cfs. As flow is routed south though the natural arroyo, it combines with additional onsite and offsite flows from the surrounding subbasin (R3). The combined discharge enters the Rincon CDP limits at an estimated peak flow of 609 cfs (reference Appendix H, Exhibit E). In existing conditions, this concentration of flow has caused both frequent flooding and the deposition of sediment as it meanders south to NM-140. As the stormwater is conveyed south, additional discharge is collected from adjacent roadway and residential for a combined total of 742 cfs at the NM-140 at-grade crossing (subbasins R4 through R11).

To capture and convey the developing discharge through the Rincon CDP limits and mitigate against flooding, it is recommended that a drainage channel be constructed. A new trapezoidal channel, extending approximately 700 feet from Derry Avenue to Palmilla Street, could be constructed with 30- to 40-feet bottom widths with 6:1 side slopes to convey developed discharge approximately 4 feet deep. Furthermore, it is recommended that the property adjacent to NM-140 (along the northern alignment) be acquired and used as a detention and sedimentation facility. This area is bound to the west by Hauser Street and to the east by Kingman Street. The facility could also serve as a recreational area while providing hydraulic efficiency to the system. There are two identified options for discharging flow south of NM-140: (1) a multibarrel box culvert or (2) an at-grade concrete crossing with erosion protection.

As identified earlier, flooding at the existing at-grade crossing at NM-140 has limited accessibility for emergency vehicles to the Rincon community. Therefore, a multibarrel box culvert is recommended as the preferred alternative to improve NM-140 transportation services, safety, and mitigate against the frequently overtopping of the roadway. As shown in Figure 9 on the following page, to properly align outflow into the downstream channel, the box culvert should be constructed at a skew with either a curvilinear box extension for the outfall or a retaining wall to redirect the outlet discharges toward the existing channel. It is also recommended that downstream protection in the form of energy dissipation or revetment be installed to protect the outfall location (rail embankment) and force stormwater into the channel and not into adjacent BNSF property. It should be noted that additional coordination for the downstream channel will be required. The channel is approximately 70 feet from the existing rail line and will require a graded section to properly convey and control the stormwater.

Given the existing grades, a modification to the NM-140 roadway vertical profile will likely be necessary. A conservative estimate of a 1-foot rise in the vertical profile would provide sufficient cover over the culvert structure and allow for proper development of headwaters at the culvert inlet.

See **Appendix F,** Exhibit H (West Channel Alternative) for a depiction of the proposed facility. See **Appendix D** for the proposed conditions analysis.

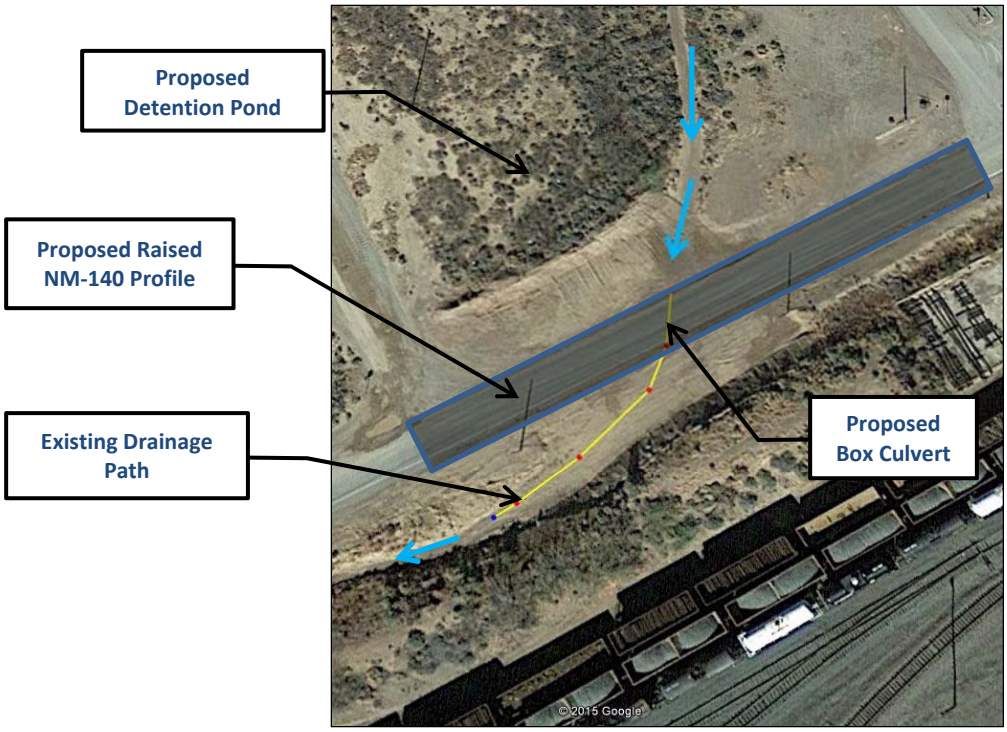



**Figure 9 – West Channel Outfall**

### 7.1.4 Onsite Drainage Infrastructure Improvement Alternative

Recommendations for onsite drainage infrastructure were assessed further by coordinating with both Rincon and DACFC. Initially, the County considered storm drain system improvements along Derry Avenue and connector streets such as Kingman and Hauser Streets. However, investigations of utility plans revealed additional underground utility constraints that would have escalated construction costs higher than present budget constraints.

Provided as-built information indicates that several utilities, including sanitary sewer, gas, electric, and communication lines, are located at relatively shallow depths between 1 and 3 feet below the asphalt surface. To develop a significant storm pipe network, it was anticipated that utility relocations would be extensive. In recognition of this constraint, the option of roadway improvements in the form of a typical roadway section with 2 percent crown and curb and gutter end treatment was accepted.

It should also be noted that existing ROW appears insufficient for developing a roadway section that includes roadside ditches. Unless additional ROW is acquired, roadside ditches could not be constructed to mitigate expected onsite discharge during the 25-year, 24-hour design event. Additionally, the cost-to-benefit ratio for construction of the improved road and storm drain system versus the realized value of flood mitigation does not prove to be beneficial to the community as a recommended alternative.

### 7.1.5 NM-140 Roadway Improvements

Based on results of the preliminary analysis, construction of roadside ditches along the northern edge of NM-140 would improve hydraulic conveyance capacity and increase the hydraulic efficiency of the existing crossing structures. A 2.5-foot deep "V" ditch (with 2:1 side slopes) is recommended along 980 feet of the existing NM-140 ROW (Figure 10). Installation of headwalls and/or endwalls at existing culverts should also be considered to improve hydraulic efficiency of crossing structures. See **Appendix F**, Exhibit J (NM-140 Roadside Improvements) for illustrations of the recommended alternatives.




**Figure 10 – NM-140 Roadside Ditches**

### 7.1.6 RVC/NM-140 Improvements

Preliminary hydrologic analysis estimates a 25-year, 24-hour peak discharge of 90 cfs to the northern limits of the RVC access road. Additionally, based on field observations, there appears to be substantial sediment deposition in the region. This is most likely attributable to the significant reduction in gradient of the terrain near the existing rail line. It is recommended that three 36-inch RCP pipe culverts be constructed to convey discharge and mitigate overtopping of NM-140 at this location. Runoff collected along the western side of NM-140 could be conveyed in a roadside ditch to a new 24-inch-diameter

culvert that discharges runoff to undeveloped areas north of the rail and east of NM-140. See **Appendix F**, Exhibit K (NMDOT Roadside Improvements Roadside Ditches) for an illustration of the recommended alternatives and **Appendix D** for the hydraulic analysis supporting the recommended improvements.

### 7.1.7 NMDOT Partner Project

A partnering opportunity with NMDOT was identified that would directly benefit the community:

- I-25 Off/On Ramp Improvements – Existing pipe crossings and roadway ditches are damaged or silted in and in need of repair. Their reduced capacity results in overtopping along the NM-140 alignment. Improved drainage infrastructure could mitigate overtopping and improve roadway access.

Additional discussion contained below describes recommended improvements at each location identified as a future partnering opportunity. See **Appendix D** for analysis results.

#### *7.1.7.1 I-25 Interchange Improvements*

Field reconnaissance identified multiple drainage facilities in the I-25 Interchange area in need of repair. South of the interchange, as shown in Figures 11 and 12 below, a 24-inch culvert pipe constructed to drain the ramp infield is silted in above the springline. The outlet is crushed and capacity is drastically reduced. Additionally, there are signs of erosion developing along the roadway edge.



**Figure 11 – Silted Inlet adjacent to NM-140**



**Figure 12 – Damaged Outlet adjacent to NM-140**

Reconstruction of the existing culvert and protection measures at the inlet and outlet would improve capacity and reduce occurrences of roadway overtopping. Inlet and outlet protection measures could also stabilize roadway slopes.

Based on the results of the analysis, 1- to 2-foot deep roadside v-ditches in the gore area along either ramp alignment would improve conveyance for runoff generated by the 25-year, 24-hour storm event. It is recommended that an NMDOT 4-foot × 4-foot median inlet be installed and the adjacent area be graded to create a sump for collecting runoff. Given the steeper gradient in the southerly direction, it is recommended that check dams be placed at appropriate intervals along the ditch flow line to mitigate erosion of v-ditch side slopes. See **Appendix F**, Exhibit I (NMDOT Roadside Improvements) for illustrations of the recommended improvements and **Appendix D** for the hydraulic analysis.

## 7.2 Prioritization of Projects

Analysis prepared in the preceding section provides three drainage improvement alternatives, three improvement projects, and a NMDOT partner project. In support of developing a prioritized listing for purposes of project implementation over the next 15 years, the following subsections have been developed for severity of drainage problems, estimated efficacy of project, and engineering opinion of probable costs based on 2012 dollars. Per the governing scope of work, this project is strictly limited to construction estimates for large construction and their supporting brief descriptions.

### 7.2.1 Prioritization by Severity of Problems

Table 9 on the following page has been prepared to provide a matrix style review of the severity of problems based on source of floodwaters, impact to emergency services, land ownership, and risks to

persons or properties. Prioritization by this method suggests that projects with the greatest impact and risk should be considered for action in numerical order based upon their respective priority level.

**Table 9 – Prioritization by Severity of Problems**

| Assessment Limits | Priority Level | Number of Structures at Risk | Impact Timing | Impact of Emergency Services | Landuse | Public Risks |
|---|---|---|---|---|---|---|
| Onsite | 1 | 74 | Immediate | Direct impact to Fire Station, local roadways, and NM-140 | Desert Shrub, Gravel, Residential 1/2 acre lots -3/4 acre lots | Disrupts access to emergency services |
| Extended Residential | 2 | 35 | Immediate | Minor impacts to local roadways | Desert Shrub, Gravel, Residential 1/2 acre lots -3/4 acre lots | Disrupts access to emergency services |
| Local Residential | 3 | 25 | Immediate | Direct impact to local roadways and NM-140 | Desert Shrub, Residential 1/4 acre lots - 1/8 acre lots | Disrupts access to emergency services |
| Foothills | 4 | None | Delayed | Significant delayed impacts due to routing of floodwater | Desert Shrub, Dirt | None |
| Offsite | 5 | None | Immediate & Delayed | Minor impacts with significantly delayed impacts due to routing of floodwater near Rio Valley Chili | Desert Shrub, Dirt | Disrupts access to emergency services |

### 7.2.2 Prioritization by Efficacy of Project

Table 10 on the following page has been prepared to provide a matrix style review of the efficacy of the alternatives to assist DACFC through a consistent, rational, and objective process of selecting the alternatives here-in. While each alternative provides benefits, the larger and more costly alternatives are less like to be considered at this time. Considerations for future funding as part of the 15 year CIP process will govern the final relationship between selection and initiation of project alternatives. The following table has been prepared to guide the selection process though the following five categories 1) Organizational Strategy, 2) Project Champion(s), 3) Organizational Assessment, 4) Assessment of Resources, 5) Parameters for Success.

**Table 10 – Prioritization by Efficacy of Project**

| Alternatives | Organizational Strategy | Ease of Implementation | Project Champion(s) | Organizational Assessment | Assessment of Resources | Parameters for Success |
|---|---|---|---|---|---|---|
| **East Channel** | **Project Lead - DACFC** | **Medium Complexity - Land Purchase, Stakeholder Coordination, ROW access, Utility Management** | **John Gwynne or Carl Lukesh** | **Cross Functional Department Project** | **People:** DACFC has sufficient staff<br>**Time:** No issues identified<br>**Budget:** Needs funding under CIP | **Timeframe for Completion:** Next 15 year of CIP projects<br>**Metric of Success:** Routing of discharges from Foothills around Onsite |
| **West Channel** | **Project Lead - DACFC** | **Medium Complexity - Land Purchase, Stakeholder Coordination, NM-140 Improvements, ROW access, Utility Management** | **John Gwynne or Carl Lukesh** | **Cross Functional Department Project** | **People:** DACFC has sufficient staff<br>**Time:** No issues identified<br>**Budget:** Needs funding under CIP | **Timeframe for Completion:** Next 15 year of CIP projects<br>**Metric of Success:** Improved routing of floodwaters from Foothills through Onsite |
| **Onsite Drainage Infrastructure** | **Project Lead - DACFC** | **Light Complexity - Stakeholder Coordination, Traffic Control, Utility Management** | **John Gwynne or Carl Lukesh** | **Cross Functional Department Project** | **People:** DACFC has sufficient staff<br>**Time:** No issues identified<br>**Budget:** Possible funding for small tasks | **Timeframe for Completion:** Next 15 year of CIP projects<br>**Metric of Success:** Improved onsite routing of floodwater, reduced residential flooding |
| **NM-140 Roadway Improvements** | **Partner Project: DACFC & NMDOT** | **Light Complexity - Stakeholder Coordination, Traffic Control, Utility Management** | **John Gwynne or Carl Lukesh & NMDOT PM** | **Cross Functional Department Project & External Communications** | **People:** DACFC has sufficient staff<br>**Time:** No issues identified<br>**Budget:** Possible funding for small tasks | **Timeframe for Completion:** Next 15 year of CIP projects<br>**Metric of Success:** Passage of flow from West Channel, mitigation of sediment deposition, improved access for emergency services |
| **RVC/NM-140 Improvements** | **Partner Project: DACFC & NMDOT** | **Medium Complexity - Land Purchase, Stakeholder Coordination, NM-140 Improvements, ROW access, Utility Management** | **NMDOT PM** | **Cross Functional Department Project & External Communications** | **People:** NMDOT has sufficient staff<br>**Time:** No issues identified<br>**Budget:** Possible funding for small tasks | **Timeframe for Completion:** Next 10 year of NMDOT Projects<br>**Metric of Success:** Passage of flow from Offsite, mitigation of sediment deposition, improved access for emergency services |
| **NMDOT Partner Project - Interstate 25 Interchange Improvement** | **Partner Project: DACFC & NMDOT** | **Light Complexity - Traffic Control, Utility Management** | **NMDOT PM** | **Cross Functional Department Project & External Communications** | **People:** NMDOT has sufficient staff<br>**Time:** No issues identified<br>**Budget:** Possible funding for small tasks | **Timeframe for Completion:** Next 10 year of NMDOT Projects<br>**Metric of Success:** Collection and conveyance of stormwater, mitigation of sediment deposition, improved access for emergency services |

### 7.2.3 Engineering Opinion of Probable Cost

The following Table 11 has been prepared to provide a matrix style review of the engineering opinion of probable cost for the alternatives developed within this report. While the level of focus for this report has been developed to quantify only large construction items, a contingency of 15% has been utilized here-in. Table 11 ranks the projects by cost for quick comparison to their respective magnitudes for future CIP development by DACFC.

**Table 11 – Prioritization by Engineering Opinion of Probable Cost**

| Alternatives | Engineering Opinion of Probable Cost per NMDOT 2012 Costs |
|---|---|
| **NM-140 Roadway Improvements** | $ 11,544 |
| **NMDOT Partner Project - Interstate 25 Interchange Improvement** | $ 24,296 |
| **East Channel** | $ 147,642 |
| **West Channel** | $ 596,193 |

# 8.0 Additional Recommendations

Several additional recommendations were identified during development of the DMP for Rincon:

- Operations and Maintenance – Both long- and short-term operations and maintenance plans should be considered. As identified in this report, the existing infrastructure is reduced in capacity by both sediment and vegetation. An improved operations and maintenance plan could maintain the hydraulic capacity and functionality of the recommended features. Additionally, the proposed detention facilities will require periodic maintenance to maintain the required volumes for flood control.
- Sediment Yield Analysis – Based on the pervasive sediment deposits noted by both the current residents of Rincon and the field reconnaissance, it is recommended that additional analysis of the sediment yield from the contributing watershed be conducted. There are several means and methods for both cursory and detailed analysis. Chapter 6 of the NMDOT Drainage Manual Volume II – Hydraulics, Sedimentation and Erosion (November 1998) contains recommended methodologies for quantifying sediment yield rates. Developing a better understanding of those characteristics will yield a finer detail of design for the final construction of any of the recommended alternatives.
- Partnerships – As discussed previously, there appears to be additional opportunity to partner with other local agencies in the effort to improve conditions for the community and surrounding region. Shared cost ventures would benefit all interested parties in developing a regional drainage plan that promotes safe passage of roadway passengers and improved esthetics.
- Detailed Floodplain Study – Based on the findings within this report, the effective FEMA Zone A mapping is antiquated and appears need updating to reflect current conditions. A detailed study and remapping of the region could further refine actual conditions within the region and further refine risks associated with existing and future development.

# 9.0 References


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- Bohannan-Huston, Inc., LiDAR Aerial Imagery, 2010, obtained July 2014.
- Bureau of Land Management, GIS Database, Landuse Reference, 2015
- Burlington Northern & Santa Fe Railway, Existing Rail Alignment, 2016
- Doña Ana County, Aerial Photography, Digital Terrain Models, and Topography, 2010, obtained July 2014.
- Doña Ana County, Design and Construction Standards, Chapter 157, Article V, 2008.
- Doña Ana County Flood Commission, Rincon Flooding Complaints, 2002, 2003, 2010, obtained April 2014
- Doña Ana County, PBS&J, Rincon Sewer As-Builts, October 2006.
- Doña Ana County, Easterling and Associates, Inc., Rincon Water As-Builts, February 1999.
- Doña Ana County Flood Commission, Soil Conservation Service Type II Distribution and Antecedent Moisture Content II and III, 2007.
- Doña Ana County Design Storm Criteria Guidelines for Commercial and Residential Sites 2014
- Federal Emergency Management Agency, Flood Insurance Rate Map – Doña Ana County, New Mexico and Incorporated Areas, Panel 250, September 27, 1991.
- Geographical Information System – Varied Aerial Imagery Sources: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
- HDR Engineering, Inc., Rincon Site Reconnaissance, April 2, 2014 and June 25, 2014.
- National Oceanic and Atmospheric Administration, ATLAS 14 Point Precipitation Frequency Estimates, obtained on December 17, 2013.
- New Mexico State Highway and Transportation Department, Interstate 25 As-Builts, 1963.
- New Mexico State Highway and Transportation Department, Drainage Design Criteria, June 2007.
- New Mexico State Highway and Transportation Department, Section 3, Hydrology, Drainage Manual, 1995.
- New Mexico State Highway and Transportation Department, Figure 3-10, Flow Velocities for Overland and Shallow Concentrated Flows, December 1995
- New Mexico State Highway and Transportation Department, New Mexico 140 As-Builts, 1946.
- New Mexico State Lands, GIS Database, Landuse Reference, 2015New Mexico Department of Transportation, Standard Specifications for Highway and Bridge Construction, 2014 Edition, Section 602.
- US Department of Agriculture – Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) Database for Doña Ana County Area, New Mexico, December 2013.








# APPENDIX A

*Data Collection*

**FLOOD COMMISSIONER**
*John Allen*
**DIRECTOR**
Paul T. Dugie, P.E.

*Character Counts!*

# FLOODING/DRAINAGE COMPLAINT

**DOÑA ANA COUNTY FLOOD COMMISSION**
***County Government Center***
***845 N Motel Blvd, Room 1-250***
***Las Cruces, NM 88007***
***Phone: (575) 525-5558 Fax: (575) 525-5567***

***Complaint Date:** July 12, 2010 ***Complaint Taken By:** Jess Williams

***Complaint Information:** Chelo Saldaña 267-9244 & 642-7868
**Name** **Phone:**

1930 Rincon Rincon, NM, 87940
**Address:** **City, State, Zip:**

**Parcel ID:** **12-00390**

**LOCATION of Complaint:**

**Name:** **Physical Address:**

**Mailing Address, City, State Zip:**

**Parcel ID:** **Flood Zone:** X **Firm #:** 35013C0250E

**District #:** 1 **Commissioner:** Oscar Vasquez-Butler

***CONDITION COMPLAINED ABOUT:** Water from an arroyo being diverted onto her home, causing significant property damage and losses.

***ASSIGNED TO:** Jesus

**INVESTIGATION ON:** July 12 **REVEALED THAT:** The property is located at the lowest point in the area. A semi-plugged culvert that is under the maintenance of NMDOT may have contributed the problem, as well as no routine maintenance to a drainage swale along the northern side of the road.
Mrs. Saldaña stated that property was damaged, by this she meant that there was damage to a shed, two refrigerators, soil from four dump truck used to lever the rear of her property as well as gravel to the front of her property. As far as the gravel she claims to have been placed on her property there is no evidence suggesting it was there, as well as the four dump trucks of soil. The damage done to her refrigerators is possibly due to water, however they were left outside unprotected. Damage to the shed consisted of water rising 1.5-2 inches, and damage would have been avoided had the shed been elevated above ground level.

**ACTION TAKEN:** Had some sandbags both full and empty and left them with Saldaña. Explained to her that DAC does not do work on private property, also alerted the NMDOT about culvert.

***MUST BE FILLED OUT WHEN TAKING COMPLAINT**

**FLOOD COMMISSIONER**
*John Allen*
**DIRECTOR**
Paul T. Dugie, P.E.

*Character Counts!*

# FLOODING/DRAINAGE COMPLAINT

**DOÑA ANA COUNTY FLOOD COMMISSION**
***County Government Center***
***845 N Motel Blvd, Room 1-250***
***Las Cruces, NM 88007***
***Phone: (575) 525-5558 Fax: (575) 525-5567***

***Complaint Date:** 13 October 2010 ***Complaint Taken By:** Road Department

***Complaint Information:** Jose Lira (575)267-4205
**Name** **Phone:**

470 Kingman Street Rincon, New Mexico 87940
**Address:** **City, State, Zip:**

**Parcel ID:** **12-03650**

**LOCATION of Complaint:**

N/A N/A
**Name:** **Physical Address:**

N/A
**Mailing Address, City, State Zip:**

**Parcel ID:** N/A **Flood Zone:** A **Firm #:** 35013C0250E

**District #:** 1 **Commissioner:** Oscar Butler

***CONDITION COMPLAINED ABOUT:** Arroyo Northeast of his place floods his area every time it rains. Road is not county maintained there fore roads could not meet his request of taking fill dirt to berm up the arroyo so water would flow like it used too. Complaint was forwarded to Flood.

***ASSIGNED TO:** David

**INVESTIGATION ON:** 10/18/2010 **REVEALED THAT:** According to the FIRMs the property in question is located within FEMA Speical Flood Hazard Area zone A.

**ACTION TAKEN:** Kingman road is basicly an extention of the arroyo. There really is nothing the County can do for this property. Kingman Street is a private road.

***MUST BE FILLED OUT WHEN TAKING COMPLAINT**

***Doña Ana County***
***OFFICE OF THE***
***FLOOD COMMISSIONER***
***Phone: (505) 647-7256***
***Fax: (505) 647-7291***

***Character Counts!*** ™

**FLOOD COMMISSIONER**
***William S. Fleming***
**DIRECTOR**
***Paul T. Dugie, P.E.***

February 3, 2003

Mr. Frank Cabrales
P.O. Box 33
Rincon, New Mexico 87940

RE: Needed Arroyo Maintenance at Property Located at 1825 Rincon Road.

Dear Mr. Cabrales:

Recently I was in the Rincon area. While in Rincon, I noticed that an arroyo on your property located at 1825 Rincon Road has been partially filled and/or silted in. With this material partially blocking the arroyo, the historic flows that have crossed your property to the culvert under Rincon Road can no longer do so. These flows have the potential to flood both your property and your neighbor's property. It is recommended that material be removed from the arroyo to allow the historic flows to pass through your property unimpeded. Please come by my office to discuss the situation at your earliest convenience to determine if a permit will be required for the proposed work.

Thank you for your assistance in this situation. If you have any questions, please feel free to contact me at 647-7256.

Sincerely,

Paul T. Dugie, P.E.
Flood Commission Director

File name: G:\share\Cabrales

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**FLOOD COMMISSIONER**
*John Allen*
**DIRECTOR**
Paul T. Dugie, P.E.

*Character Counts!*

# FLOODING/DRAINAGE COMPLAINT

**DOÑA ANA COUNTY FLOOD COMMISSION**
***County Government Center***
***845 N Motel Blvd, Room 1-250***
***Las Cruces, NM 88007***
***Phone: (575) 525-5558 Fax: (575) 525-5567***

***Complaint Date:** July 12, 2010 ***Complaint Taken By:** Paul

***Complaint Information:** **Name** **Phone:**

**Address:** **City, State, Zip:**

**Parcel ID:**

**LOCATION of Complaint:**

Hershey Arroyo **Name:** **Physical Address:**

**Mailing Address, City, State Zip:**

**Parcel ID:** **Flood Zone:** **Firm #:**

**District #:** 1 **Commissioner:** Oscar Vasquez-Butler

***CONDITION COMPLAINED ABOUT:** Fact Finding: Flooding of properties within Peaceful Valley caused by mining of the Hershey Arroyo.

***ASSIGNED TO:** Jesus/Mary

**INVESTIGATION ON:** 7/12/10 **REVEALED THAT:** There was a home near the road that had about a foot of water along the rockwall and did not appear to enter home. At the time of the investication NMDOT was fixing the road, and upon further investigation a truck was embeded in the center of the arroyo about 150 feet from the main road. Per our investigation the arroyo banks did not break in the areas that were said to be disturbed. Looking at historical photos there apears to be a "finger" that breaks off from the main arroyo and is dirrected at the rock mining operations, also water from the top of the hill could also contribute. As part of our investigation it is determined that the arroyo worked as it has historically, with the exeption that additional water from an above average rain event

**ACTION TAKEN:** Facts only, please see photos in file.

***MUST BE FILLED OUT WHEN TAKING COMPLAINT**

# FLOODING/DRAINAGE COMPLAINT
## DOÑA ANA COUNTY FLOOD COMMISSSION

*251 W. Amador, Rm 100B,*
*Las Cruces, NM 88001*
*Phone: (505) 647-7256 Fax: (505) 647-7291*

Character Counts! SM

***Complaint Date:** August 21, 2003 ***Complaint Taken By:** Robert Avalos

***Complaint Information:** Sammy Rel to Dale Antreasian (Rincon Water (505) 267-0633
**Name** **Phone**

Rincon Water Office Rincon, NM 87940
**Address** **City, State, Zip**

**Location of Complaint:**

280 Kingman St.
**Name**

3-011-110-212-115
**Assessor's Parcel No.**

280 Kingman St.
**Physical Address**

Victor Perez (P.O. Box 472)
***Mailing Address**

Hatch, NM 87937
***City, State, Zip**

**See Attached**
**Maps &**
**Photos @ (G:share/Rincon/Photos 1-9)**

***CONDITION COMPLAINTED ABOUT:** Mr. Perez filling arroyo with fill dirt.

***ASSIGNED TO:** Robert Avalos

**INVESTIGATION ON:** August 22 & August 26 **REVEALED THAT:** Fill dirt was being dumped in arroyo from Helena's warehouse, that was being demolished by Alex Martinez (contractor). Permit for building was granted to Helena Co. Perez said he was going to push fill against bank to help with errosion process. On August 22, 2003, talked to Richard Guerra, Environmental Codes and asked for his assistance. He went and did an inspection.

**ACTION TAKEN:** August 26, 2003, I talked with Mr. Perez about obtaining a permit for fill dirt and advised him to clean arroyo for water runoff to continue its flow. **A trench was built from property at south to divert water flow into arroyo which might be contributing to errosion of back at Perez's property.

***MUST BE FILLED OUT WHEN TAKING COMPLAINT**

**FLOODING/DRAINAGE COMPLAINT**
**DOÑA ANA COUNTY FLOOD COMMISSSION**
***251 W. Amador, Rm 100B,***
***Las Cruces, NM 88001***
***Phone: (505) 647-7256 Fax: (505) 647-7291***

Character Counts! SM

***Complaint Date:** July 22, 2002 ***Complaint Taken By:** Orlando V. Fierro

***Complaint Information:** Martha Torres (505) 621-6496
**Name** **Phone**

1835 Rincon Rd. Rincon, NM 87937-0658
**Address** **City, State, Zip**

**Location of Complaint:**

**Name**

12-00401
**Assessor's Parcel No.**

1835 Rincon Rd.
**Physical Address**

P.O. Box 214
***Mailing Address**

Rincon, NM 87940
***City, State, Zip**

- **3-011-110-305-266**
- **T19, R2W, Sec 8**
- **+/- 0.339 acres**
- **See attached map**

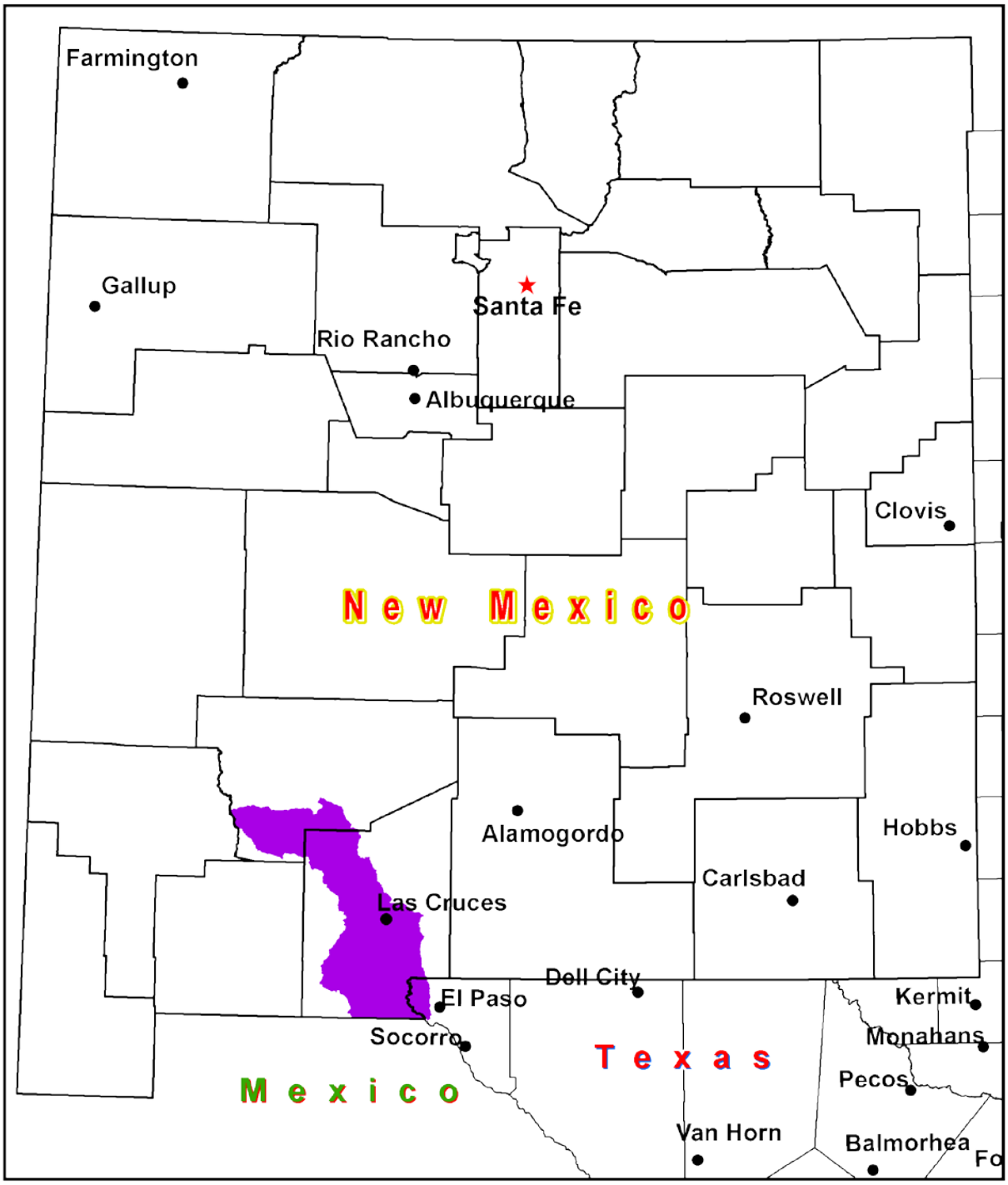
***CONDITION COMPLAINTED ABOUT:** DAC Engineering Department had forwarded this complaint. The subject lot has been receiving an enormous amount of water runoff from the north along Inca Street.

***ASSIGNED TO:** Orlando V. Fierro and Andrew Guerra

**INVESTIGATION ON:** July 22, 2002 **REVEALED THAT:** There is a drainage channel to the west of the subject lot. The company that recently installed sewage lines, may have disturbed the natural ground and/or eliminated a berm that sat to the rear of the subject lot. This berm prohibited water runoff from entering the subject lot. Also, Inca St. is a private road easement.

**ACTION TAKEN:** The drainage channel to the west of the subject lot needs to be cleared of debris and redug. If there was a berm to the rear of the lot, it may need to be reinstalled. ***Please note that it may take a licensed engineer to do an engineer analysis of the property to determine the extent of the problem, and any possible parcel modifications since this is private property.**

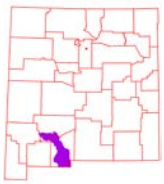
***MUST BE FILLED OUT WHEN TAKING COMPLAINT**




# **R**apid **W**atershed **A**ssessment

## El Paso- Las Cruces Watershed





*Helping People Help the Land*

An Equal Opportunity Provider and Employer

# Overview




**Figure 1. El Paso-Las Cruces Watershed Overview**





## Overview

The El Paso-Las Cruces Watershed is located in southwestern central New Mexico and in extremely northwestern part of Texas and in some section of Northeast corner of Mexico covering 1,564,342 total acres (6,331 sq. km). Portions of the El Paso-Las Cruces Watershed are in the Dona Ana, Grant, and Sierra counties in New Mexico and in El Paso County, Texas and in part of the state of Chihuahua, Mexico. Table 1 summarizes the distribution of the El Paso-Las Cruces watershed.

| County | County Acres Total | Acres in HUC | % of HUC in County | % of County in HUC |
|---|---|---|---|---|
| Dona Ana CO, NM | 2,441,262 | 1,157,994 | 74 | 47 |
| El Paso CO, TX | 648,847 | 63,883 | 4 | 10 |
| Grant CO, NM | 2,543,536 | 145 | <1 | <1 |
| Sierra CO, NM | 2,711,883 | 342,320 | 22 | 13 |
| Chihuahua, Mexico | 61,301,622 | 2,796 | <1 | <1 |
| Sum (∑) | -- | 1,564,342 | 100 | -- |

**Table 1. El Paso-Las Cruces Watershed acreage distribution.**





*Helping People Help the Land*

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# Physical Setting

## Geology:

This HUC is the portion of the Rio Grande watershed from Caballo Reservoir Dam to El Paso. It is bordered on the west by the Black Range, northern edge of the Godsight Mountains, the Sierra de Las Uvas, the Sleeping Lady Hills, the Aden Hills, Mount Aden, the West Portillo Mountains, Mount Riley, the East Portillo Mountains, and to just east of the site of Potrillo. The southern boundary follows the New Mexico-Mexico boundary into El Paso and Arena Park. The eastern border consists of the Caballo Mountains near Brushy Mountain, near the site of Alivio, Point of Rocks, and the Doña Ana Mountains; passes through the town of Organ to Baylor Peak in the Organ Mountains.

The Organ Mountains are a Tertiary Period granite intrusion. The Doña Ana Mountains, the Black Range, the Godsight Mountains, Sierra de Las Uvas, Sleeping Lady Hills, the Aden Hills, Mount Aden, and Point of Rocks are also Tertiary Period intrusive and volcanic rocks. The Caballo Mountains are composed of Pennsylvanian Period limestone at the crest, which changes to Permian Period limestones, sandstones, siltstones, anhydrite, gypsum, halite and dolomite until the valley floor is encountered. The limestone is porous.

The valley floor contains small areas of Tertiary Period basaltic andesites and vocaniclastic sedimentary units. Most of the valley floor is Quaternary-Tertiary Period partly compacted sands and gravels of the Santa Fe group. The Santa Fe Group consists of alluvial fans, river channel deposits and inter-bedded volcanic rocks preserved in a complex of depressed fault blocks within the Rio Grande depression. Quaternary Period piedmont alluvial sediments form alluvial fans, and alluvium are the rest of the sediments on the valley floor.

Resource concerns are high sediment erosion and water runoff. In addition the lowering of valleys by river incision is a continuing process. Many valleys are flanked by terraces. Rivers respond by aggrading during climates that promote large sediment yield and large, stable discharges; and incise during climates that produce flashy flows and reduce the sediment supply.

Groundwater quality and quantity is a concern. Depth to groundwater is a concern if the shallow unconfined aquifer does not produce enough water for the resource or increased population demands are ‘mining’ the water. Groundwater in the limestone, igneous rocks and volcanics is usually along fracture zones which are hard to intercept with water wells. Groundwater quality ranges from good to fair for livestock or crops. Chloride and sulfate concentrations in sections of the watershed are also a concern. High nitrates/nitrites from confined animal operations have been measured in the Mesilla Valley.







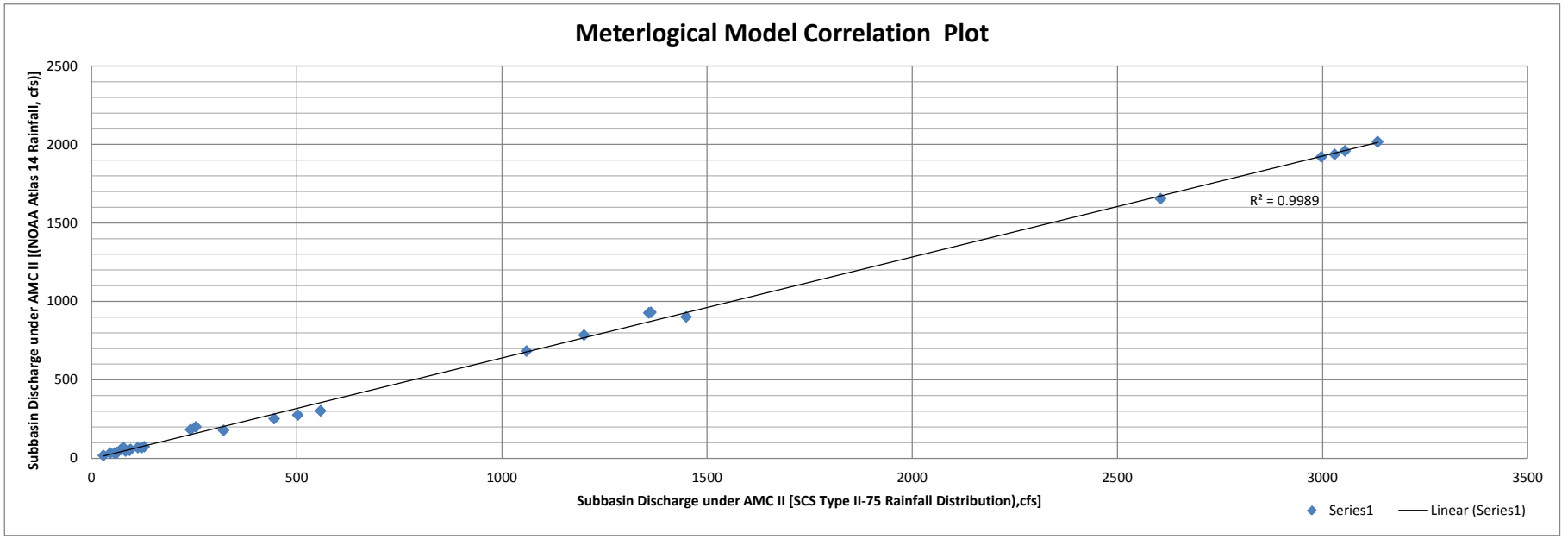



# APPENDIX B

*Hydrologic Evaluation*

Computed: **DGH** Date: **07.02.2014**
Checked: **MAFO** Date: **07.02.2014**

| | | | 100-year Recurrence Interval Peak Flow per Antecedent Moisture Condition (cfs) | | | | 100-year Recurrence Interval Peak Volume per Antecedent Moisture Condition (in) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Basin ID** | **HMS Computation ID** | **Area (ft2)** | **AMC III (SCS)** | **AMC II (SCS)** | **AMCIII (SCS) - AMCII (SCS)** | **AMC II (NOAA)** | **AMC III** | **AMC II** | **AMCIII (SCS) - AMCII (SCS)** | **AMC II (NOAA)** |
| F1 | FLOW_F1 | 10415849 | 1403 | 1060 | 343 | 683 | 3.73 | 2.83 | 0.90 | 3.72 |
| F2 | FLOW_F2 | 6712878 | 1775 | 1449 | 326 | 901 | 3.84 | 3.11 | 0.73 | 4.02 |
| F3 | FLOW_F3 | 738135 | 157 | 128 | 28 | 74 | 3.74 | 2.94 | 0.80 | 3.84 |
| F4 | FLOW_F4 | 1753009 | 371 | 322 | 49 | 178 | 3.84 | 3.22 | 0.62 | 4.14 |
| F5 | FLOW_F5 | 6477027 | 1414 | 1200 | 213 | 785 | 3.95 | 3.31 | 0.64 | 4.24 |
| F6 | FLOW_F6 | 340566 | 81 | 62 | 18 | 37 | 3.52 | 2.48 | 1.04 | 3.33 |
| F7 | FLOW_F7 | 2791803 | 535 | 445 | 90 | 253 | 3.84 | 3.11 | 0.73 | 4.02 |
| F8 | FLOW_F8 | 3932548 | 353 | 241 | 112 | 182 | 3.53 | 2.50 | 1.03 | 3.35 |
| F9 | OUTLET_3 | 734127 | 371 | 254 | 117 | 200 | 3.53 | 2.49 | 1.04 | 3.34 |
| R1 | COMB_F5_F6_F7_R1 | 183539 | 1612 | 1358 | 254 | 927 | 3.91 | 3.25 | 0.66 | 4.17 |
| R10 | COMB_R3R7R10B_R9R10_R10 | 352634 | 3833 | 2998 | 835 | 1921 | 3.75 | 2.94 | 0.81 | 3.84 |
| R11 | COMB_R12R16_R10R11_R11 | 651288 | 3886 | 3030 | 856 | 1937 | 3.74 | 2.92 | 0.82 | 3.82 |
| R12 | FLOW_R12 | 314132 | 79 | 60 | 19 | 33 | 3.52 | 2.48 | 1.04 | 3.34 |
| R13 | FLOW_R13 | 629606 | 127 | 95 | 32 | 56 | 3.58 | 2.63 | 0.95 | 3.49 |
| R14 | FLOW_R14 | 890352 | 159 | 113 | 46 | 68 | 3.52 | 2.48 | 1.04 | 3.33 |
| R15 | FLOW_R15 | 442068 | 110 | 83 | 28 | 46 | 3.51 | 2.46 | 1.05 | 3.31 |
| R16 | COMB_R13R16_R11R16_R16 | 235864 | 3931 | 3055 | 876 | 1958 | 3.73 | 2.91 | 0.82 | 3.81 |
| R17 | OUTLET_2 | 395133 | 4061 | 3134 | 927 | 2017 | 3.72 | 2.88 | 0.84 | 3.78 |
| R18 | OUTLET_2 | 406358 | 4061 | 3134 | 927 | 2017 | 3.72 | 2.88 | 0.84 | 3.78 |
| R19 | FLOW_R19 | 697112 | 73 | 45 | 27 | 33 | 3.08 | 2.06 | 1.02 | 2.82 |
| R2 | OUTLET_1 | 226740 | 1619 | 1363 | 256 | 931 | 3.91 | 3.23 | 0.68 | 4.16 |
| R20 | COMB_R19R20_R20 | 831664 | 125 | 72 | 53 | 57 | 2.88 | 1.77 | 1.11 | 2.48 |
| R21 | OUTLET_4 | 1097453 | 139 | 78 | 61 | 67 | 2.80 | 1.63 | 1.17 | 2.34 |
| R3 | COMB_F2R3_R3 | 2129902 | 3319 | 2606 | 713 | 1654 | 3.77 | 2.94 | 0.83 | 3.84 |
| R4 | COMB_F3_F4_R4 | 616259 | 606 | 503 | 103 | 275 | 3.72 | 2.99 | 0.73 | 3.90 |
| R5 | FLOW_R5 | 198429 | 42 | 29 | 12 | 17 | 3.32 | 2.24 | 1.08 | 3.06 |
| R6 | FLOW_R6 | 307923 | 72 | 56 | 16 | 32 | 3.46 | 2.54 | 0.92 | 3.38 |
| R7 | COMB_R4R7_R7 | 376547 | 675 | 558 | 117 | 302 | 3.71 | 2.99 | 0.72 | 3.90 |
| R8 | COMB_R6R8_R8 | 130828 | 116 | 93 | 23 | 50 | 3.59 | 2.77 | 0.82 | 3.64 |
| R9 | COMB_R8R9_R9 | 106040 | 152 | 121 | 31 | 67 | 3.63 | 2.83 | 0.80 | 3.71 |


Meterlogical Model Correlation Plot
Subbasin Discharge under AMC II [(NOAA Atlas 14 Rainfall, cfs)]
Subbasin Discharge under AMC II [SCS Type II-75 Rainfall Distribution),cfs]
R² = 0.9989
Series1
Linear (Series1)
0
500
1000
1500
2000
2500
3000
3500

Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

Point precipitation frequency estimates (inches)
NOAA Atlas 14 Volume 1 Version 5
Data type: Precipitation depth
Time series type: Partial duration
Project area: Southwest
Location name: Rincon, New Mexico, US*
Station Name: -
Latitude: 32.6747°
Longitude: -107.0634°
Elevation: 4079 ft*
* source: Google Maps

PRECIPITATION FREQUENCY ESTIMATES

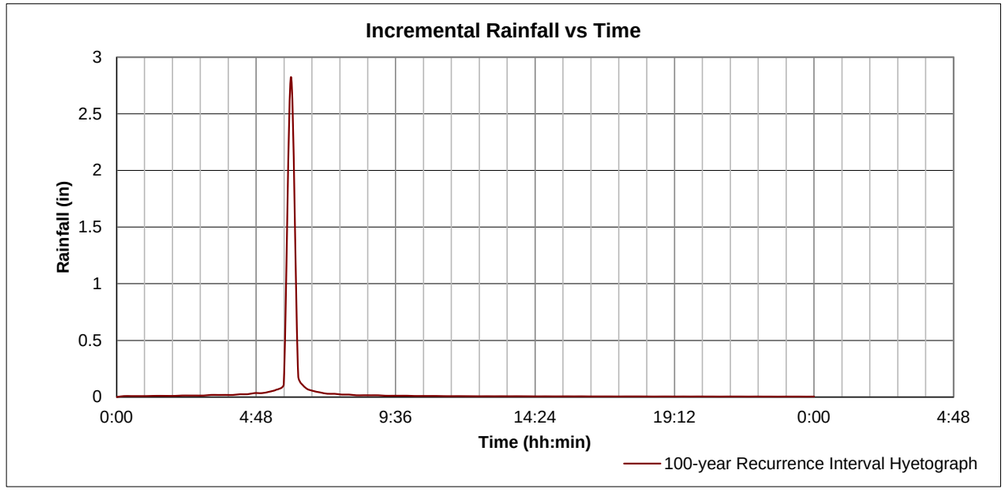
| luration for | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 years |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-min: | 0.22 | 0.28 | 0.38 | 0.46 | 0.56 | 0.64 | 0.72 | 0.81 | 0.93 | 1.02 |
| 10-min: | 0.33 | 0.43 | 0.58 | 0.69 | 0.85 | 0.97 | 1.10 | 1.23 | 1.41 | 1.56 |
| 15-min: | 0.41 | 0.54 | 0.72 | 0.86 | 1.05 | 1.20 | 1.36 | 1.53 | 1.75 | 1.94 |
| 30-min: | 0.56 | 0.72 | 0.97 | 1.16 | 1.42 | 1.62 | 1.83 | 2.05 | 2.36 | 2.60 |
| 60-min: | 0.69 | 0.89 | 1.20 | 1.43 | 1.75 | 2.00 | 2.27 | 2.54 | 2.92 | 3.22 |
| 2-hr: | 0.79 | 1.02 | 1.36 | 1.63 | 1.99 | 2.28 | 2.58 | 2.89 | 3.31 | 3.65 |
| 3-hr: | 0.83 | 1.07 | 1.41 | 1.68 | 2.05 | 2.34 | 2.65 | 2.96 | 3.39 | 3.74 |
| 6-hr: | 0.95 | 1.21 | 1.57 | 1.84 | 2.22 | 2.51 | 2.81 | 3.12 | 3.53 | 3.87 |
| 12-hr: | 1.06 | 1.34 | 1.72 | 2.01 | 2.39 | 2.68 | 2.98 | 3.28 | 3.67 | 3.99 |
| 24-hr: | 1.17 | 1.48 | 1.88 | 2.20 | 2.63 | 2.99 | 3.36 | 3.75 | 4.31 | 4.76 |
| 2-day: | 1.27 | 1.60 | 2.03 | 2.37 | 2.85 | 3.23 | 3.64 | 4.08 | 4.69 | 5.20 |
| 3-day: | 1.37 | 1.73 | 2.19 | 2.56 | 3.07 | 3.48 | 3.92 | 4.37 | 5.03 | 5.57 |
| 4-day: | 1.47 | 1.86 | 2.36 | 2.75 | 3.30 | 3.73 | 4.19 | 4.67 | 5.37 | 5.95 |
| 7-day: | 1.72 | 2.17 | 2.75 | 3.21 | 3.83 | 4.33 | 4.86 | 5.41 | 6.19 | 6.81 |
| 10-day: | 1.90 | 2.40 | 3.05 | 3.57 | 4.28 | 4.86 | 5.46 | 6.10 | 7.00 | 7.73 |
| 20-day: | 2.42 | 3.05 | 3.84 | 4.45 | 5.26 | 5.89 | 6.54 | 7.21 | 8.12 | 8.83 |
| 30-day: | 2.88 | 3.63 | 4.53 | 5.21 | 6.11 | 6.79 | 7.49 | 8.18 | 9.12 | 9.84 |
| 45-day: | 3.49 | 4.38 | 5.41 | 6.18 | 7.18 | 7.92 | 8.65 | 9.38 | 10.32 | 11.03 |
| 60-day: | 4.09 | 5.14 | 6.34 | 7.22 | 8.35 | 9.18 | 10.00 | 10.80 | 11.84 | 12.61 |

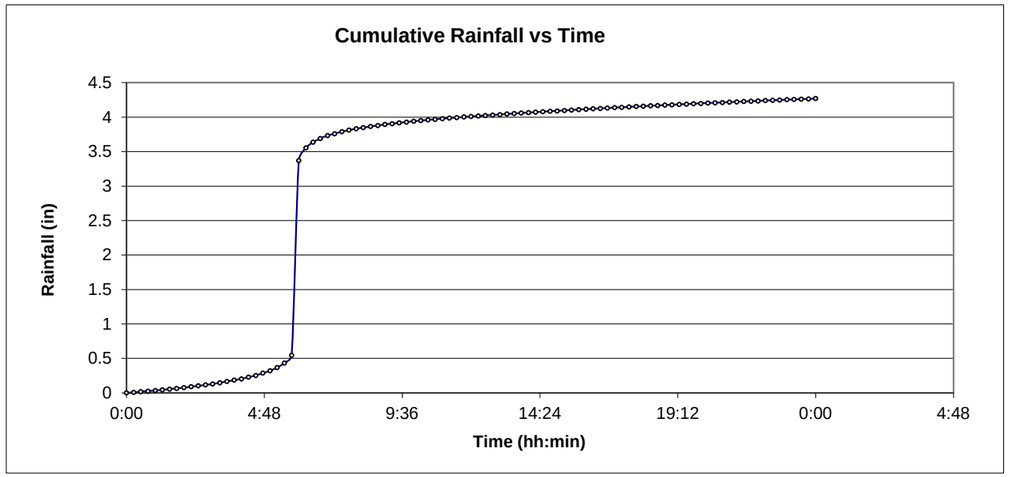
Date/time (GMT): Thu Jul 3 23:05:02 2014
pyRunTime: 0.0509760379791

Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

| 100-year total storm depth (in) | 4.27 | in |
|---|---|---|

| Time | Unit Precipitation (Type II-75) | Unit Precipitation * Storm Depth | Incremental Rainfall (in) |
|---|---|---|---|
| 0:00 | 0 | 0 | 0 |
| 0:15 | 0.002 | 0.00854 | 0.00854 |
| 0:30 | 0.004 | 0.01708 | 0.00854 |
| 0:45 | 0.006 | 0.02562 | 0.00854 |
| 1:00 | 0.008 | 0.03416 | 0.00854 |
| 1:15 | 0.0104 | 0.044408 | 0.010248 |
| 1:30 | 0.0129 | 0.055083 | 0.010675 |
| 1:45 | 0.0153 | 0.065331 | 0.010248 |
| 2:00 | 0.0177 | 0.075579 | 0.010248 |
| 2:15 | 0.0208 | 0.088816 | 0.013237 |
| 2:30 | 0.0239 | 0.102053 | 0.013237 |
| 2:45 | 0.027 | 0.11529 | 0.013237 |
| 3:00 | 0.0301 | 0.128527 | 0.013237 |
| 3:15 | 0.0345 | 0.147315 | 0.018788 |
| 3:30 | 0.0388 | 0.165676 | 0.018361 |
| 3:45 | 0.0432 | 0.184464 | 0.018788 |
| 4:00 | 0.0475 | 0.202825 | 0.018361 |
| 4:15 | 0.0533 | 0.227591 | 0.024766 |
| 4:30 | 0.0591 | 0.252357 | 0.024766 |
| 4:45 | 0.0673 | 0.287371 | 0.035014 |
| 5:00 | 0.0754 | 0.321958 | 0.034587 |
| 5:15 | 0.0863 | 0.368501 | 0.046543 |
| 5:30 | 0.1016 | 0.433832 | 0.065331 |
| 5:45 | 0.128 | 0.54656 | 0.112728 |
| 6:00 | 0.7895 | 3.371165 | 2.824605 |
| 6:15 | 0.8323 | 3.553921 | 0.182756 |
| 6:30 | 0.8516 | 3.636332 | 0.082411 |
| 6:45 | 0.8644 | 3.690988 | 0.054656 |
| 7:00 | 0.874 | 3.73198 | 0.040992 |
| 7:15 | 0.8808 | 3.761016 | 0.029036 |
| 7:30 | 0.8875 | 3.789625 | 0.028609 |
| 7:45 | 0.8926 | 3.811402 | 0.021777 |
| 8:00 | 0.8977 | 3.833179 | 0.021777 |
| 8:15 | 0.9013 | 3.848551 | 0.015372 |
| 8:30 | 0.905 | 3.86435 | 0.015799 |
| 8:45 | 0.9086 | 3.879722 | 0.015372 |
| 9:00 | 0.9122 | 3.895094 | 0.015372 |
| 9:15 | 0.9149 | 3.906623 | 0.011529 |
| 9:30 | 0.9176 | 3.918152 | 0.011529 |
| 9:45 | 0.9203 | 3.929681 | 0.011529 |
| 10:00 | 0.923 | 3.94121 | 0.011529 |
| 10:15 | 0.9252 | 3.950604 | 0.009394 |
| 10:30 | 0.9274 | 3.959998 | 0.009394 |
| 10:45 | 0.9296 | 3.969392 | 0.009394 |
| 11:00 | 0.9318 | 3.978786 | 0.009394 |
| 11:15 | 0.9337 | 3.986899 | 0.008113 |
| 11:30 | 0.9355 | 3.994585 | 0.007686 |
| 11:45 | 0.9374 | 4.002698 | 0.008113 |
| 12:00 | 0.9392 | 4.010384 | 0.007686 |
| 12:15 | 0.9409 | 4.017643 | 0.007259 |
| 12:30 | 0.9425 | 4.024475 | 0.006832 |
| 12:45 | 0.9442 | 4.031734 | 0.007259 |
| 13:00 | 0.9458 | 4.038566 | 0.006832 |
| 13:15 | 0.9475 | 4.045825 | 0.007259 |
| 13:30 | 0.9491 | 4.052657 | 0.006832 |



| 100-year total storm depth (in) | 4.27 | in |
|---|---|---|

| Time | Unit Precipitation (Type II-75) | Unit Precipitation * Storm Depth | Incremental Rainfall (in) |
|---|---|---|---|
| 13:45 | 0.9508 | 4.059916 | 0.007259 |
| 14:00 | 0.9524 | 4.066748 | 0.006832 |
| 14:15 | 0.9539 | 4.073153 | 0.006405 |
| 14:30 | 0.9553 | 4.079131 | 0.005978 |
| 14:45 | 0.9568 | 4.085536 | 0.006405 |
| 15:00 | 0.9582 | 4.091514 | 0.005978 |
| 15:15 | 0.9596 | 4.097492 | 0.005978 |
| 15:30 | 0.9611 | 4.103897 | 0.006405 |
| 15:45 | 0.9625 | 4.109875 | 0.005978 |
| 16:00 | 0.964 | 4.11628 | 0.006405 |
| 16:15 | 0.9653 | 4.121831 | 0.005551 |
| 16:30 | 0.9666 | 4.127382 | 0.005551 |
| 16:45 | 0.9679 | 4.132933 | 0.005551 |
| 17:00 | 0.9692 | 4.138484 | 0.005551 |
| 17:15 | 0.9704 | 4.143608 | 0.005124 |
| 17:30 | 0.9717 | 4.149159 | 0.005551 |
| 17:45 | 0.973 | 4.15471 | 0.005551 |
| 18:00 | 0.9743 | 4.160261 | 0.005551 |
| 18:15 | 0.9755 | 4.165385 | 0.005124 |
| 18:30 | 0.9766 | 4.170082 | 0.004697 |
| 18:45 | 0.9778 | 4.175206 | 0.005124 |
| 19:00 | 0.979 | 4.18033 | 0.005124 |
| 19:15 | 0.9801 | 4.185027 | 0.004697 |
| 19:30 | 0.9813 | 4.190151 | 0.005124 |
| 19:45 | 0.9824 | 4.194848 | 0.004697 |
| 20:00 | 0.9836 | 4.199972 | 0.005124 |
| 20:15 | 0.9847 | 4.204669 | 0.004697 |
| 20:30 | 0.9858 | 4.209366 | 0.004697 |
| 20:45 | 0.9868 | 4.213636 | 0.00427 |
| 21:00 | 0.9879 | 4.218333 | 0.004697 |
| 21:15 | 0.989 | 4.22303 | 0.004697 |
| 21:30 | 0.9901 | 4.227727 | 0.004697 |
| 21:45 | 0.9911 | 4.231997 | 0.00427 |
| 22:00 | 0.9922 | 4.236694 | 0.004697 |
| 22:15 | 0.9932 | 4.240964 | 0.00427 |
| 22:30 | 0.9942 | 4.245234 | 0.00427 |
| 22:45 | 0.9951 | 4.249077 | 0.003843 |
| 23:00 | 0.9961 | 4.253347 | 0.00427 |
| 23:15 | 0.9971 | 4.257617 | 0.00427 |
| 23:30 | 0.9981 | 4.261887 | 0.00427 |
| 23:45 | 0.999 | 4.26573 | 0.003843 |
| 0:00 | 1 | 4.27 | 0.00427 |

Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

| Subbasin | Total Area (mi2) | Total Area (ft2) | Total Impervious Area (ft2) [a,b] | Percent Impervious (%) | Total Pervious Area (ft2) | Composite CN AMC II [c,d] | Composite CN AMC III [c,d] |
|---|---|---|---|---|---|---|---|
| F1 | 0.374 | 10415745 | 44662 | 0.4 | 10371083 | 86 | 95 |
| F2 | 0.473 | 6712878 | 10135 | 0.2 | 6702743 | 89 | 96 |
| F3 | 0.026 | 738135 | 13712 | 1.9 | 724422 | 87 | 95 |
| F4 | 0.063 | 1753009 | 23770 | 1.4 | 1729239 | 90 | 96 |
| F5 | 0.473 | 6469040 | 17776 | 0.3 | 6451264 | 91 | 97 |
| F6 | 0.012 | 340566 | 2895 | 0.9 | 337671 | 82 | 93 |
| F7 | 0.100 | 2791803 | 24029 | 0.0 | 2767774 | 89 | 96 |
| F8 | 0.143 | 3931945 | 74983 | 1.9 | 3856961 | 82 | 93 |
| F9 | 0.026 | 734126 | 0 | 0.0 | 734126 | 82 | 93 |
| R1 | 0.007 | 183539 | 34206 | 18.6 | 149332 | 74 | 88 |
| R2 | 0.008 | 226740 | 26518 | 11.7 | 200222 | 78 | 91 |
| R3 | 0.079 | 2129986 | 44315 | 2.1 | 2085671 | 82 | 93 |
| R4 | 0.022 | 616259 | 35483 | 5.8 | 580776 | 80 | 91 |
| R5 | 0.007 | 198429 | 3062 | 1.5 | 195367 | 79 | 91 |
| R6 | 0.011 | 307923 | 48015 | 15.6 | 259908 | 79 | 91 |

| Subbasin | Total Area (mi2) | Total Area (ft2) | Total Impervious Area (ft2) [a,b] | Percent Impervious (%) | Total Pervious Area (ft2) | Composite CN AMC II [c,d] | Composite CN AMC III [c,d] |
|---|---|---|---|---|---|---|---|
| R7 | 0.013 | 376681 | 55983 | 14.9 | 320698 | 85 | 93 |
| R8 | 0.007 | 130828 | 34415 | 26.3 | 96413 | 85 | 94 |
| R9 | 0.006 | 106040 | 19892 | 18.8 | 86149 | 85 | 94 |
| R10 | 0.015 | 352634 | 51572 | 14.6 | 301062 | 81 | 92 |
| R11 | 0.018 | 651288 | 527 | 0.1 | 650761 | 81 | 92 |
| R12 | 0.012 | 314132 | 3550 | 1.1 | 310582 | 82 | 93 |
| R13 | 0.022 | 629606 | 56019 | 8.9 | 573587 | 82 | 93 |
| R14 | 0.031 | 890352 | 8224 | 0.9 | 882128 | 82 | 93 |
| R15 | 0.017 | 442068 | 0 | 0.0 | 442068 | 82 | 93 |
| R16 | 0.008 | 235864 | 11178 | 4.7 | 224687 | 68 | 84 |
| R17 | 0.014 | 395133 | 388 | 0.1 | 394746 | 81 | 92 |
| R18 | 0.014 | 406358 | 0 | 0.0 | 406358 | 82 | 93 |
| R19 | 0.025 | 697082 | 85220 | 12.2 | 611862 | 73 | 87 |
| R20 | 0.030 | 831664 | 34600 | 4.2 | 797064 | 68 | 84 |
| R21 | 0.039 | 1097453 | 516 | 0.0 | 1096937 | 69 | 85 |

Notes
a - Includes delineated impervious area (paved roads) and the portion of the other land cover estimated as impervious area (See "CN GIS Export Data" tab).
b - Estimations for impervious area percentages within residential areas were developed by obtaining a representative takeoff of impervious area for one square block. This ratio was then applied to the majority of residential land use within the project area.
c - The "Newly Graded Areas" cover type was assumed for all remaining pervious areas of residential land use types.
c - Developed for the pervious portion of the subbasin only, as per the SCS loss method hydrologic inputs within the HEC-HMS model.

**F1**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 10 | B | 433566 | 83 | 93 |
| | | D | 740069 | 94 | 98 |
| | 20 | B | 3786562 | 82 | 93 |
| | | D | 819788 | 93 | 98 |
| | 30 | B | 181254 | 82 | 93 |
| | | D | 926915 | 92 | 97 |
| | 40 | B | 2636791 | 81 | 92 |
| | | D | 4432626 | 90 | 96 |
| Dirt (Including ROW) | -- | B | 502852 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **14460424** | **86** | **95** |

**F2**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 10 | D | 740069 | 94 | 98 |
| | 20 | B | 1885678 | 82 | 93 |
| | | D | 4946054 | 93 | 98 |
| | 30 | B | 785544 | 82 | 93 |
| | | D | 4990072 | 92 | 97 |
| | 40 | B | 2636791 | 81 | 92 |
| | | D | 4432626 | 90 | 96 |
| Dirt (Including ROW) | -- | B | 502852 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **20919685** | **89** | **96** |

**F3**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 20 | B | 1885678 | 82 | 93 |
| | | D | 629046 | 93 | 98 |
| | 30 | D | 4063157 | 92 | 97 |
| | 40 | B | 2636791 | 81 | 92 |
| Dirt (Including ROW) | -- | (blank) | 502852 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **9717524** | **87** | **95** |

**F4**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 20 | B | 1993511 | 82 | 93 |
| | | D | 4946054 | 93 | 98 |
| | 30 | B | 604290 | 82 | 93 |
| | | D | 4063157 | 92 | 97 |
| Dirt (Including ROW) | -- | B | 502852 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **12109862** | **90** | **96** |

**F5**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 20 | B | 107832 | 82 | 93 |
| | | D | 4317008 | 93 | 98 |
| | 30 | B | 604290 | 82 | 93 |
| | | D | 4063157 | 92 | 97 |
| | 40 | B | 256730 | 81 | 92 |
| | | D | 6140901 | 90 | 96 |
| Dirt (Including ROW) | -- | B | 502852 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **15992770** | **91** | **97** |

**F6**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 30 | B | 504415 | 82 | 93 |
| Dirt (Including ROW) | -- | B | 502852 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1007267** | **82** | **93** |

**F7**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 20 | D | 394363 | 93 | 98 |
| | 30 | B | 187620 | 82 | 93 |
| | | D | 1360298 | 92 | 97 |
| | 40 | B | 360598 | 81 | 92 |
| | | D | 34874 | 90 | 96 |
| | 50 | B | 141386 | 80 | 92 |
| | | D | 166755 | 89 | 96 |
| Dirt (Including ROW) | -- | B | 121741 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2767636** | **89** | **96** |

**F8**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 10 | B | 607713 | 83 | 93 |
| | 30 | B | 18426652 | 82 | 93 |
| Dirt (Including ROW) | -- | B | 509281 | 82 | 93 |
| Gravel (including ROW) | -- | B | 432886 | 85 | 94 |
| **Subbasin Composite Area & CN** | **--** | **--** | **19976532** | **82** | **93** |

**F9**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 30 | B | 7193196 | 82 | 93 |
| Dirt (Including ROW) | -- | B | 341407 | 82 | 93 |
| Gravel (including ROW) | -- | B | 432886 | 85 | 94 |
| **Subbasin Composite Area & CN** | **--** | **--** | **7967489** | **82** | **93** |

**R1**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 30 | A | 48915 | 58 | 77 |
| | | B | 100998 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **149914** | **74** | **88** |

**R2**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Commercial and business | -- | A | 19289 | 89 | 96 |
| | -- | B | 490 | 92 | 97 |
| Desert shrub | 30 | A | 48915 | 58 | 77 |
| | | B | 100998 | 82 | 93 |
| | 40 | A | 794064 | 81 | 92 |
| | | B | 0 | 0 | 0 |
| Dirt (Including ROW) | -- | A | 253553 | 72 | 87 |
| | -- | B | 7682 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1224992** | **78** | **91** |

**R3**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | Composite CN AMC II | Composite CN AMC III |
|---|---|---|---|---|---|
| Desert shrub | 10 | B | 386334 | 83 | 93 |
| | 30 | B | 12259683 | 82 | 93 |
| | 40 | B | 794282 | 81 | 92 |
| Dirt (Including ROW) | -- | B | 162154 | 82 | 93 |
| Gravel (including ROW) | -- | B | 614030 | 85 | 94 |
| **Subbasin Composite Area & CN** | **--** | **--** | **14216484** | **82** | **93** |

| R4 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 40 | A | 107981 | 57 | 76 |
| | | B | 794064 | 81 | 92 |
| Dirt (Including ROW) | -- | A | 253553 | 72 | 87 |
| | | B | 161937 | 82 | 93 |
| Gravel (Including ROW) | -- | A | 61817 | 76 | 90 |
| | | B | 410569 | 85 | 94 |
| Residential 3/4 acre lots | -- | B | 262743 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2052664** | **80** | **91** |

| R5 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 40 | A | 107981 | 57 | 76 |
| | | B | 794064 | 81 | 92 |
| Dirt (Including ROW) | -- | A | 253553 | 72 | 87 |
| Gravel (Including ROW) | -- | A | 67889 | 76 | 90 |
| | | B | 410569 | 85 | 94 |
| Residential 1/4 acre lots | | B | 71811 | 77 | 90 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1705867** | **79** | **91** |

| R6 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Commercial and business | -- | A | 20250 | 89 | 96 |
| | | B | 6220 | 92 | 97 |
| Desert shrub | 30 | A | 22978 | 58 | 77 |
| | | B | 1394 | 82 | 93 |
| | 40 | A | 107981 | 57 | 76 |
| | | B | 794064 | 81 | 92 |
| Dirt (Including ROW) | -- | A | 253553 | 72 | 87 |
| | | B | 7682 | 82 | 93 |
| Gravel (Including ROW) | -- | A | 67889 | 76 | 90 |
| | | B | 216443 | 85 | 94 |
| Residential 1/2 acre lots | -- | A | 2847 | 77 | 90 |
| | | B | 20436 | 86 | 95 |
| Residential 1/4 acre lots | -- | A | 71811 | 77 | 90 |
| | | B | 20123 | 86 | 95 |
| Residential 3/4 acre lots | -- | A | 31 | 77 | 90 |
| | | B | 137056 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1750759** | **79** | **91** |

| R7 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 40 | B | 794282 | 81 | 92 |
| | 80 | B | 25179 | 78 | 91 |
| Dirt (Including ROW) | -- | B | 137401 | 82 | 93 |
| Gravel (Including ROW) | -- | B | 627011 | 85 | 94 |
| Residential 1/2 acre lots | -- | B | 8153 | 86 | 95 |
| Residential 3/4 acre lots | -- | B | 417924 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2009952** | **83** | **93** |

| R8 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Commercial and business | -- | A | 961 | 89 | 96 |
| | | B | 6220 | 92 | 97 |
| Gravel (Including ROW) | -- | A | 61817 | 76 | 90 |
| | | B | 627011 | 85 | 94 |
| Residential 1/2 acre lots | -- | A | 2847 | 77 | 90 |
| | | B | 20436 | 86 | 95 |
| Residential 3/4 acre lots | -- | B | 309236 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1028528** | **85** | **94** |

| R9 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Gravel (Including ROW) | -- | B | 216443 | 85 | 94 |
| Residential 3/4 acre lots | -- | B | 172179 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **388622** | **85** | **94** |

| R10 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 50 | B | 23098 | 80 | 92 |
| | 80 | A | 59571 | 50 | 70 |
| | | B | 32813 | 78 | 91 |
| Dirt (Including ROW) | -- | A | 25592 | 72 | 87 |
| | | B | 23041 | 82 | 93 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| | | B | 216443 | 85 | 94 |
| Residential 3/4 acre lots | -- | A | 17985 | 77 | 90 |
| | | B | 591475 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1389912** | **81** | **92** |

| R11 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 133153 | 58 | 77 |
| | | B | 6129842 | 82 | 93 |
| | 80 | A | 59571 | 50 | 70 |
| | | B | 7634 | 78 | 91 |
| Dirt (Including ROW) | -- | A | 119499 | 72 | 87 |
| | | B | 193106 | 82 | 93 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| | | B | 216443 | 85 | 94 |
| Residential 3/4 acre lots | -- | A | 17985 | 77 | 90 |
| | | B | 262743 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **7539871** | **81** | **92** |

| R12 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 31620 | 58 | 77 |
| | | B | 6129842 | 82 | 93 |
| Dirt (Including ROW) | -- | A | 50187 | 72 | 87 |
| | | B | 148707 | 82 | 93 |
| Residential 1/4 acre lots | -- | B | 147920 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **6508275** | **82** | **93** |

| R13 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 31620 | 58 | 77 |
| | | B | 6129842 | 82 | 93 |
| Dirt (Including ROW) | -- | A | 50187 | 72 | 87 |
| | | B | 148707 | 82 | 93 |
| Residential 1/4 acre lots | -- | A | 84219 | 77 | 90 |
| | | B | 147920 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **6592494** | **82** | **93** |

| R14 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 31620 | 58 | 77 |
| | | B | 18389525 | 82 | 93 |
| Dirt (Including ROW) | -- | B | 655530 | 82 | 93 |
| Residential 1/4 acre lots | -- | A | 84219 | 77 | 90 |
| | | B | 147920 | 86 | 95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **19308814** | **82** | **93** |

| R15 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | B | 12259683 | 82 | 93 |
| Dirt (Including ROW) | -- | B | 655530 | 82 | 93 |
| **Subbasin Composite Area & CN** | **--** | **--** | **12915214** | **82** | **93** |

| R16 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 223194 | 58 | 77 |
| | 50 | A | 62264 | 55 | 74 |
| | 70 | A | 53931 | 52 | 72 |
| Dirt (Including ROW) | -- | A | 85092 | 72 | 87 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| Residential 1/8 acre lots | -- | A | 44711 | 77 | 90 |
| **Subbasin Composite Area & CN** | **--** | **--** | **869087** | **68** | **84** |

| R17 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 153280 | 58 | 77 |
| | | B | 7193196 | 82 | 93 |
| | 50 | A | 62264 | 55 | 74 |
| | | B | 12166 | 80 | 92 |
| Dirt (Including ROW) | -- | A | 55150 | 72 | 87 |
| | | B | 192701 | 82 | 93 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| | | B | 216443 | 85 | 94 |
| Residential 1/4 acre lots | -- | A | 84219 | 77 | 90 |
| **Subbasin Composite Area & CN** | **--** | **--** | **8369313** | **81** | **92** |

| R18 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | B | 7193196 | 82 | 93 |
| Dirt (Including ROW) | -- | B | 192701 | 82 | 93 |
| Gravel (Including ROW) | -- | B | 216443 | 85 | 94 |
| **Subbasin Composite Area & CN** | **--** | **--** | **7602339** | **82** | **93** |

| R19 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Pinon | 20 | A | 616865 | 60 | 79 |
| | | B | 400651 | 82 | 93 |
| | 50 | A | 84759 | 55 | 74 |
| | | B | 51 | 80 | 92 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| | | B | 216443 | 85 | 94 |
| Pinon | 60 | A | 53577 | 58 | 77 |
| Residential 1/2 acre lots | -- | A | 102212 | 77 | 90 |
| Residential 1/4 acre lots | -- | A | 45385 | 77 | 90 |
| Residential 3/4 acre lots | -- | A | 333749 | 77 | 90 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2253586** | **73** | **87** |

| R20 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 30 | A | 346589 | 58 | 77 |
| | 50 | A | 194985 | 55 | 74 |
| Dirt (Including ROW) | -- | A | 46427 | 72 | 87 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| Pinon | 40 | A | 52248 | 58 | 77 |
| Residential 3/4 acre lots | -- | A | 333749 | 77 | 90 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1373892** | **68** | **84** |

| R21 | | | | | |
|---|---|---|---|---|---|
| | | | | Composite CN | |
| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ft2) | AMC II | AMC III |
| Desert shrub | 20 | A | 593632 | 60 | 79 |
| | | B | 400651 | 82 | 93 |
| | 30 | A | 346589 | 58 | 77 |
| Dirt (Including ROW) | -- | A | 46427 | 72 | 87 |
| Gravel (Including ROW) | -- | A | 399895 | 76 | 90 |
| Pinon | 40 | A | 52248 | 58 | 77 |
| | 60 | A | 53577 | 58 | 77 |
| Residential 3/4 acre lots | -- | A | 333749 | 77 | 90 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2226768** | **69** | **85** |

Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

| BasinID | Area (mi2) | Land Use | % Cover | HSG | CN Value (AMC II) | CN Value (AMC III) | Area [Total,(ft2)] | % Impervious | Area [Impervious, (ft2)] | Area [Pervious, (ft2)] |
|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 0.37362 | Impervious | | B | 98 | 99 | 44662.031 | 100 | 44662.03101 | 0 |
| F1 | 0.37362 | Dirt (including ROW) | | B | 82 | 93 | 165200.385 | 0 | 0 | 165200.3849 |
| F1 | 0.37362 | Desert shrub | 40 | B | 81 | 92 | 2319381.08 | 0 | 0 | 2319381.084 |
| F1 | 0.37362 | Desert shrub | 40 | D | 90 | 96 | 3114377.02 | 0 | 0 | 3114377.022 |
| F1 | 0.37362 | Desert shrub | 20 | B | 82 | 93 | 580009.258 | 0 | 0 | 580009.2579 |
| F1 | 0.37362 | Desert shrub | 20 | D | 93 | 98 | 819788.456 | 0 | 0 | 819788.4557 |
| F1 | 0.37362 | Desert shrub | 20 | B | 82 | 93 | 1320868.86 | 0 | 0 | 1320868.86 |
| F1 | 0.37362 | Desert shrub | 10 | B | 83 | 93 | 433566.172 | 0 | 0 | 433566.172 |
| F1 | 0.37362 | Desert shrub | 10 | D | 94 | 98 | 738473.437 | 0 | 0 | 738473.4369 |
| F1 | 0.37362 | Desert shrub | 20 | B | 82 | 93 | 128286.028 | 0 | 0 | 128286.0277 |
| F1 | 0.37362 | Desert shrub | 30 | B | 82 | 93 | 158396.631 | 0 | 0 | 158396.6314 |
| F1 | 0.37362 | Desert shrub | 30 | D | 92 | 97 | 592735.34 | 0 | 0 | 592735.3396 |
| F10 | 0.02633 | Desert shrub | 30 | B | 82 | 93 | 112716.171 | 0 | 0 | 112716.1706 |
| F10 | 0.02633 | Gravel (including ROW) | | B | 85 | 94 | 45586.7887 | 0 | 0 | 45586.78872 |
| F10 | 0.02633 | Desert shrub | 30 | B | 82 | 93 | 533407.668 | 0 | 0 | 533407.6683 |
| F10 | 0.02633 | Dirt (including ROW) | | B | 82 | 93 | 13620.2913 | 0 | 0 | 13620.29131 |
| F10 | 0.02633 | Dirt (including ROW) | | B | 82 | 93 | 28792.0475 | 0 | 0 | 28792.04753 |
| F10 | 0.02633 | Gravel (including ROW) | | B | 85 | 94 | 2.46427338 | 0 | 0 | 2.464273378 |
| F10 | 0.02633 | Dirt (including ROW) | | B | 82 | 93 | 1.06599632 | 0 | 0 | 1.065996321 |
| F2 | 0.47266 | Impervious | | B | 98 | 99 | 10134.8509 | 100 | 10134.85086 | 0 |
| F2 | 0.47266 | Desert shrub | 20 | D | 93 | 98 | 264.38689 | 0 | 0 | 264.3868903 |
| F2 | 0.47266 | Dirt (including ROW) | | B | 82 | 93 | 25437.4182 | 0 | 0 | 25437.41824 |
| F2 | 0.47266 | Desert shrub | 40 | B | 81 | 92 | 206138.5 | 0 | 0 | 206138.5004 |
| F2 | 0.47266 | Desert shrub | 40 | D | 90 | 96 | 1317373.07 | 0 | 0 | 1317373.073 |
| F2 | 0.47266 | Desert shrub | 10 | D | 94 | 98 | 1595.32621 | 0 | 0 | 1595.326212 |
| F2 | 0.47266 | Desert shrub | 20 | B | 82 | 93 | 1044109.87 | 0 | 0 | 1044109.875 |
| F2 | 0.47266 | Desert shrub | 20 | D | 93 | 98 | 194210.478 | 0 | 0 | 194210.478 |
| F2 | 0.47266 | Desert shrub | 30 | B | 82 | 93 | 22857.4935 | 0 | 0 | 22857.49349 |
| F2 | 0.47266 | Desert shrub | 30 | D | 92 | 97 | 334179.765 | 0 | 0 | 334179.7647 |
| F2 | 0.47266 | Desert shrub | 30 | B | 82 | 93 | 155074.347 | 0 | 0 | 155074.3473 |
| F2 | 0.47266 | Desert shrub | 30 | D | 92 | 97 | 3401502.05 | 0 | 0 | 3401502.053 |
| F3 | 0.02648 | Impervious | | B | 98 | 99 | 13712.462 | 100 | 13712.46201 | 0 |
| F3 | 0.02648 | Dirt (including ROW) | | B | 82 | 93 | 33297.9241 | 0 | 0 | 33297.92408 |
| F3 | 0.02648 | Desert shrub | 40 | B | 81 | 92 | 111270.155 | 0 | 0 | 111270.1548 |
| F3 | 0.02648 | Desert shrub | 20 | B | 82 | 93 | 296681.367 | 0 | 0 | 296681.367 |
| F3 | 0.02648 | Desert shrub | 20 | D | 93 | 98 | 252761.714 | 0 | 0 | 252761.7145 |
| F3 | 0.02648 | Desert shrub | 30 | D | 92 | 97 | 30410.9156 | 0 | 0 | 30410.91563 |
| F4 | 0.06283 | Impervious | | B | 98 | 99 | 23770.247 | 100 | 23770.24701 | 0 |
| F4 | 0.06283 | Desert shrub | 20 | B | 82 | 93 | 6129.62347 | 0 | 0 | 6129.623468 |
| F4 | 0.06283 | Desert shrub | 20 | D | 93 | 98 | 8.09474202 | 0 | 0 | 8.094742023 |
| F4 | 0.06283 | Dirt (including ROW) | | B | 82 | 93 | 63297.4802 | 0 | 0 | 63297.4802 |
| F4 | 0.06283 | Desert shrub | 20 | B | 82 | 93 | 416600.995 | 0 | 0 | 416600.9948 |
| F4 | 0.06283 | Desert shrub | 20 | D | 93 | 98 | 182073.775 | 0 | 0 | 182073.7748 |
| F4 | 0.06283 | Desert shrub | 30 | B | 82 | 93 | 449158.541 | 0 | 0 | 449158.5409 |
| F4 | 0.06283 | Desert shrub | 30 | D | 92 | 97 | 611970.734 | 0 | 0 | 611970.7336 |
| F5 | 0.47266 | Impervious | | B | 98 | 99 | 17776.347 | 100 | 17776.34704 | 0 |
| F5 | 0.47266 | Desert shrub | 20 | B | 82 | 93 | 101702.786 | 0 | 0 | 101702.7864 |
| F5 | 0.47266 | Desert shrub | 20 | D | 93 | 98 | 4316735.09 | 0 | 0 | 4316735.089 |
| F5 | 0.47266 | Desert shrub | 40 | B | 81 | 92 | 256730.398 | 0 | 0 | 256730.3981 |
| F5 | 0.47266 | Desert shrub | 40 | D | 90 | 96 | 1708269.16 | 0 | 0 | 1708269.158 |
| F5 | 0.47266 | Dirt (including ROW) | | B | 82 | 93 | 47629.2596 | 0 | 0 | 47629.25958 |
| F5 | 0.47266 | Desert shrub | 40 | D | 90 | 96 | 867.437874 | 0 | 0 | 867.4378744 |
| F5 | 0.47266 | Desert shrub | 30 | B | 82 | 93 | 56.7893617 | 0 | 0 | 56.78936171 |
| F5 | 0.47266 | Desert shrub | 30 | D | 92 | 97 | 19272.8357 | 0 | 0 | 19272.83573 |
| F6 | 0.01221 | Impervious | | B | 98 | 99 | 2895.40299 | 100 | 2895.402994 | 0 |
| F6 | 0.01221 | Dirt (including ROW) | | B | 82 | 93 | 20875.7512 | 0 | 0 | 20875.75117 |
| F6 | 0.01221 | Desert shrub | 30 | B | 82 | 93 | 316794.998 | 0 | 0 | 316794.998 |
| F7 | 0.0782 | Impervious | | B | 98 | 99 | 8048.22732 | 100 | 8048.227321 | 0 |
| F7 | 0.0782 | Desert shrub | 40 | B | 81 | 92 | 0.20811346 | 0 | 0 | 0.208113456 |
| F7 | 0.0782 | Desert shrub | 40 | D | 90 | 96 | 68.0361272 | 0 | 0 | 68.03612716 |
| F7 | 0.0782 | Desert shrub | 20 | D | 93 | 98 | 394261.457 | 0 | 0 | 394261.4571 |
| F7 | 0.0782 | Desert shrub | 50 | B | 80 | 92 | 141386.497 | 0 | 0 | 141386.4969 |
| F7 | 0.0782 | Desert shrub | 50 | D | 89 | 96 | 166755.333 | 0 | 0 | 166755.3329 |
| F7 | 0.0782 | Dirt (including ROW) | | B | 82 | 93 | 48675.466 | 0 | 0 | 48675.46598 |
| F7 | 0.0782 | Desert shrub | 40 | B | 81 | 92 | 2406.04941 | 0 | 0 | 2406.049412 |
| F7 | 0.0782 | Desert shrub | 30 | B | 82 | 93 | 187620.449 | 0 | 0 | 187620.4494 |
| F7 | 0.0782 | Desert shrub | 30 | D | 92 | 97 | 1360297.7 | 0 | 0 | 1360297.698 |
| F7 | 0.01574 | Impervious | | B | 98 | 99 | 15980.9235 | 100 | 15980.92354 | 0 |
| F7 | 0.01574 | Dirt (including ROW) | | B | 82 | 93 | 7.0711351 | 0 | 0 | 7.071135101 |
| F7 | 0.01574 | Desert shrub | 40 | B | 81 | 92 | 349710.385 | 0 | 0 | 349710.3847 |
| F7 | 0.01574 | Desert shrub | 40 | D | 90 | 96 | 34874.263 | 0 | 0 | 34874.26295 |
| F7 | 0.01574 | Desert shrub | 50 | B | 80 | 92 | 4.69998422 | 0 | 0 | 4.699984218 |
| F7 | 0.01574 | Dirt (including ROW) | | B | 82 | 93 | 73065.4401 | 0 | 0 | 73065.44015 |
| F7 | 0.01574 | Desert shrub | 40 | B | 81 | 92 | 8481.23573 | 0 | 0 | 8481.235726 |
| F9 | 0.14328 | Desert shrub | 30 | B | 82 | 93 | 2957324.7 | 0 | 0 | 2957324.699 |
| F9 | 0.14328 | Gravel (including ROW) | | B | 85 | 94 | 3759.94948 | 0 | 0 | 3759.949476 |
| F9 | 0.14328 | Impervious | | B | 98 | 99 | 18863.1513 | 100 | 18863.15131 | 0 |
| F9 | 0.14328 | Impervious | | B | 98 | 99 | 56120.1818 | 100 | 56120.18185 | 0 |
| F9 | 0.14328 | Desert shrub | 10 | B | 83 | 93 | 607689.363 | 0 | 0 | 607689.3628 |
| F9 | 0.14328 | Desert shrub | 30 | B | 82 | 93 | 37052.9858 | 0 | 0 | 37052.9858 |
| F9 | 0.14328 | Dirt (including ROW) | | B | 82 | 93 | 211820.094 | 0 | 0 | 211820.0945 |
| F9 | 0.14328 | Dirt (including ROW) | | B | 82 | 93 | 39243.8102 | 0 | 0 | 39243.81019 |
| F9 | 0.14328 | Gravel (including ROW) | | B | 85 | 94 | 2.46427338 | 0 | 0 | 2.464273378 |
| F9 | 0.14328 | Dirt (including ROW) | | B | 82 | 93 | 1.06599632 | 0 | 0 | 1.065996321 |
| F9 | 0.14328 | Desert shrub | 30 | B | 82 | 93 | 34.1542502 | 0 | 0 | 34.15425017 |
| F9 | 0.14328 | Desert shrub | 30 | B | 82 | 93 | 32.8847758 | 0 | 0 | 32.88477579 |
| R1 | 0.00658 | Impervious | | B | 98 | 99 | 33790.5388 | 100 | 33790.53875 | 0 |
| R1 | 0.00658 | Impervious | | A | 98 | 99 | 415.83312 | 100 | 415.8331202 | 0 |
| R1 | 0.00658 | Desert shrub | 30 | B | 82 | 93 | 100506.582 | 0 | 0 | 100506.5818 |
| R1 | 0.00658 | Desert shrub | 30 | A | 58 | 77 | 48825.6267 | 0 | 0 | 48825.62666 |
| R10 | 0.01491 | Residential 3/4 acre lots | | A | 77 | 90 | 22267.1821 | 20 | 4453.436426 | 17813.7457 |
| R10 | 0.01491 | Residential 3/4 acre lots | | B | 86 | 95 | 144681.055 | 20 | 28936.21094 | 115744.8437 |
| R10 | 0.01491 | Gravel (including ROW) | | A | 76 | 90 | 4707.84515 | 0 | 0 | 4707.845153 |
| R10 | 0.01491 | Gravel (including ROW) | | B | 85 | 94 | 36038.5146 | 0 | 0 | 36038.51463 |
| R10 | 0.01491 | Residential 3/4 acre lots | | B | 86 | 95 | 72.2209084 | 20 | 14.44418167 | 57.7767267 |
| R10 | 0.01491 | Residential 3/4 acre lots | | B | 86 | 95 | 2953.82693 | 20 | 590.7653863 | 2363.061545 |
| R10 | 0.01491 | Desert shrub | 80 | A | 50 | 70 | 1623.96878 | 0 | 0 | 1623.968777 |
| R10 | 0.01491 | Desert shrub | 80 | B | 78 | 91 | 127.654685 | 0 | 0 | 127.6546848 |

| BasinID | Area (mi2) | Land Use | % Cover | HSG | CN Value (AMC II) | CN Value (AMC III) | Area [Total,(ft2)] | % Impervious | Area [Impervious, (ft2)] | Area [Pervious, (ft2)] |
|---|---|---|---|---|---|---|---|---|---|---|
| R10 | 0.01491 | Residential 3/4 acre lots | | B | 86 | 95 | 3800.33554 | 20 | 760.0671082 | 3040.268433 |
| R10 | 0.01491 | Residential 3/4 acre lots | | B | 86 | 95 | 84083.6092 | 20 | 16816.72183 | 67266.88733 |
| R10 | 0.01491 | Dirt (including ROW) | | A | 72 | 87 | 3352.24217 | 0 | 0 | 3352.24217 |
| R10 | 0.01491 | Dirt (including ROW) | | B | 82 | 93 | 859.809714 | 0 | 0 | 859.8097142 |
| R10 | 0.01491 | Desert shrub | 50 | B | 80 | 92 | 23098.2994 | 0 | 0 | 23098.29936 |
| R10 | 0.01491 | Desert shrub | 80 | B | 78 | 91 | 24967.3663 | 0 | 0 | 24967.36627 |
| R11 | 0.01805 | Desert shrub | 30 | A | 58 | 77 | 17788.1061 | 0 | 0 | 17788.10613 |
| R11 | 0.01805 | Desert shrub | 30 | B | 82 | 93 | 244579.14 | 0 | 0 | 244579.1404 |
| R11 | 0.01805 | Residential 3/4 acre lots | | A | 77 | 90 | 214.429687 | 20 | 42.88593741 | 171.5437497 |
| R11 | 0.01805 | Residential 3/4 acre lots | | B | 86 | 95 | 2421.52266 | 20 | 484.304531 | 1937.218124 |
| R11 | 0.01805 | Gravel (including ROW) | | A | 76 | 90 | 79036.1061 | 0 | 0 | 79036.10606 |
| R11 | 0.01805 | Gravel (including ROW) | | B | 85 | 94 | 35998.2013 | 0 | 0 | 35998.20127 |
| R11 | 0.01805 | Desert shrub | 80 | A | 50 | 70 | 57946.6043 | 0 | 0 | 57946.60434 |
| R11 | 0.01805 | Desert shrub | 80 | B | 78 | 91 | 7505.90741 | 0 | 0 | 7505.907415 |
| R11 | 0.01805 | Dirt (including ROW) | | A | 72 | 87 | 22239.3162 | 0 | 0 | 22239.31617 |
| R11 | 0.01805 | Dirt (including ROW) | | B | 82 | 93 | 22181.6819 | 0 | 0 | 22181.68187 |
| R11 | 0.01805 | Dirt (including ROW) | | A | 72 | 87 | 20159.5777 | 0 | 0 | 20159.57769 |
| R11 | 0.01805 | Dirt (including ROW) | | B | 82 | 93 | 13829.9114 | 0 | 0 | 13829.9114 |
| R11 | 0.01805 | Dirt (including ROW) | | A | 72 | 87 | 13779.1909 | 0 | 0 | 13779.19088 |
| R11 | 0.01805 | Dirt (including ROW) | | B | 82 | 93 | 21335.4158 | 0 | 0 | 21335.4158 |
| R11 | 0.01805 | Dirt (including ROW) | | A | 72 | 87 | 22798.7049 | 0 | 0 | 22798.70488 |
| R11 | 0.01805 | Dirt (including ROW) | | B | 82 | 93 | 22.8205823 | 0 | 0 | 22.82058227 |
| R11 | 0.01805 | Desert shrub | 30 | A | 58 | 77 | 69451.3777 | 0 | 0 | 69451.37773 |
| R12 | 0.01173 | Desert shrub | 30 | A | 58 | 77 | 600.771088 | 0 | 0 | 600.7710881 |
| R12 | 0.01173 | Desert shrub | 30 | B | 82 | 93 | 261869.632 | 0 | 0 | 261869.6316 |
| R12 | 0.01173 | Dirt (including ROW) | | A | 72 | 87 | 6792.07837 | 0 | 0 | 6792.078373 |
| R12 | 0.01173 | Dirt (including ROW) | | B | 82 | 93 | 41194.3616 | 0 | 0 | 41194.36157 |
| R12 | 0.01173 | Residential 1/4 acre lots | | B | 86 | 95 | 156.290311 | 20 | 31.25806221 | 125.0322488 |
| R12 | 0.01173 | Impervious | | B | 98 | 99 | 671.774536 | 100 | 671.7745358 | 0 |
| R12 | 0.01173 | Impervious | | B | 98 | 99 | 2846.61227 | 100 | 2846.612275 | 0 |
| R13 | 0.02226 | Desert shrub | 30 | A | 58 | 77 | 406.313845 | 0 | 0 | 406.3138448 |
| R13 | 0.02226 | Desert shrub | 30 | B | 82 | 93 | 321639.288 | 0 | 0 | 321639.2879 |
| R13 | 0.02226 | Dirt (including ROW) | | A | 72 | 87 | 15169.8255 | 0 | 0 | 15169.82554 |
| R13 | 0.02226 | Dirt (including ROW) | | B | 82 | 93 | 25299.4551 | 0 | 0 | 25299.45509 |
| R13 | 0.02226 | Residential 1/4 acre lots | | A | 77 | 90 | 103333.525 | 20 | 20666.70499 | 82666.81998 |
| R13 | 0.02226 | Residential 1/4 acre lots | | B | 86 | 95 | 160506.274 | 20 | 32101.25489 | 128405.0196 |
| R13 | 0.02226 | Impervious | | B | 98 | 99 | 3251.42031 | 100 | 3251.420312 | 0 |
| R14 | 0.03091 | Desert shrub | 30 | A | 58 | 77 | 6024.35532 | 0 | 0 | 6024.355317 |
| R14 | 0.03091 | Desert shrub | 30 | B | 82 | 93 | 686158.164 | 0 | 0 | 686158.1636 |
| R14 | 0.03091 | Dirt (including ROW) | | B | 82 | 93 | 160.317211 | 0 | 0 | 160.3172106 |
| R14 | 0.03091 | Residential 1/4 acre lots | | A | 77 | 90 | 2.96539568 | 20 | 0.593079137 | 2.372316546 |
| R14 | 0.03091 | Residential 1/4 acre lots | | B | 86 | 95 | 24237.0831 | 20 | 4847.416628 | 19389.66651 |
| R14 | 0.03091 | Dirt (including ROW) | | B | 82 | 93 | 170204.039 | 0 | 0 | 170204.0395 |
| R14 | 0.03091 | Impervious | | B | 98 | 99 | 3375.59811 | 100 | 3375.598109 | 0 |
| R14 | 0.03091 | Desert shrub | 30 | B | 82 | 93 | 100.348383 | 0 | 0 | 100.3483833 |
| R14 | 0.03091 | Dirt (including ROW) | | B | 82 | 93 | 4.12578687 | 0 | 0 | 4.125786867 |
| R14 | 0.03091 | Dirt (including ROW) | | B | 82 | 93 | 50.6802786 | 0 | 0 | 50.68027859 |
| R14 | 0.03091 | Desert shrub | 30 | B | 82 | 93 | 34.1542502 | 0 | 0 | 34.15425017 |
| R15 | 0.01665 | Desert shrub | 30 | B | 82 | 93 | 431346.353 | 0 | 0 | 431346.3531 |
| R15 | 0.01665 | Dirt (including ROW) | | B | 82 | 93 | 1762.86812 | 0 | 0 | 1762.868116 |
| R15 | 0.01665 | Dirt (including ROW) | | B | 82 | 93 | 8803.75405 | 0 | 0 | 8803.754055 |
| R15 | 0.01665 | Desert shrub | 30 | B | 82 | 93 | 100.348383 | 0 | 0 | 100.3483833 |
| R15 | 0.01665 | Dirt (including ROW) | | B | 82 | 93 | 4.12578687 | 0 | 0 | 4.125786867 |
| R15 | 0.01665 | Dirt (including ROW) | | B | 82 | 93 | 50.6802786 | 0 | 0 | 50.68027859 |
| R16 | 0.00846 | Gravel (including ROW) | | A | 76 | 90 | 54790.415 | 0 | 0 | 54790.41498 |
| R16 | 0.00846 | Desert shrub | 30 | A | 58 | 77 | 24093.1084 | 0 | 0 | 24093.1084 |
| R16 | 0.00846 | Residential 1/8 acre lots | | A | 77 | 90 | 55888.8387 | 20 | 11177.76774 | 44711.07095 |
| R16 | 0.00846 | Dirt (including ROW) | | A | 72 | 87 | 3867.23465 | 0 | 0 | 3867.234645 |
| R16 | 0.00846 | Dirt (including ROW) | | A | 72 | 87 | 7143.11966 | 0 | 0 | 7143.119657 |
| R16 | 0.00846 | Dirt (including ROW) | | A | 72 | 87 | 1106.40185 | 0 | 0 | 1106.401851 |
| R16 | 0.00846 | Desert shrub | 30 | A | 58 | 77 | 32082.2316 | 0 | 0 | 32082.23163 |
| R16 | 0.00846 | Desert shrub | 70 | A | 52 | 72 | 53931.161 | 0 | 0 | 53931.16104 |
| R16 | 0.00846 | Desert shrub | 50 | A | 55 | 74 | 2961.87252 | 0 | 0 | 2961.872522 |
| R17 | 0.01429 | Desert shrub | 30 | A | 58 | 77 | 6800.09756 | 0 | 0 | 6800.097555 |
| R17 | 0.01429 | Desert shrub | 30 | B | 82 | 93 | 1297.31223 | 0 | 0 | 1297.312232 |
| R17 | 0.01429 | Gravel (including ROW) | | A | 76 | 90 | 33092.8642 | 0 | 0 | 33092.86423 |
| R17 | 0.01429 | Gravel (including ROW) | | B | 85 | 94 | 6988.74573 | 0 | 0 | 6988.745728 |
| R17 | 0.01429 | Desert shrub | 30 | A | 58 | 77 | 97567.3542 | 0 | 0 | 97567.3542 |
| R17 | 0.01429 | Desert shrub | 30 | B | 82 | 93 | 158341.98 | 0 | 0 | 158341.9796 |
| R17 | 0.01429 | Dirt (including ROW) | | A | 72 | 87 | 4198.17011 | 0 | 0 | 4198.170105 |
| R17 | 0.01429 | Dirt (including ROW) | | B | 82 | 93 | 4594.56289 | 0 | 0 | 4594.562892 |
| R17 | 0.01429 | Residential 1/4 acre lots | | A | 77 | 90 | 1937.55802 | 20 | 387.5116036 | 1550.046414 |
| R17 | 0.01429 | Dirt (including ROW) | | A | 72 | 87 | 3857.07865 | 0 | 0 | 3857.078648 |
| R17 | 0.01429 | Dirt (including ROW) | | B | 82 | 93 | 4989.87118 | 0 | 0 | 4989.871183 |
| R17 | 0.01429 | Desert shrub | 50 | A | 55 | 74 | 59301.995 | 0 | 0 | 59301.99502 |
| R17 | 0.01429 | Desert shrub | 50 | B | 80 | 92 | 12165.7093 | 0 | 0 | 12165.70935 |
| R18 | 0.01446 | Desert shrub | 30 | B | 82 | 93 | 1568.2613 | 0 | 0 | 1568.2613 |
| R18 | 0.01446 | Gravel (including ROW) | | B | 85 | 94 | 14056.94 | 0 | 0 | 14056.94003 |
| R18 | 0.01446 | Desert shrub | 30 | B | 82 | 93 | 371604.482 | 0 | 0 | 371604.4818 |
| R18 | 0.01446 | Dirt (including ROW) | | B | 82 | 93 | 8916.62466 | 0 | 0 | 8916.624658 |
| R18 | 0.01446 | Dirt (including ROW) | | B | 82 | 93 | 10211.9417 | 0 | 0 | 10211.9417 |
| R19 | 0.02501 | Gravel (including ROW) | | A | 76 | 90 | 154683.148 | 0 | 0 | 154683.1477 |
| R19 | 0.02501 | Gravel (including ROW) | | B | 85 | 94 | 148.873737 | 0 | 0 | 148.8737368 |
| R19 | 0.02501 | Desert shrub | 50 | A | 55 | 74 | 84737.7259 | 0 | 0 | 84737.72585 |
| R19 | 0.02501 | Desert shrub | 50 | B | 80 | 92 | 38.8299846 | 0 | 0 | 38.82998459 |
| R19 | 0.02501 | Residential 1/2 acre lots | | A | 77 | 90 | 127765.496 | 20 | 25553.09913 | 102212.3965 |
| R19 | 0.02501 | Desert shrub | 20 | A | 60 | 79 | 6085.89616 | 0 | 0 | 6085.896163 |
| R19 | 0.02501 | Desert shrub | 20 | B | 82 | 93 | 222.554506 | 0 | 0 | 222.5545059 |
| R19 | 0.02501 | Residential 1/4 acre lots | | A | 77 | 90 | 56731.1563 | 20 | 11346.23125 | 45384.92502 |
| R19 | 0.02501 | Residential 3/4 acre lots | | A | 77 | 90 | 241604.88 | 20 | 48320.97601 | 193283.904 |
| R19 | 0.02501 | Desert shrub | 20 | A | 60 | 79 | 23232.3868 | 0 | 0 | 23232.38681 |
| R19 | 0.02501 | Pinon | 60 | A | 58 | 77 | 1831.02975 | 0 | 0 | 1831.029755 |
| R2 | 0.00813 | Impervious | | B | 98 | 99 | 21333.3352 | 100 | 21333.33517 | 0 |
| R2 | 0.00813 | Impervious | | A | 98 | 99 | 4701.37017 | 100 | 4701.370173 | 0 |
| R2 | 0.00813 | Dirt (including ROW) | | B | 82 | 93 | 3163.51528 | 0 | 0 | 3163.51528 |
| R2 | 0.00813 | Dirt (including ROW) | | A | 72 | 87 | 43094.0889 | 0 | 0 | 43094.08888 |
| R2 | 0.00813 | Commercial and business | | B | 92 | 97 | 18.5718669 | 85 | 15.78608688 | 2.785780037 |
| R2 | 0.00813 | Commercial and business | | A | 89 | 96 | 550.114287 | 85 | 467.5971442 | 82.51714309 |
| R2 | 0.00813 | Desert shrub | 40 | B | 81 | 92 | 58526.7849 | 0 | 0 | 58526.78489 |
| R2 | 0.00813 | Desert shrub | 40 | A | 57 | 76 | 94965.3769 | 0 | 0 | 94965.3769 |
| R2 | 0.00813 | Desert shrub | 30 | B | 82 | 93 | 386.865123 | 0 | 0 | 386.8651228 |
| R2 | 0.00813 | Desert shrub | 30 | A | 58 | 77 | 0.01497534 | 0 | 0 | 0.014975339 |
| R20 | 0.02983 | Desert shrub | 30 | A | 58 | 77 | 327751.752 | 0 | 0 | 327751.7521 |
| R20 | 0.02983 | Gravel (including ROW) | | A | 76 | 90 | 41128.2832 | 0 | 0 | 41128.28321 |
| R20 | 0.02983 | Desert shrub | 50 | A | 55 | 74 | 15129.9195 | 0 | 0 | 15129.91948 |
| R20 | 0.02983 | Residential 3/4 acre lots | | A | 77 | 90 | 173000.033 | 20 | 34600.00663 | 138400.0265 |
| R20 | 0.02983 | Dirt (including ROW) | | A | 72 | 87 | 43759.6022 | 0 | 0 | 43759.60218 |
| R20 | 0.02983 | Pinon | 40 | A | 58 | 77 | 51039.6321 | 0 | 0 | 51039.63211 |
| R20 | 0.02983 | Desert shrub | 50 | A | 55 | 74 | 179854.706 | 0 | 0 | 179854.7055 |
| R21 | 0.03937 | Desert shrub | 30 | A | 58 | 77 | 18837.6688 | 0 | 0 | 18837.66878 |
| R21 | 0.03937 | Gravel (including ROW) | | A | 76 | 90 | 32455.4982 | 0 | 0 | 32455.49825 |
| R21 | 0.03937 | Desert shrub | 20 | A | 60 | 79 | 587546.245 | 0 | 0 | 587546.2451 |

| BasinID | Area (mi2) | Land Use | % Cover | HSG | CN Value (AMC II) | CN Value (AMC III) | Area [Total,(ft2)] | % Impervious | Area [Impervious, (ft2)] | Area [Pervious, (ft2)] |
|---|---|---|---|---|---|---|---|---|---|---|
| R21 | 0.03937 | Desert shrub | 20 | B | 82 | 93 | 400411.17 | 0 | 0 | 400411.1703 |
| R21 | 0.03937 | Residential 3/4 acre lots | | A | 77 | 90 | 2580.74576 | 20 | 516.1491527 | 2064.596611 |
| R21 | 0.03937 | Pinon | 60 | A | 58 | 77 | 51745.7709 | 0 | 0 | 51745.7709 |
| R21 | 0.03937 | Dirt (including ROW) | | A | 72 | 87 | 2667.53487 | 0 | 0 | 2667.534874 |
| R21 | 0.03937 | Pinon | 40 | A | 58 | 77 | 1208.24212 | 0 | 0 | 1208.242116 |
| R3 | 0.07945 | Desert shrub | 30 | B | 82 | 93 | 1110396.81 | 0 | 0 | 1110396.81 |
| R3 | 0.07945 | Impervious | | B | 98 | 99 | 35256.8216 | 100 | 35256.82164 | 0 |
| R3 | 0.07945 | Gravel (including ROW) | | B | 85 | 94 | 40.6198914 | 0 | 0 | 40.61989141 |
| R3 | 0.07945 | Impervious | | B | 98 | 99 | 9058.55008 | 100 | 9058.55008 | 0 |
| R3 | 0.07945 | Gravel (including ROW) | | B | 85 | 94 | 28027.8189 | 0 | 0 | 28027.8189 |
| R3 | 0.07945 | Desert shrub | 40 | B | 81 | 92 | 522344.942 | 0 | 0 | 522344.9419 |
| R3 | 0.07945 | Dirt (including ROW) | | B | 82 | 93 | 65.3364697 | 0 | 0 | 65.33646973 |
| R3 | 0.07945 | Desert shrub | 10 | B | 83 | 93 | 386334.393 | 0 | 0 | 386334.393 |
| R3 | 0.07945 | Dirt (including ROW) | | B | 82 | 93 | 38259.7857 | 0 | 0 | 38259.78566 |
| R3 | 0.07945 | Desert shrub | 30 | B | 82 | 93 | 32.8847758 | 0 | 0 | 32.88477579 |
| R3 | 0.07945 | Desert shrub | 40 | B | 81 | 92 | 84.0570402 | 0 | 0 | 84.05704021 |
| R3 | 0.07945 | Dirt (including ROW) | | B | 82 | 93 | 84.0570402 | 0 | 0 | 84.05704021 |
| R4 | 0.02211 | Residential 3/4 acre lots | | B | 86 | 95 | 377.774168 | 20 | 75.55483355 | 302.2193342 |
| R4 | 0.02211 | Impervious | | B | 98 | 99 | 35407.4411 | 100 | 35407.44112 | 0 |
| R4 | 0.02211 | Dirt (including ROW) | | A | 72 | 87 | 30142.541 | 0 | 0 | 30142.54095 |
| R4 | 0.02211 | Gravel (including ROW) | | B | 85 | 94 | 297760.953 | 0 | 0 | 297760.9532 |
| R4 | 0.02211 | Gravel (including ROW) | | A | 76 | 90 | 45340.2083 | 0 | 0 | 45340.20826 |
| R4 | 0.02211 | Desert shrub | 40 | B | 81 | 92 | 174375.19 | 0 | 0 | 174375.1903 |
| R4 | 0.02211 | Desert shrub | 40 | A | 57 | 76 | 5869.14821 | 0 | 0 | 5869.14821 |
| R4 | 0.02211 | Dirt (including ROW) | | B | 82 | 93 | 24687.7651 | 0 | 0 | 24687.7651 |
| R4 | 0.02211 | Dirt (including ROW) | | B | 82 | 93 | 2284.4842 | 0 | 0 | 2284.484199 |
| R4 | 0.02211 | Gravel (including ROW) | | B | 85 | 94 | 13.0118773 | 0 | 0 | 13.01187732 |
| R5 | 0.00712 | Impervious | | B | 98 | 99 | 1272.02831 | 100 | 1272.02831 | 0 |
| R5 | 0.00712 | Gravel (including ROW) | | A | 76 | 90 | 3.28207949 | 0 | 0 | 3.282079487 |
| R5 | 0.00712 | Dirt (including ROW) | | A | 72 | 87 | 64625.7481 | 0 | 0 | 64625.74807 |
| R5 | 0.00712 | Residential 1/4 acre lots | | A | 77 | 90 | 8950.51514 | 20 | 1790.103028 | 7160.412112 |
| R5 | 0.00712 | Gravel (including ROW) | | B | 85 | 94 | 69918.6931 | 0 | 0 | 69918.69312 |
| R5 | 0.00712 | Gravel (including ROW) | | A | 76 | 90 | 16415.0586 | 0 | 0 | 16415.05855 |
| R5 | 0.00712 | Desert shrub | 40 | B | 81 | 92 | 29308.725 | 0 | 0 | 29308.72504 |
| R5 | 0.00712 | Desert shrub | 40 | A | 57 | 76 | 6470.03689 | 0 | 0 | 6470.036895 |
| R5 | 0.00712 | Gravel (including ROW) | | B | 85 | 94 | 1465.37971 | 0 | 0 | 1465.379711 |
| R6 | 0.01105 | Gravel (including ROW) | | B | 85 | 94 | 14209.8096 | 0 | 0 | 14209.80957 |
| R6 | 0.01105 | Gravel (including ROW) | | A | 76 | 90 | 6068.61295 | 0 | 0 | 6068.612952 |
| R6 | 0.01105 | Dirt (including ROW) | | B | 82 | 93 | 4510.72335 | 0 | 0 | 4510.723354 |
| R6 | 0.01105 | Dirt (including ROW) | | A | 72 | 87 | 115686.357 | 0 | 0 | 115686.3573 |
| R6 | 0.01105 | Residential 3/4 acre lots | | B | 86 | 95 | 3336.87154 | 20 | 667.3743088 | 2669.497235 |
| R6 | 0.01105 | Residential 3/4 acre lots | | A | 77 | 90 | 39.3518546 | 20 | 7.870370915 | 31.48148366 |
| R6 | 0.01105 | Residential 3/4 acre lots | | B | 86 | 95 | 4955.15295 | 20 | 991.0305909 | 3964.122364 |
| R6 | 0.01105 | Commercial and business | | A | 89 | 96 | 21.1874378 | 85 | 18.00932209 | 3.178115663 |
| R6 | 0.01105 | Commercial and business | | B | 92 | 97 | 22931.1759 | 85 | 19491.49952 | 3439.676385 |
| R6 | 0.01105 | Commercial and business | | A | 89 | 96 | 6395.61922 | 85 | 5436.276335 | 959.3428827 |
| R6 | 0.01105 | Residential 1/4 acre lots | | B | 86 | 95 | 25153.7581 | 20 | 5030.751615 | 20123.00646 |
| R6 | 0.01105 | Residential 1/4 acre lots | | A | 77 | 90 | 80813.2155 | 20 | 16162.64311 | 64650.57244 |
| R6 | 0.01105 | Gravel (including ROW) | | A | 76 | 90 | 25.8285611 | 0 | 0 | 25.82856112 |
| R6 | 0.01105 | Desert shrub | 40 | B | 81 | 92 | 6104.18465 | 0 | 0 | 6104.184654 |
| R6 | 0.01105 | Desert shrub | 40 | A | 57 | 76 | 676.785959 | 0 | 0 | 676.7859594 |
| R6 | 0.01105 | Desert shrub | 30 | B | 82 | 93 | 1050.90199 | 0 | 0 | 1050.901989 |
| R6 | 0.01105 | Desert shrub | 30 | A | 58 | 77 | 14895.2845 | 0 | 0 | 14895.28448 |
| R6 | 0.01105 | Residential 1/2 acre lots | | B | 86 | 95 | 135.779323 | 20 | 27.15586457 | 108.6234583 |
| R6 | 0.01105 | Residential 1/2 acre lots | | A | 77 | 90 | 912.659583 | 20 | 182.5319166 | 730.1276665 |
| R7 | 0.01339 | Residential 3/4 acre lots | | B | 86 | 95 | 180948.782 | 20 | 36189.75647 | 144759.0259 |
| R7 | 0.01339 | Gravel (including ROW) | | B | 85 | 94 | 22159.4465 | 0 | 0 | 22159.44651 |
| R7 | 0.01339 | Residential 3/4 acre lots | | B | 86 | 95 | 2392.24381 | 20 | 478.4487622 | 1913.795049 |
| R7 | 0.01339 | Residential 3/4 acre lots | | B | 86 | 95 | 1452.70085 | 20 | 290.5401696 | 1162.160678 |
| R7 | 0.01339 | Gravel (including ROW) | | B | 85 | 94 | 809.544175 | 0 | 0 | 809.5441748 |
| R7 | 0.01339 | Desert shrub | 40 | B | 81 | 92 | 3404.61946 | 0 | 0 | 3404.619457 |
| R7 | 0.01339 | Dirt (including ROW) | | B | 82 | 93 | 96639.1635 | 0 | 0 | 96639.16349 |
| R7 | 0.01339 | Desert shrub | 80 | B | 78 | 91 | 211.822598 | 0 | 0 | 211.8225977 |
| R7 | 0.01339 | Gravel (including ROW) | | B | 85 | 94 | 41217.4199 | 0 | 0 | 41217.41993 |
| R7 | 0.01339 | Residential 1/2 acre lots | | B | 86 | 95 | 27177.4808 | 70 | 19024.23656 | 8153.244239 |
| R7 | 0.01339 | Desert shrub | 40 | B | 81 | 92 | 133.810034 | 0 | 0 | 133.8100337 |
| R7 | 0.01339 | Dirt (including ROW) | | B | 82 | 93 | 133.810034 | 0 | 0 | 133.8100337 |
| R8 | 0.0069 | Gravel (including ROW) | | B | 85 | 94 | 17342.7498 | 0 | 0 | 17342.74981 |
| R8 | 0.0069 | Residential 3/4 acre lots | | B | 86 | 95 | 60847.0216 | 20 | 12169.40433 | 48677.61731 |
| R8 | 0.0069 | Residential 3/4 acre lots | | B | 86 | 95 | 188.094344 | 20 | 37.61886875 | 150.475475 |
| R8 | 0.0069 | Residential 3/4 acre lots | | B | 86 | 95 | 44.575602 | 20 | 8.915120399 | 35.6604816 |
| R8 | 0.0069 | Commercial and business | | B | 92 | 97 | 18533.4049 | 85 | 15753.39414 | 2780.010731 |
| R8 | 0.0069 | Commercial and business | | A | 89 | 96 | 11.4317745 | 85 | 9.717008348 | 1.714766179 |
| R8 | 0.0069 | Residential 3/4 acre lots | | B | 86 | 95 | 4121.88738 | 20 | 824.3774759 | 3297.509903 |
| R8 | 0.0069 | Gravel (including ROW) | | B | 85 | 94 | 1069.65842 | 0 | 0 | 1069.658425 |
| R8 | 0.0069 | Gravel (including ROW) | | A | 76 | 90 | 36.2520592 | 0 | 0 | 36.2520592 |
| R8 | 0.0069 | Residential 1/2 acre lots | | B | 86 | 95 | 25408.7927 | 20 | 5081.758543 | 20327.03417 |
| R8 | 0.0069 | Residential 1/2 acre lots | | A | 77 | 90 | 2646.69183 | 20 | 529.3383652 | 2117.353461 |
| R8 | 0.0069 | Gravel (including ROW) | | B | 85 | 94 | 577.315899 | 0 | 0 | 577.3158989 |
| R9 | 0.00566 | Gravel (including ROW) | | B | 85 | 94 | 6582.23492 | 0 | 0 | 6582.234919 |
| R9 | 0.00566 | Residential 3/4 acre lots | | B | 86 | 95 | 1332.63808 | 20 | 266.5276154 | 1066.110461 |
| R9 | 0.00566 | Residential 3/4 acre lots | | B | 86 | 95 | 98125.2328 | 20 | 19625.04655 | 78500.18622 |

Computed: DGH Date: 06.10.2014
Checked: SDK Date: 06.11.2014

**Table 3–1 — Runoff Curve Numbers for Arid and Semiarid Rangelands**[1]
Source: USDA SCS, TR–55, 1986

| Cover Description | | Curve Numbers for Hydrologic Soil Group – | | | |
|---|---|---|---|---|---|
| Cover Type | Hydrologic Condition[2] | A[3] | B | C | D |
| Herbaceous—mixture of grass, weeds, and low growing brush, with brush the minor element. | Poor | | 80 | 87 | 93 |
| | Fair | | 71 | 81 | 89 |
| | Good | | 62 | 74 | 85 |
| Oak–aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush. | Poor | | 66 | 74 | 79 |
| | Fair | | 48 | 57 | 63 |
| | Good | | 30 | 41 | 48 |
| Piñon, juniper, or both; grass understory. | Poor | | 75 | 85 | 89 |
| | Fair | | 58 | 73 | 80 |
| | Good | | 41 | 61 | 71 |
| Sagebrush with grass understory. | Poor | | 67 | 80 | 85 |
| | Fair | | 51 | 63 | 70 |
| | Good | | 35 | 47 | 55 |
| Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus. | Poor | 63 | 77 | 85 | 88 |
| | Fair | 55 | 72 | 81 | 86 |
| | Good | 49 | 68 | 79 | 84 |

[1] Average runoff condition.

[2] Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3] Curve numbers for group A have been developed only for desert shrub.



**Table 3–4 — Runoff Curve Numbers Urban Areas**[1]
Source: USDA SCS, TR–55, 1986

| Cover Description | | Curve Numbers for Hydrologic Soil Group – | | | |
|---|---|---|---|---|---|
| Cover Type and Hydrologic Condition | Average Percent Impervious Area[2] | A | B | C | D |
| Fully developed urban areas (vegetation established) | | | | | |
| Open space (lawns, parks, golf courses, cemeteries, etc.)[3]: | | | | | |
| Poor condition (grass cover < 50%) | | 68 | 79 | 86 | 89 |
| Fair condition (grass cover 50% to 75%) | | 49 | 69 | 79 | 84 |
| Good condition (grass cover > 75%) | | 39 | 61 | 74 | 80 |
| Impervious areas: | | | | | |
| Paved parking lots, roofs, driveways, etc. (excluding right–of–way) | | 98 | 98 | 98 | 98 |
| Streets and roads: | | | | | |
| Paved; curbs and storm sewers (excluding right–of–way) | | 98 | 98 | 98 | 98 |
| Paved; open ditches (including right–of–way) | | 83 | 89 | 92 | 93 |
| Gravel (including right–of–way) | | 76 | 85 | 89 | 91 |
| Dirt (including right–of–way) | | 72 | 82 | 87 | 89 |
| Western desert urban areas: | | | | | |
| Natural desert landscaping (pervious areas only)[4] | | 63 | 77 | 85 | 88 |
| Artificial desert landscaping (impervious weed barrier, desert shrub with 1– to 2–inch sand or gravel mulch and basin borders) | | 96 | 96 | 96 | 96 |
| Urban districts: | | | | | |
| Commercial and business | 85 | 89 | 92 | 94 | 95 |
| Industrial | 72 | 81 | 88 | 91 | 93 |
| Residential districts by average lot size: | | | | | |
| 1/8 acre or less (town houses) | 65 | 77 | 85 | 90 | 92 |
| 1/4 acre | 38 | 61 | 75 | 83 | 87 |
| 1/3 acre | 30 | 57 | 72 | 81 | 86 |
| 1/2 acre | 25 | 54 | 70 | 80 | 85 |
| 1 acre | 20 | 51 | 68 | 79 | 84 |
| 2 acres | 12 | 46 | 65 | 77 | 82 |
| Developing urban areas | | | | | |
| Newly graded areas (pervious areas only, no vegetation)[5] | | 77 | 86 | 91 | 94 |
| Vacant lands (CN's are determined using cover types similar to those in **Table 3–3**). | | | | | |

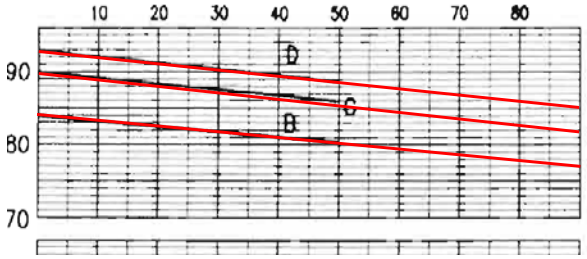
[1] Average runoff condition.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 3.9.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using Figure 3.9 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 3.9, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.



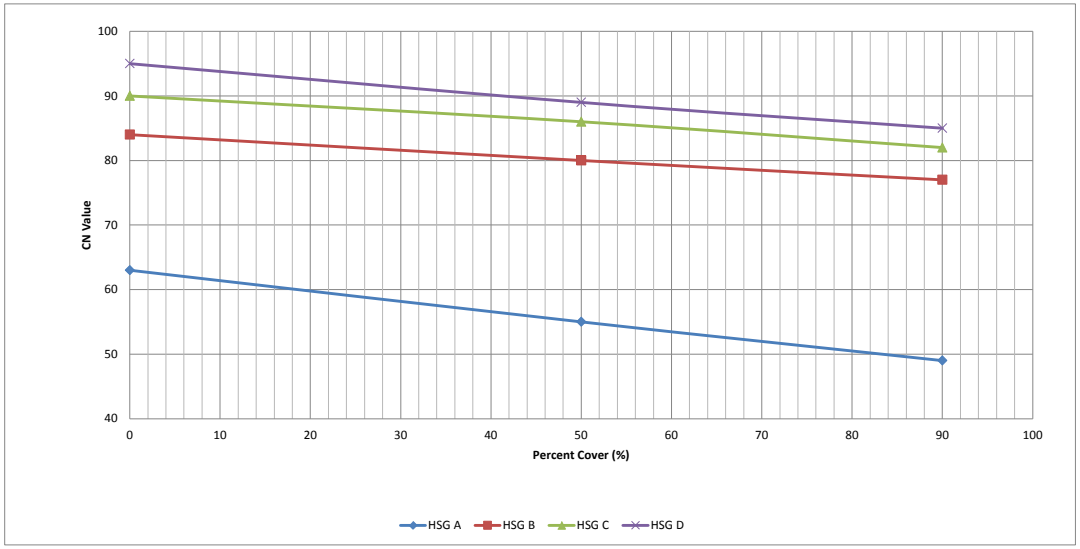

Desert Brush: Brush–weed and grass mixtures with brush the predominant element. Some typical plants are – Mesquite, Creosote, Yuccas, Sagebrush, Saltbush, etc. This area is typical of lower elevations of desert and semi–desert areas.

**Desert Shrub Curve Number Equation Development**

| HSG | Equation Ordinates | | Equation |
|---|---|---|---|
| | *% Cover* | *CN* | |
| A | 0 | 63 | -0.1557x + 62.934 |
| | 50 | 55 | |
| | 90 | 49 | |
| B | 0 | 84 | -0.0779x + 83.967 |
| | 50 | 80 | |
| | 90 | 77 | |
| C | 0 | 90 | -0.0885x + 90.131 |
| | 50 | 86 | |
| | 90 | 82 | |
| D | 0 | 95 | -0.1115x + 94.869 |
| | 50 | 89 | |
| | 90 | 85 | |

**Desert Shrub Curve Numbers per percent cover**

| % Cover | "CN" per HSG | | | |
|---|---|---|---|---|
| | A | B | C | D |
| **0** | 63 | 84 | 90 | 95 |
| **10** | 61 | 83 | 89 | 94 |
| **20** | 60 | 82 | 88 | 93 |
| **30** | 58 | 82 | 87 | 92 |
| **40** | 57 | 81 | 87 | 90 |
| **50** | 55 | 80 | 86 | 89 |
| **60** | 54 | 79 | 85 | 88 |
| **70** | 52 | 79 | 84 | 87 |
| **80** | 50 | 78 | 83 | 86 |
| **90** | 49 | 77 | 82 | 85 |
| **100** | 47 | 76 | 81 | 84 |



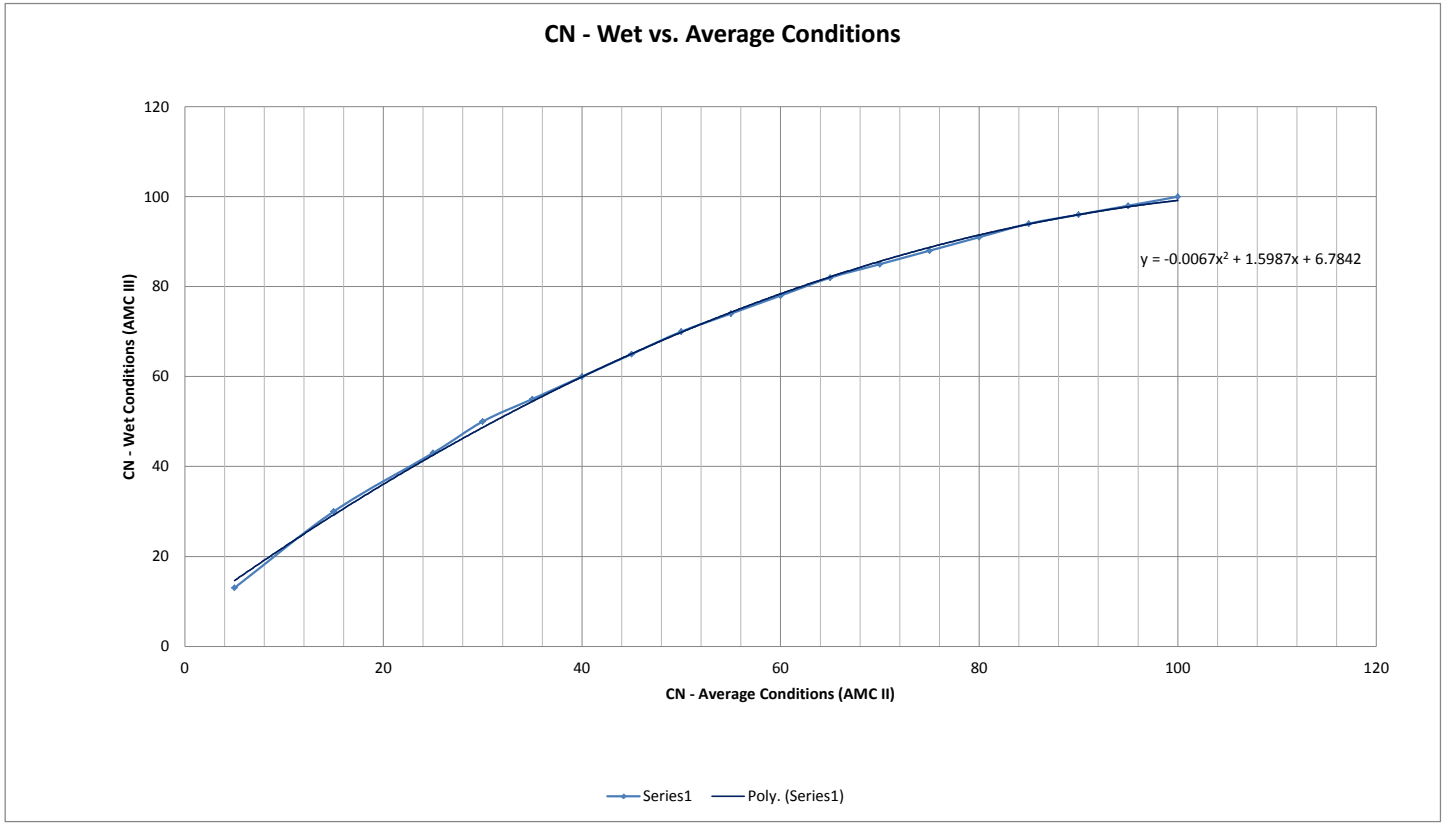
| | | | |
|---|---|---|---|
| Computed: | **DGH** | Date: | **06.10.2014** |
| Checked: | **SDK** | Date: | **06.11.2014** |

**Table 3–5 — Conversion from Average Antecedent Moisture Conditions to Dry and Wet Conditions**
Source: USDA SCS, TR–55, 1986

| CN for Average Conditions | Corresponding CN's for | |
|---|---|---|
| | Dry | Wet |
| 100 | 100 | 100 |
| 95 | 87 | 98 |
| 90 | 78 | 96 |
| 85 | 70 | 94 |
| 80 | 63 | 91 |
| 75 | 57 | 88 |
| 70 | 51 | 85 |
| 65 | 45 | 82 |
| 60 | 40 | 78 |
| 55 | 35 | 74 |
| 50 | 31 | 70 |
| 45 | 26 | 65 |
| 40 | 22 | 60 |
| 35 | 18 | 55 |
| 30 | 15 | 50 |
| 25 | 12 | 43 |
| 15 | 6 | 30 |
| 5 | 2 | 13 |

**CN Conversion to Alternative Moisture Conditions**

| Dry Conditions (AMC I) | Average Conditions (AMC II) | Wet Conditions (AMC III) |
|---|---|---|
| 100 | 100 | 100 |
| 87 | 95 | 98 |
| 78 | 90 | 96 |
| 70 | 85 | 94 |
| 63 | 80 | 91 |
| 57 | 75 | 88 |
| 51 | 70 | 85 |
| 45 | 65 | 82 |
| 40 | 60 | 78 |
| 35 | 55 | 74 |
| 31 | 50 | 70 |
| 26 | 45 | 65 |
| 22 | 40 | 60 |
| 18 | 35 | 55 |
| 15 | 30 | 50 |
| 12 | 25 | 43 |
| 6 | 15 | 30 |
| 2 | 5 | 13 |


CN - Wet vs. Average Conditions
CN - Wet Conditions (AMC III)
CN - Average Conditions (AMC II)
y = -0.0067x² + 1.5987x + 6.7842
0
20
40
60
80
100
120
Series1
Poly. (Series1)

Computed: **DGH** Date: **06.06.2014**
Checked: **SDK** Date: **06.06.2014**

| Subbasin | Tt sub-parts (min) | Composite Tc (min) [a,b, c,d] | Design Tc (min) [a] | Lag Time (min) [e] |
|---|---|---|---|---|
| F1 | F1.1, F1.2, F1.3 | 30.9 | 30.9 | 18.5 |
| F2 | F2.1, F2.2, F2.3 | 31.8 | 31.8 | 19.1 |
| F3 | F3.1, F3.2 | 13.0 | 13.0 | 7.8 |
| F4 | F4.1, F4.2 | 14.6 | 14.6 | 8.8 |
| F5 | F5.1, F5.2 | 43.7 | 43.7 | 26.2 |
| F6 | F6.1, F6.2 | 6.3 | 6.3 | 3.8 |
| F7 | F7.1, F7.2 | 18.1 | 18.1 | 10.9 |
| F8 | F9.1, F9.2 | 48.7 | 48.7 | 29.2 |
| F9 | F10.1, F10.2 | 14.7 | 14.7 | 8.8 |
| R1 | R1.1, R1.2 | 7.2 | 7.2 | 4.3 |
| R2 | R2.1, R2.2, R2.3 | 11.7 | 11.7 | 7.0 |
| R3 | R3.1, R3.2, R3.3 | 13.9 | 13.9 | 8.3 |
| R4 | R4.1, R4.2 | 22.5 | 22.5 | 13.5 |
| R5 | R5.1, R5.2 | 10.4 | 10.4 | 6.2 |
| R6 | R6.1, R6.2 | 6.7 | 6.7 | 4.0 |

| Subbasin | Tt sub-parts (min) | omposite Tc (mi | Design Tc (min) | Lag Time (min) [e] |
|---|---|---|---|---|
| R7 | R7.1, R7.2 | 12.2 | 12.2 | 7.3 |
| R8 | R8.1, R8.2 | 10.9 | 10.9 | 6.5 |
| R9 | R9.1, R9.2 | 12.5 | 12.5 | 7.5 |
| R10 | R10.1, R10.2 | 6.0 | 6.0 | 3.6 |
| R11 | R11.1, R11.2, R11.3 | 16.8 | 16.8 | 10.1 |
| R12 | R12.1, R12.2 | 7.6 | 7.6 | 4.6 |
| R13 | R13.1, R13.2 | 13.3 | 13.3 | 8.0 |
| R14 | R14.1, R14.2 | 17.1 | 17.1 | 10.3 |
| R15 | R15.1, R15.2 | 8.3 | 8.3 | 5.0 |
| R16 | R16.1, R16.2, R16.3 | 3.3 | 5.0 | 3.0 |
| R17 | R17.1, R17.2, R17.3 | 10.8 | 10.8 | 6.5 |
| R18 | R18.1, R18.2 | 12.0 | 12.0 | 7.2 |
| R19 | R19.1, R19.2 | 33.0 | 33.0 | 19.8 |
| R20 | R20.1, R20.2 | 48.0 | 48.0 | 28.8 |
| R21 | R21.1, R21.2 | 100.4 | 100.4 | 60.2 |

Notes
a - Computations based on Equation 3-1 and 3-2 from TR55 Documentation.
b - Elevation data derived from 2-foot contour GIS data provided by Dona Ana County.
c - Velocities derived from Figure 3-10 of the New Mexico State highway and Transportation Department (NMSHTD) Drainage Manual, Volume 1, Hydrology (NMSHTD, 1995).
d - Velocities for sections of "channel" flow within the flowpath were developed utilizing manning's equation. For wide shallow channels, a hydraulic radius of 1 is acceptable (NMSHTD, 1995).
Manning's roughness coefficients were estimated through review of available aerial imagery and site photos. Roughness values derived from "Manning's n for Channels (Chow, 1959).
e - Transform input for the HEC-HMS model. This value has been estimated by SCS as 60% of the time of concentration.

| F1 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | F1.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4702 |
| Low Elevation, ft | 4622 |
| Length, ft | 300 |
| Slope (Percent) | 26.7 |
| Velocity, ft/s (from Upland Graph) | 5.3 |
| Tt=L/(60*V), min | 0.9 |
| **Shallow concentrated flow** | |
| Segment ID | F1.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4622 |
| Low Elevation, ft | 4145.7 |
| Length, ft | 4684 |
| Slope (Percent) | 10.2 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 3.2 |
| Tt=L/(60*V), min | 24.0 |
| **Channel/Pipe Flow** | |
| Segment ID | F1.3 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4145.7 |
| Low Elevation, ft | 4100 |
| Length, ft | 2426 |
| Slope (Percent) | 1.9 |
| Velocity, ft/s (from graphs) | 6.8 |
| Tt=L/(60*V), min | 5.9 |
| Total Travel Time, min | 30.9 |

| F2 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | F2.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4694 |
| Low Elevation, ft | 4640 |
| Length, ft | 300 |
| Slope (Percent) | 18.0 |
| Velocity, ft/s (from Upland Graph) | 4.3 |
| Tt=L/(60*V), min | 1.2 |
| **Shallow concentrated flow** | |
| Segment ID | F2.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4640 |
| Low Elevation, ft | 4141.7 |
| Length, ft | 4962 |
| Slope (Percent) | 10.0 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 3.2 |
| Tt=L/(60*V), min | 25.6 |
| **Channel/Pipe Flow** | |
| Segment ID | F2.3 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4141.7 |
| Low Elevation, ft | 4109 |
| Length, ft | 1955 |
| Slope (Percent) | 1.7 |
| Velocity, ft/s (from graphs) | 6.4 |
| Tt=L/(60*V), min | 5.1 |
| Total Travel Time, min | 31.8 |

| F3 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | F3.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4215 |
| Low Elevation, ft | 4152 |
| Length, ft | 300 |
| Slope (Percent) | 21.0 |
| Velocity, ft/s (from Upland Graph) | 4.7 |
| Tt=L/(60*V), min | 1.1 |
| **Shallow concentrated flow** | |
| Segment ID | F3.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4152 |
| Low Elevation, ft | 4096 |
| Length, ft | 1432 |
| Slope (Percent) | 3.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.0 |
| Tt=L/(60*V), min | 12.0 |
| Total Travel Time, min | 13.0 |

| F4 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | F4.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4397.5 |
| Low Elevation, ft | 4310 |
| Length, ft | 300 |
| Slope (Percent) | 29.2 |
| Velocity, ft/s (from Upland Graph) | 5.6 |
| Tt=L/(60*V), min | 0.9 |
| **Shallow concentrated flow** | |
| Segment ID | F4.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4310 |
| Low Elevation, ft | 4090 |
| Length, ft | 2488 |
| Slope (Percent) | 8.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 3.0 |
| Tt=L/(60*V), min | 13.7 |
| Total Travel Time, min | 14.6 |

| F5 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | F5.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4662 |
| Low Elevation, ft | 4616 |
| Length, ft | 300 |
| Slope (Percent) | 15.3 |
| Velocity, ft/s (from Upland Graph) | 4.0 |
| Tt=L/(60*V), min | 1.2 |
| **Shallow concentrated flow** | |
| Segment ID | F5.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4616 |
| Low Elevation, ft | 4096 |
| Length, ft | 7030 |
| Slope (Percent) | 7.4 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.8 |
| Tt=L/(60*V), min | 42.4 |
| Total Travel Time, min | 43.7 |

| F6 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | F6.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4184 |
| Low Elevation, ft | 4118.5 |
| Length, ft | 300 |
| Slope (Percent) | 21.8 |
| Velocity, ft/s (from Upland Graph) | 4.8 |
| Tt=L/(60*V), min | 1.0 |
| **Shallow concentrated flow** | |
| Segment ID | F6.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4118.5 |
| Low Elevation, ft | 4094 |
| Length, ft | 629 |
| Slope (Percent) | 3.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.0 |
| Tt=L/(60*V), min | 5.3 |
| Total Travel Time, min | 6.3 |

| F7 | |
|---|---|
| Sheet Flow | |
| Segment ID | F7.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4560 |
| Low Elevation, ft | 4521 |
| Length, ft | 300 |
| Slope (Percent) | 13.0 |
| Velocity, ft/s (from Upland Graph) | 3.7 |
| Tt=L/(60*V), min | 1.4 |
| Shallow concentrated flow | |
| Segment ID | F7.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4521 |
| Low Elevation, ft | 4090 |
| Length, ft | 3564 |
| Slope (Percent) | 12.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 3.5 |
| Tt=L/(60*V), min | 16.7 |
| Total Travel Time, min | 18.1 |

| #REF! | |
|---|---|
| Sheet Flow | |
| Segment ID | #REF! |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | #REF! |
| Low Elevation, ft | #REF! |
| Length, ft | #REF! |
| Slope (Percent) | #REF! |
| Velocity, ft/s (from Upland Graph) | #REF! |
| Tt=L/(60*V), min | #REF! |
| Shallow concentrated flow | |
| Segment ID | #REF! |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | #REF! |
| Low Elevation, ft | #REF! |
| Length, ft | #REF! |
| Slope (Percent) | #REF! |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | #REF! |
| Tt=L/(60*V), min | #REF! |
| Total Travel Time, min | #REF! |

| F8 | |
|---|---|
| Sheet Flow | |
| Segment ID | F8.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4166 |
| Low Elevation, ft | 4133.5 |
| Length, ft | 300 |
| Slope (Percent) | 10.8 |
| Velocity, ft/s (from Upland Graph) | 3.4 |
| Tt=L/(60*V), min | 1.5 |
| Shallow concentrated flow | |
| Segment ID | F8.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4133.5 |
| Low Elevation, ft | 4049 |
| Length, ft | 4086 |
| Slope (Percent) | 2.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.4 |
| Tt=L/(60*V), min | 47.2 |
| Total Travel Time, min | 48.7 |

| F9 | |
|---|---|
| Sheet Flow | |
| Segment ID | F9.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4120 |
| Low Elevation, ft | 4089 |
| Length, ft | 300 |
| Slope (Percent) | 10.3 |
| Velocity, ft/s (from Upland Graph) | 3.3 |
| Tt=L/(60*V), min | 1.5 |
| Shallow concentrated flow | |
| Segment ID | F9.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4089 |
| Low Elevation, ft | 4042 |
| Length, ft | 1436 |
| Slope (Percent) | 3.3 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.8 |
| Tt=L/(60*V), min | 13.1 |
| Total Travel Time, min | 14.7 |

| R1 | |
|---|---|
| Sheet Flow | |
| Segment ID | R1.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4099 |
| Low Elevation, ft | 4098.5 |
| Length, ft | 300 |
| Slope (Percent) | 0.2 |
| Velocity, ft/s (from Upland Graph) | 0.8 |
| Tt=L/(60*V), min | 6.2 |
| Shallow concentrated flow | |
| Segment ID | R1.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4098.5 |
| Low Elevation, ft | 4082 |
| Length, ft | 539 |
| Slope (Percent) | 3.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 8.7 |
| Tt=L/(60*V), min | 1.0 |
| Total Travel Time, min | 7.2 |

| R2 | |
|---|---|
| Sheet Flow | |
| Segment ID | R2.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4098.5 |
| Low Elevation, ft | 4098 |
| Length, ft | 300 |
| Slope (Percent) | 0.2 |
| Velocity, ft/s (from Upland Graph) | 0.8 |
| Tt=L/(60*V), min | 6.2 |
| Shallow concentrated flow | |
| Segment ID | R2.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4098 |
| Low Elevation, ft | 4086 |
| Length, ft | 739 |
| Slope (Percent) | 1.6 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.5 |
| Tt=L/(60*V), min | 4.8 |
| Channel/Pipe Flow | |
| Segment ID | R2.3 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4086 |
| Low Elevation, ft | 4076 |
| Length, ft | 359 |
| Slope (Percent) | 2.8 |
| Velocity, ft/s (from graphs) | 8.3 |
| Tt=L/(60*V), min | 0.7 |
| Total Travel Time, min | 11.7 |

| R3 | |
|---|---|
| Sheet Flow | |
| Segment ID | R3.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4140.5 |
| Low Elevation, ft | 4133.5 |
| Length, ft | 300 |
| Slope (Percent) | 2.3 |
| Velocity, ft/s (from Upland Graph) | 1.5 |
| Tt=L/(60*V), min | 3.3 |
| Shallow concentrated flow | |
| Segment ID | R3.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4133.5 |
| Low Elevation, ft | 4090 |
| Length, ft | 954 |
| Slope (Percent) | 4.6 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.2 |
| Tt=L/(60*V), min | 7.3 |
| Channel/Pipe Flow | |
| Segment ID | R3.3 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4089.5 |
| Low Elevation, ft | 4075 |
| Length, ft | 1116 |
| Slope (Percent) | 1.3 |
| Velocity, ft/s (from graphs) | 5.7 |
| Tt=L/(60*V), min | 3.3 |
| Total Travel Time, min | 13.9 |

| R4 | |
|---|---|
| Sheet Flow | |
| Segment ID | R4.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4100.5 |
| Low Elevation, ft | 4092.5 |
| Length, ft | 300 |
| Slope (Percent) | 2.7 |
| Velocity, ft/s (from Upland Graph) | 1.6 |
| Tt=L/(60*V), min | 3.0 |
| Shallow concentrated flow | |
| Segment ID | R4.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4092.5 |
| Low Elevation, ft | 4078 |
| Length, ft | 1255 |
| Slope (Percent) | 1.2 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.1 |
| Tt=L/(60*V), min | 19.5 |
| Total Travel Time, min | 22.5 |

| R5 | |
|---|---|
| Sheet Flow | |
| Segment ID | R5.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4098 |
| Low Elevation, ft | 4086 |
| Length, ft | 300 |
| Slope (Percent) | 4.0 |
| Velocity, ft/s (from Upland Graph) | 2.0 |
| Tt=L/(60*V), min | 2.5 |
| Shallow concentrated flow | |
| Segment ID | R5.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4086 |
| Low Elevation, ft | 4074 |
| Length, ft | 660 |
| Slope (Percent) | 1.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.4 |
| Tt=L/(60*V), min | 8.0 |
| Total Travel Time, min | 10.4 |

| R6 | |
|---|---|
| Sheet Flow | |
| Segment ID | R6.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4104 |
| Low Elevation, ft | 4087 |
| Length, ft | 300 |
| Slope (Percent) | 5.7 |
| Velocity, ft/s (from Upland Graph) | 2.4 |
| Tt=L/(60*V), min | 2.1 |
| Shallow concentrated flow | |
| Segment ID | R6.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4087 |
| Low Elevation, ft | 4072 |
| Length, ft | 492 |
| Slope (Percent) | 3.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.8 |
| Tt=L/(60*V), min | 4.6 |
| Total Travel Time, min | 6.7 |

| R7 | |
|---|---|
| Sheet Flow | |
| Segment ID | R7.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4086 |
| Low Elevation, ft | 4083 |
| Length, ft | 300 |
| Slope (Percent) | 1.0 |
| Velocity, ft/s (from Upland Graph) | 1.0 |
| Tt=L/(60*V), min | 5.0 |
| Shallow concentrated flow | |
| Segment ID | R7.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4083 |
| Low Elevation, ft | 4073 |
| Length, ft | 573 |
| Slope (Percent) | 1.7 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.3 |
| Tt=L/(60*V), min | 7.2 |
| Total Travel Time, min | 12.2 |

| R8 | |
|---|---|
| Sheet Flow | |
| Segment ID | R8.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4077.5 |
| Low Elevation, ft | 4073 |
| Length, ft | 300 |
| Slope (Percent) | 1.5 |
| Velocity, ft/s (from Upland Graph) | 1.2 |
| Tt=L/(60*V), min | 4.1 |
| Shallow concentrated flow | |
| Segment ID | R8.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4073 |
| Low Elevation, ft | 4069 |
| Length, ft | 404 |
| Slope (Percent) | 1.0 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.0 |
| Tt=L/(60*V), min | 6.8 |
| Total Travel Time, min | 10.9 |

| R9 | |
|---|---|
| Sheet Flow | |
| Segment ID | R9.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4072.5 |
| Low Elevation, ft | 4071.5 |
| Length, ft | 300 |
| Slope (Percent) | 0.3 |
| Velocity, ft/s (from Upland Graph) | 0.6 |
| Tt=L/(60*V), min | 8.8 |
| Shallow concentrated flow | |
| Segment ID | R9.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4071.5 |
| Low Elevation, ft | 4069 |
| Length, ft | 233 |
| Slope (Percent) | 1.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.0 |
| Tt=L/(60*V), min | 3.7 |
| Total Travel Time, min | 12.5 |

| R10 | |
|---|---|
| Sheet Flow | |
| Segment ID | R10.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4080.5 |
| Low Elevation, ft | 4076.5 |
| Length, ft | 300 |
| Slope (Percent) | 1.3 |
| Velocity, ft/s (from Upland Graph) | 1.2 |
| Tt=L/(60*V), min | 4.3 |
| Shallow concentrated flow | |
| Segment ID | R10.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4076.5 |
| Low Elevation, ft | 4066 |
| Length, ft | 658 |
| Slope (Percent) | 1.7 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 6.4 |
| Tt=L/(60*V), min | 1.7 |
| Total Travel Time, min | 6.0 |

| R11 | |
|---|---|
| Sheet Flow | |
| Segment ID | R11.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4130 |
| Low Elevation, ft | 4091.5 |
| Length, ft | 300 |
| Slope (Percent) | 12.8 |
| Velocity, ft/s (from Upland Graph) | 3.7 |
| Tt=L/(60*V), min | 1.4 |
| Shallow concentrated flow | |
| Segment ID | R11.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4091.5 |
| Low Elevation, ft | 4060.5 |
| Length, ft | 1231 |
| Slope (Percent) | 2.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.6 |
| Tt=L/(60*V), min | 12.9 |
| Channel/Pipe Flow | |
| Segment ID | R11.3 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4060.5 |
| Low Elevation, ft | 4056.5 |
| Length, ft | 615 |
| Slope (Percent) | 0.7 |
| Velocity, ft/s (from graphs) | 4.0 |
| Tt=L/(60*V), min | 2.6 |
| Total Travel Time, min | 16.8 |

| R12 | |
|---|---|
| Sheet Flow | |
| Segment ID | R12.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4130 |
| Low Elevation, ft | 4089 |
| Length, ft | 300 |
| Slope (Percent) | 13.7 |
| Velocity, ft/s (from Upland Graph) | 3.8 |
| Tt=L/(60*V), min | 1.3 |
| Shallow concentrated flow | |
| Segment ID | R12.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4089 |
| Low Elevation, ft | 4064 |
| Length, ft | 713 |
| Slope (Percent) | 3.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.9 |
| Tt=L/(60*V), min | 6.3 |
| Total Travel Time, min | 7.6 |

| R13 | |
|---|---|
| Sheet Flow | |
| Segment ID | R13.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4130 |
| Low Elevation, ft | 4108 |
| Length, ft | 300 |
| Slope (Percent) | 7.3 |
| Velocity, ft/s (from Upland Graph) | 2.8 |
| Tt=L/(60*V), min | 1.8 |
| Shallow concentrated flow | |
| Segment ID | R13.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4108 |
| Low Elevation, ft | 4064 |
| Length, ft | 1282 |
| Slope (Percent) | 3.4 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.9 |
| Tt=L/(60*V), min | 11.4 |
| Total Travel Time, min | 13.3 |

| R14 | |
|---|---|
| Sheet Flow | |
| Segment ID | R14.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4158 |
| Low Elevation, ft | 4136 |
| Length, ft | 300 |
| Slope (Percent) | 7.3 |
| Velocity, ft/s (from Upland Graph) | 2.8 |
| Tt=L/(60*V), min | 1.8 |
| Shallow concentrated flow | |
| Segment ID | R14.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4136 |
| Low Elevation, ft | 4064 |
| Length, ft | 1837 |
| Slope (Percent) | 3.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.0 |
| Tt=L/(60*V), min | 15.3 |
| Total Travel Time, min | 17.1 |

| R15 | |
|---|---|
| Sheet Flow | |
| Segment ID | R15.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4130 |
| Low Elevation, ft | 4113 |
| Length, ft | 300 |
| Slope (Percent) | 5.7 |
| Velocity, ft/s (from Upland Graph) | 2.4 |
| Tt=L/(60*V), min | 2.1 |
| Shallow concentrated flow | |
| Segment ID | R15.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4113 |
| Low Elevation, ft | 4074 |
| Length, ft | 819 |
| Slope (Percent) | 4.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.2 |
| Tt=L/(60*V), min | 6.2 |
| Total Travel Time, min | 8.3 |

| R16 | |
|---|---|
| Sheet Flow | |
| Segment ID | R16.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4064 |
| Low Elevation, ft | 4056.2 |
| Length, ft | 87 |
| Slope (Percent) | 9.0 |
| Velocity, ft/s (from Upland Graph) | 3.0 |
| Tt=L/(60*V), min | 0.5 |
| Channel/Pipe Flow | |
| Segment ID | R16.2 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4056.2 |
| Low Elevation, ft | 4048 |
| Length, ft | 830 |
| Slope (Percent) | 1.0 |
| Velocity, ft/s (from graphs) | 4.9 |
| Tt=L/(60*V), min | 2.8 |
| Total Travel Time, min | 3.3 |

| R17 | |
|---|---|
| Sheet Flow | |
| Segment ID | R17.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4070 |
| Low Elevation, ft | 4062 |
| Length, ft | 300 |
| Slope (Percent) | 2.7 |
| Velocity, ft/s (from Upland Graph) | 1.6 |
| Tt=L/(60*V), min | 3.0 |
| Shallow concentrated flow | |
| Segment ID | R17.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4062 |
| Low Elevation, ft | 4043.5 |
| Length, ft | 629 |
| Slope (Percent) | 2.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.7 |
| Tt=L/(60*V), min | 6.1 |
| Channel/Pipe Flow | |
| Segment ID | R17.3 |
| Pipe Diameter/Material | N/A |
| High Elevation, ft | 4043.5 |
| Low Elevation, ft | 4042 |
| Length, ft | 329 |
| Slope (Percent) | 0.5 |
| Velocity, ft/s (from graphs) | 3.4 |
| Tt=L/(60*V), min | 1.6 |
| Total Travel Time, min | 10.8 |

| R18 | |
|---|---|
| Sheet Flow | |
| Segment ID | R18.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4090 |
| Low Elevation, ft | 4076.5 |
| Length, ft | 300 |
| Slope (Percent) | 4.5 |
| Velocity, ft/s (from Upland Graph) | 2.1 |
| Tt=L/(60*V), min | 2.3 |
| Shallow concentrated flow | |
| Segment ID | R18.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4067.5 |
| Low Elevation, ft | 4048 |
| Length, ft | 874 |
| Slope (Percent) | 2.2 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.5 |
| Tt=L/(60*V), min | 9.7 |
| Total Travel Time, min | 12.0 |

| R19 | |
|---|---|
| Sheet Flow | |
| Segment ID | R19.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4058 |
| Low Elevation, ft | 4057 |
| Length, ft | 300 |
| Slope (Percent) | 0.3 |
| Velocity, ft/s (from Upland Graph) | 0.6 |
| Tt=L/(60*V), min | 8.8 |
| Shallow concentrated flow | |
| Segment ID | R19.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4057 |
| Low Elevation, ft | 4040 |
| Length, ft | 1528 |
| Slope (Percent) | 1.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.1 |
| Tt=L/(60*V), min | 24.2 |
| Total Travel Time, min | 33.0 |

| R20 | |
|---|---|
| Sheet Flow | |
| Segment ID | R20.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4060 |
| Low Elevation, ft | 4048 |
| Length, ft | 300 |
| Slope (Percent) | 4.0 |
| Velocity, ft/s (from Upland Graph) | 2.0 |
| Tt=L/(60*V), min | 2.5 |
| Shallow concentrated flow | |
| Segment ID | R20.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4048 |
| Low Elevation, ft | 4040 |
| Length, ft | 1817 |
| Slope (Percent) | 0.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 0.7 |
| Tt=L/(60*V), min | 45.6 |
| Total Travel Time, min | 48.0 |

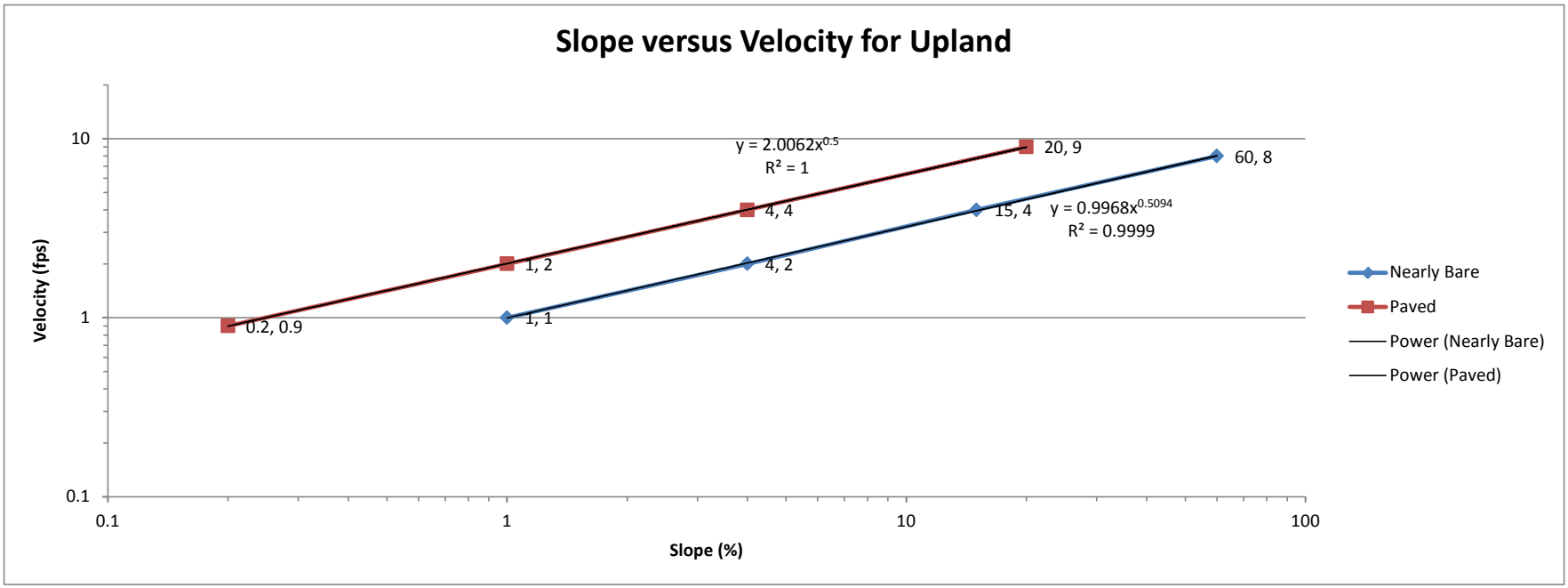
| R21 | |
|---|---|
| Sheet Flow | |
| Segment ID | R21.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4040 |
| Low Elevation, ft | 4039.9 |
| Length, ft | 300 |
| Slope (Percent) | 0.0 |
| Velocity, ft/s (from Upland Graph) | 0.2 |
| Tt=L/(60*V), min | 28.4 |
| Shallow concentrated flow | |
| Segment ID | R21.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4039.9 |
| Low Elevation, ft | 4038 |
| Length, ft | 1503 |
| Slope (Percent) | 0.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 0.3 |
| Tt=L/(60*V), min | 72.1 |
| Total Travel Time, min | 100.4 |

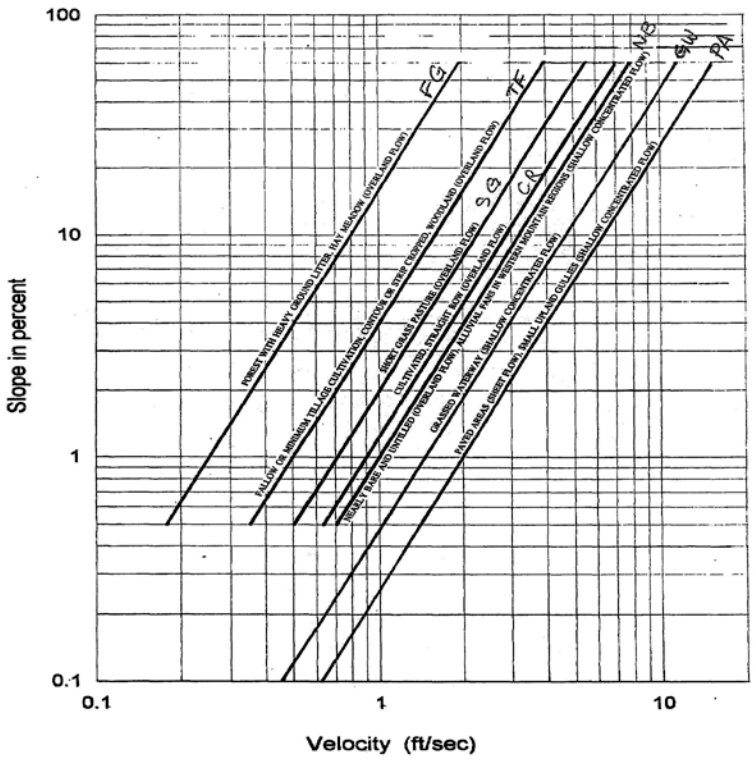
Computed: DGH Date: 06.06.2014
Checked: SDK Date: 06.06.2014

| Flow ID | Flow Type | Start Elevation (ft) | End Elevation (ft) | Length (ft) | Slope (ft/ft) | Slope (%) | Velocity Equation | Velocity [Pg. 3-33 NMSHTD, (ft/s)] |
|---|---|---|---|---|---|---|---|---|
| F1.1 | Sheet Flow | 4702.0 | 4622.0 | 300 | 0.267 | 26.7 | Bare Ground | 5.3 |
| F1.2 | Shallow Concentrated | 4622.0 | 4145.7 | 4684 | 0.102 | 10.2 | Bare Ground | 3.2 |
| F1.3 | Channel | 4145.7 | 4100.0 | 2426 | 0.019 | 1.9 | Channel | 6.8 |
| F2.1 | Sheet Flow | 4694.0 | 4640.0 | 300 | 0.180 | 18.0 | Bare Ground | 4.3 |
| F2.2 | Shallow Concentrated | 4640.0 | 4141.7 | 4962 | 0.100 | 10.0 | Bare Ground | 3.2 |
| F2.3 | Channel | 4141.7 | 4109.0 | 1955 | 0.017 | 1.7 | Channel | 6.4 |
| F3.1 | Sheet Flow | 4215.0 | 4152.0 | 300 | 0.210 | 21.0 | Bare Ground | 4.7 |
| F3.2 | Shallow Concentrated | 4152.0 | 4096.0 | 1432 | 0.039 | 3.9 | Bare Ground | 2.0 |
| F4.1 | Sheet Flow | 4397.5 | 4310.0 | 300 | 0.292 | 29.2 | Bare Ground | 5.6 |
| F4.2 | Shallow Concentrated | 4310.0 | 4090.0 | 2488 | 0.088 | 8.8 | Bare Ground | 3.0 |
| F5.1 | Sheet Flow | 4662.0 | 4616.0 | 300 | 0.153 | 15.3 | Bare Ground | 4.0 |
| F5.2 | Shallow Concentrated | 4616.0 | 4096.0 | 7030 | 0.074 | 7.4 | Bare Ground | 2.8 |
| F6.1 | Sheet Flow | 4184.0 | 4118.5 | 300 | 0.218 | 21.8 | Bare Ground | 4.8 |
| F6.2 | Shallow Concentrated | 4118.5 | 4094.0 | 629 | 0.039 | 3.9 | Bare Ground | 2.0 |
| F7.1 | Sheet Flow | 4560.0 | 4521.0 | 300 | 0.130 | 13.0 | Bare Ground | 3.7 |
| F7.2 | Shallow Concentrated | 4521.0 | 4090.0 | 3564 | 0.121 | 12.1 | Bare Ground | 3.5 |
| F8.1 | Sheet Flow | 4166.0 | 4133.5 | 300 | 0.108 | 10.8 | Bare Ground | 3.4 |
| F8.2 | Shallow Concentrated | 4133.5 | 4049.0 | 4086 | 0.021 | 2.1 | Bare Ground | 1.4 |
| F9.1 | Sheet Flow | 4120.0 | 4089.0 | 300 | 0.103 | 10.3 | Bare Ground | 3.3 |
| F9.2 | Shallow Concentrated | 4089.0 | 4042.0 | 1436 | 0.033 | 3.3 | Bare Ground | 1.8 |
| R1.1 | Sheet Flow | 4099.0 | 4098.5 | 300 | 0.002 | 0.2 | Paved Area | 0.8 |
| R1.2 | Channel | 4098.5 | 4082.0 | 539 | 0.031 | 3.1 | Channel | 8.7 |
| R2.1 | Sheet Flow | 4098.5 | 4098.0 | 300 | 0.002 | 0.2 | Paved Area | 0.8 |
| R2.2 | Shallow Concentrated | 4098.0 | 4086.0 | 739 | 0.016 | 1.6 | Paved Area | 2.5 |
| R2.3 | Channel | 4086.0 | 4076.0 | 359 | 0.028 | 2.8 | Channel | 8.3 |
| R3.1 | Sheet Flow | 4140.5 | 4133.5 | 300 | 0.023 | 2.3 | Bare Ground | 1.5 |
| R3.2 | Shallow Concentrated | 4133.5 | 4089.5 | 954 | 0.046 | 4.6 | Bare Ground | 2.2 |
| R3.3 | Channel | 4089.5 | 4075.0 | 1116 | 0.013 | 1.3 | Channel | 5.7 |
| R4.1 | Sheet Flow | 4100.5 | 4092.5 | 300 | 0.027 | 2.7 | Bare Ground | 1.6 |
| R4.2 | Shallow Concentrated | 4092.5 | 4078.0 | 1255 | 0.012 | 1.2 | Bare Ground | 1.1 |
| R5.1 | Sheet Flow | 4098.0 | 4086.0 | 300 | 0.040 | 4.0 | Bare Ground | 2.0 |
| R5.2 | Shallow Concentrated | 4086.0 | 4073.5 | 660 | 0.019 | 1.9 | Bare Ground | 1.4 |
| R6.1 | Sheet Flow | 4104.0 | 4087.0 | 300 | 0.057 | 5.7 | Bare Ground | 2.4 |
| R6.2 | Shallow Concentrated | 4087.0 | 4071.7 | 492 | 0.031 | 3.1 | Bare Ground | 1.8 |
| R7.1 | Sheet Flow | 4086.0 | 4083.0 | 300 | 0.010 | 1.0 | Bare Ground | 1.0 |
| R7.2 | Shallow Concentrated | 4083.0 | 4073.0 | 573 | 0.017 | 1.7 | Bare Ground | 1.3 |
| R8.1 | Sheet Flow | 4077.5 | 4073.0 | 300 | 0.015 | 1.5 | Bare Ground | 1.2 |
| R8.2 | Shallow Concentrated | 4073.0 | 4069.0 | 404 | 0.010 | 1.0 | Bare Ground | 1.0 |
| R9.1 | Sheet Flow | 4072.5 | 4071.5 | 300 | 0.003 | 0.3 | Bare Ground | 0.6 |
| R9.2 | Shallow Concentrated | 4071.5 | 4069.0 | 233 | 0.011 | 1.1 | Bare Ground | 1.0 |
| R10.1 | Sheet Flow | 4080.5 | 4076.5 | 300 | 0.013 | 1.3 | Bare Ground | 1.2 |
| R10.2 | Channel | 4076.5 | 4065.5 | 658 | 0.017 | 1.7 | Channel | 6.4 |
| R11.1 | Sheet Flow | 4130.0 | 4091.5 | 300 | 0.128 | 12.8 | Bare Ground | 3.7 |
| R11.2 | Shallow Concentrated | 4091.5 | 4060.5 | 1231 | 0.025 | 2.5 | Bare Ground | 1.6 |
| R11.3 | Channel | 4060.5 | 4056.5 | 615 | 0.007 | 0.7 | Channel | 4.0 |
| R12.1 | Sheet Flow | 4130.0 | 4089.0 | 300 | 0.137 | 13.7 | Bare Ground | 3.8 |
| R12.2 | Shallow Concentrated | 4089.0 | 4064.0 | 713 | 0.035 | 3.5 | Bare Ground | 1.9 |
| R13.1 | Sheet Flow | 4130.0 | 4108.0 | 300 | 0.073 | 7.3 | Bare Ground | 2.8 |
| R13.2 | Shallow Concentrated | 4108.0 | 4064.0 | 1282 | 0.034 | 3.4 | Bare Ground | 1.9 |
| R14.1 | Sheet Flow | 4158.0 | 4136.0 | 300 | 0.073 | 7.3 | Bare Ground | 2.8 |
| R14.2 | Shallow Concentrated | 4136.0 | 4064.0 | 1837 | 0.039 | 3.9 | Bare Ground | 2.0 |
| R15.1 | Sheet Flow | 4130.0 | 4113.0 | 300 | 0.057 | 5.7 | Bare Ground | 2.4 |
| R15.2 | Shallow Concentrated | 4113.0 | 4074.0 | 819 | 0.048 | 4.8 | Bare Ground | 2.2 |
| R16.1 | Sheet Flow | 4064.0 | 4056.2 | 87 | 0.090 | 9.0 | Bare Ground | 3.0 |
| R16.2 | Channel | 4056.2 | 4048.0 | 830 | 0.010 | 1.0 | Channel | 4.9 |
| R17.1 | Sheet Flow | 4070.0 | 4062.0 | 300 | 0.027 | 2.7 | Bare Ground | 1.6 |
| R17.2 | Shallow Concentrated | 4062.0 | 4043.5 | 629 | 0.029 | 2.9 | Bare Ground | 1.7 |
| R17.3 | Channel | 4043.5 | 4042.0 | 329 | 0.005 | 0.5 | Channel | 3.4 |
| R18.1 | Sheet Flow | 4090.0 | 4076.5 | 300 | 0.045 | 4.5 | Bare Ground | 2.1 |
| R18.2 | Shallow Concentrated | 4067.5 | 4048.0 | 874 | 0.022 | 2.2 | Bare Ground | 1.5 |
| R19.1 | Sheet Flow | 4058.0 | 4057.0 | 300 | 0.003 | 0.3 | Bare Ground | 0.6 |
| R19.2 | Shallow Concentrated | 4057.0 | 4040.0 | 1528 | 0.011 | 1.1 | Bare Ground | 1.1 |
| R20.1 | Sheet Flow | 4060.0 | 4048.0 | 300 | 0.040 | 4.0 | Bare Ground | 2.0 |
| R20.2 | Shallow Concentrated | 4048.0 | 4039.8 | 1817 | 0.005 | 0.5 | Bare Ground | 0.7 |
| R21.1 | Sheet Flow | 4040.0 | 4039.9 | 300 | 0.000 | 0.0 | Bare Ground | 0.2 |
| R21.2 | Shallow Concentrated | 4039.9 | 4038.0 | 1503 | 0.001 | 0.1 | Bare Ground | 0.3 |

| | | | |
|---|---|---|---|
| Computed: | DGH | Date: | 05.18.2014 |
| Checked: | SDK | Date: | 05.20.2014 |

| | *Slope* | *Velocity* | |
|---|---|---|---|
| **Nearly Bare** | 1 | 1 | **1x^0.5094** |
| | 4 | 2 | |
| | 15 | 4 | |
| | 60 | 8 | |
| **Paved Area (Shallow Concentrated Flow)** | 0.2 | 0.9 | **2x^0.5021** |
| | 1 | 2 | |
| | 4 | 4 | |
| | 20 | 9 | |






Note: For watercourses with slopes less than 0.5 percent, use the overland flow velocity given for 0.5 percent, except for shallow concentrated flow where a flatter slope may be considered.

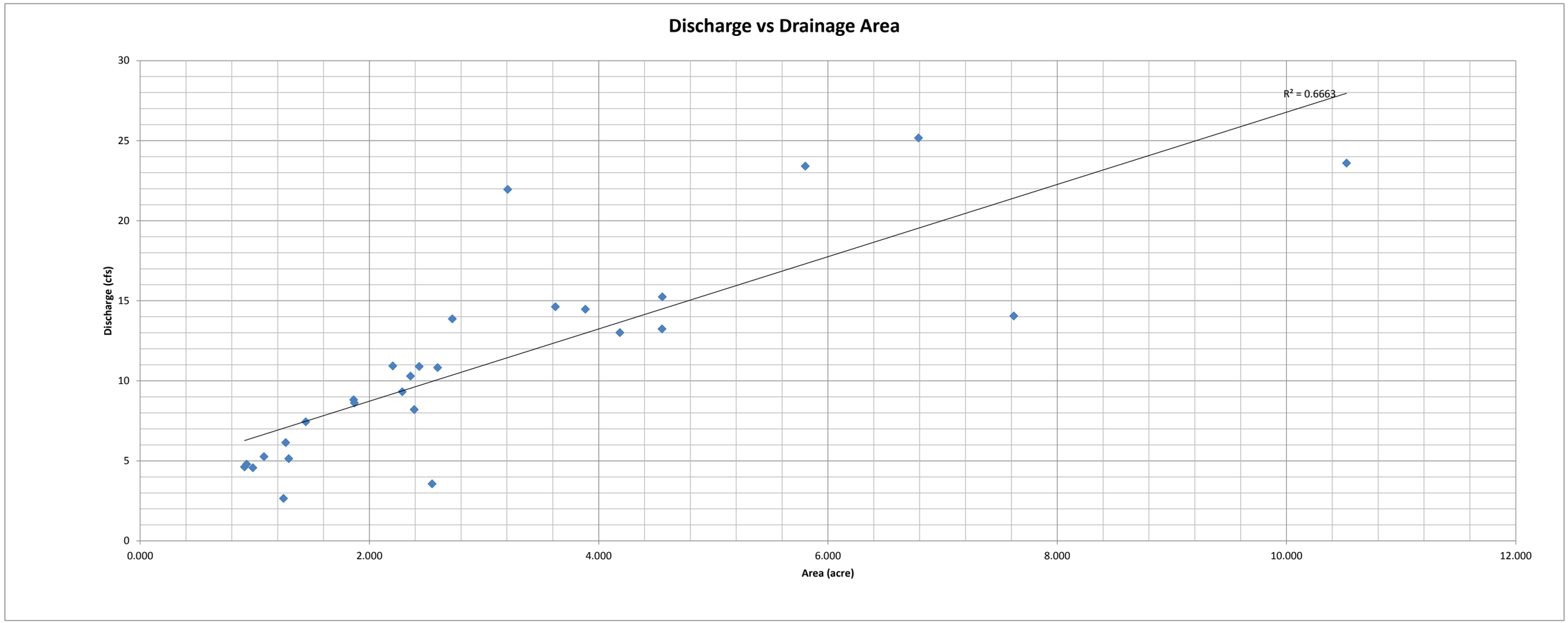
**Figure 3–10**
Flow Velocities for Overland and Shallow Concentrated Flows

Modified from SCS, NEH–4, 1972

Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

## Rational Method Runoff Calculations

| | | | | Rainfall Intensity per recurrence interval (in/hr) | | | | | Peak Discharge per recurrence interval (cfs) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subbasin ID | Contributing Area (acre) | Composite "C" value | Tc (min) | $i_5$ | $i_{10}$ | $i_{25}$ | $i_{50}$ | $i_{100}$ | $Q_5$ | $Q_{10}$ | $Q_{25}$ | $Q_{50}$ | $Q_{100}$ | Discharge ($Q_{100}$) to Area (ac) Ratio |
| RN1 | 6.790 | 0.44 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 13 | 16 | 19 | 22 | 25 | 4 |
| RN10 | 5.802 | 0.52 | 6.7 | 4.1 | 4.9 | 5.9 | 6.8 | 7.7 | 12 | 15 | 18 | 21 | 23 | 4 |
| RN11 | 1.270 | 0.57 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 3 | 4 | 5 | 5 | 6 | 5 |
| RN12 | 2.359 | 0.68 | 10.9 | 3.4 | 4.1 | 5.0 | 5.7 | 6.4 | 5 | 6 | 8 | 9 | 10 | 4 |
| RN13 | 2.595 | 0.61 | 9.2 | 3.6 | 4.3 | 5.3 | 6.1 | 6.9 | 6 | 7 | 8 | 10 | 11 | 4 |
| RN14 | 3.884 | 0.51 | 8.0 | 3.8 | 4.6 | 5.6 | 6.4 | 7.2 | 8 | 9 | 11 | 13 | 14 | 4 |
| RN15 | 0.984 | 0.60 | 6.6 | 4.1 | 4.9 | 6.0 | 6.8 | 7.7 | 2 | 3 | 4 | 4 | 5 | 5 |
| RN16 | 1.296 | 0.68 | 13.8 | 3.1 | 3.7 | 4.5 | 5.2 | 5.8 | 3 | 3 | 4 | 5 | 5 | 4 |
| RN17 | 2.434 | 0.61 | 7.6 | 3.9 | 4.7 | 5.7 | 6.5 | 7.4 | 6 | 7 | 8 | 10 | 11 | 4 |
| RN18 | 2.204 | 0.60 | 5.4 | 4.4 | 5.2 | 6.4 | 7.3 | 8.3 | 6 | 7 | 8 | 10 | 11 | 5 |
| RN19 | 0.910 | 0.60 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 2 | 3 | 4 | 4 | 5 | 5 |
| RN2 | 1.862 | 0.56 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 5 | 6 | 7 | 8 | 9 | 5 |
| RN20 | 1.445 | 0.62 | 5.3 | 4.4 | 5.2 | 6.4 | 7.3 | 8.3 | 4 | 5 | 6 | 7 | 7 | 5 |
| RN21 | 1.870 | 0.62 | 7.3 | 3.9 | 4.7 | 5.8 | 6.6 | 7.5 | 5 | 5 | 7 | 8 | 9 | 5 |
| RN22 | 2.723 | 0.61 | 5.1 | 4.4 | 5.3 | 6.5 | 7.4 | 8.4 | 7 | 9 | 11 | 12 | 14 | 5 |
| RN23 | 4.184 | 0.47 | 10.5 | 3.4 | 4.1 | 5.0 | 5.8 | 6.5 | 7 | 8 | 10 | 11 | 13 | 3 |
| RN24 | 0.930 | 0.61 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 3 | 3 | 4 | 4 | 5 | 5 |
| RN25 | 1.080 | 0.58 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 3 | 3 | 4 | 5 | 5 | 5 |
| RN26 | 2.547 | 0.19 | 7.9 | 3.8 | 4.6 | 5.6 | 6.4 | 7.3 | 2 | 2 | 3 | 3 | 4 | 1 |
| RN27 | 7.621 | 0.31 | 13.4 | 3.1 | 3.7 | 4.6 | 5.2 | 5.9 | 7 | 9 | 11 | 12 | 14 | 2 |
| RN28 | 1.251 | 0.25 | 5.0 | 4.5 | 5.3 | 6.5 | 7.5 | 8.5 | 1 | 2 | 2 | 2 | 3 | 2 |
| RN3 | 2.287 | 0.50 | 5.6 | 4.3 | 5.2 | 6.3 | 7.2 | 8.2 | 5 | 6 | 7 | 8 | 9 | 4 |
| RN4 | 4.553 | 0.47 | 11.8 | 3.3 | 3.9 | 4.8 | 5.5 | 6.2 | 7 | 8 | 10 | 12 | 13 | 3 |
| RN5 | 2.391 | 0.44 | 6.3 | 4.1 | 5.0 | 6.1 | 7.0 | 7.9 | 4 | 5 | 6 | 7 | 8 | 3 |
| RN6 | 3.207 | 0.88 | 6.5 | 4.1 | 4.9 | 6.0 | 6.9 | 7.8 | 12 | 14 | 17 | 19 | 22 | 7 |
| RN7 | 3.622 | 0.69 | 13.6 | 3.1 | 3.7 | 4.5 | 5.2 | 5.9 | 8 | 9 | 11 | 13 | 15 | 4 |
| RN8 | 10.524 | 0.49 | 22.5 | 2.4 | 2.9 | 3.5 | 4.0 | 4.6 | 12 | 15 | 18 | 21 | 24 | 2 |
| RN9 | 4.555 | 0.51 | 10.4 | 3.5 | 4.1 | 5.1 | 5.8 | 6.6 | 8 | 10 | 12 | 13 | 15 | 3 |


Discharge vs Drainage Area
Discharge (cfs)
Area (acre)
R² = 0.6663
0
5
10
15
20
25
30
0.000
2.000
4.000
6.000
8.000
10.000
12.000

Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

Precipitation information obtained from NOAA Atlas 14 at the approximate center of the town of Rincon, NM:

Latitude: 32.674698 Longitude: -107.063366

LAT: 32D40M29SEC LONG: 107D03M48SEC

## Precipitation Frequency Estimates (in/hr)

| Duration | | Return Interval (year) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **Minutes** | **1** | **2** | **5** | **10** | **25** | **50** | **100** | **200** | **500** | **1000** |
| **5-min** | **5** | 2.63 | 3.41 | 4.57 | 5.47 | 6.68 | 7.66 | 8.66 | 9.71 | 11.15 | 12.30 |
| **10-min** | **10** | 2.00 | 2.59 | 3.47 | 4.16 | 5.09 | 5.82 | 6.59 | 7.38 | 8.48 | 9.36 |
| **15-min** | **15** | 1.65 | 2.14 | 2.87 | 3.44 | 4.20 | 4.81 | 5.45 | 6.10 | 7.01 | 7.74 |
| **30-min** | **30** | 1.11 | 1.44 | 1.93 | 2.32 | 2.83 | 3.24 | 3.67 | 4.11 | 4.72 | 5.21 |
| **60-min** | **60** | 0.69 | 0.89 | 1.20 | 1.43 | 1.75 | 2.00 | 2.27 | 2.54 | 2.92 | 3.22 |
| **2-hr** | **120** | 0.39 | 0.51 | 0.68 | 0.81 | 1.00 | 1.14 | 1.29 | 1.45 | 1.66 | 1.83 |
| **3-hr** | **180** | 0.28 | 0.36 | 0.47 | 0.56 | 0.68 | 0.78 | 0.88 | 0.99 | 1.13 | 1.25 |
| **6-hr** | **360** | 0.16 | 0.20 | 0.26 | 0.31 | 0.37 | 0.42 | 0.47 | 0.52 | 0.59 | 0.65 |
| **12-hr** | **720** | 0.09 | 0.11 | 0.14 | 0.17 | 0.20 | 0.22 | 0.25 | 0.27 | 0.30 | 0.33 |
| **24-hr** | **1440** | 0.05 | 0.06 | 0.08 | 0.09 | 0.11 | 0.12 | 0.14 | 0.16 | 0.18 | 0.20 |
| **2-day** | **2880** | 0.03 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.08 | 0.10 | 0.11 |
| **3-day** | **4320** | 0.02 | 0.02 | 0.03 | 0.04 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 |
| **4-day** | **5760** | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 | 0.05 | 0.06 | 0.06 |
| **7-day** | **10080** | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 |
| **10-day** | **14400** | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 |
| **20-day** | **28800** | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 |
| **30-day** | **43200** | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| **45-day** | **64800** | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| **60-day** | **86400** | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

## Latitude and Longitude of a Point




Clear / Reset | Remove Last Blue Marker | Center Red Marker

### Get the Latitude and Longitude of a Point

When you click on the map, move the marker or enter an address the latitude and longitude coordinates of the point are inserted in the boxes below.

| | |
|---|---|
| Latitude: | 32.674698 |
| Longitude: | -107.063366 |

| | Degrees | Minutes | Seconds |
|---|---|---|---|
| Latitude: | 32 | 40 | 28.9122 |
| Longitude: | -107 | 3 | 48.1176 |

### Show Point from Latitude and Longitude

Use this if you know the latitude and longitude coordinates of a point and want to see where on the map the point is.
**Use:** **+** for *N* Lat or *E* Long **-** for *S* Lat or *W* Long.
**Example:** +40.689060 -74.044636
**Note:** Your entry should not have any embedded spaces.

| | |
|---|---|
| Decimal Deg. Latitude: | |
| Decimal Deg. Longitude: | |

Show Point

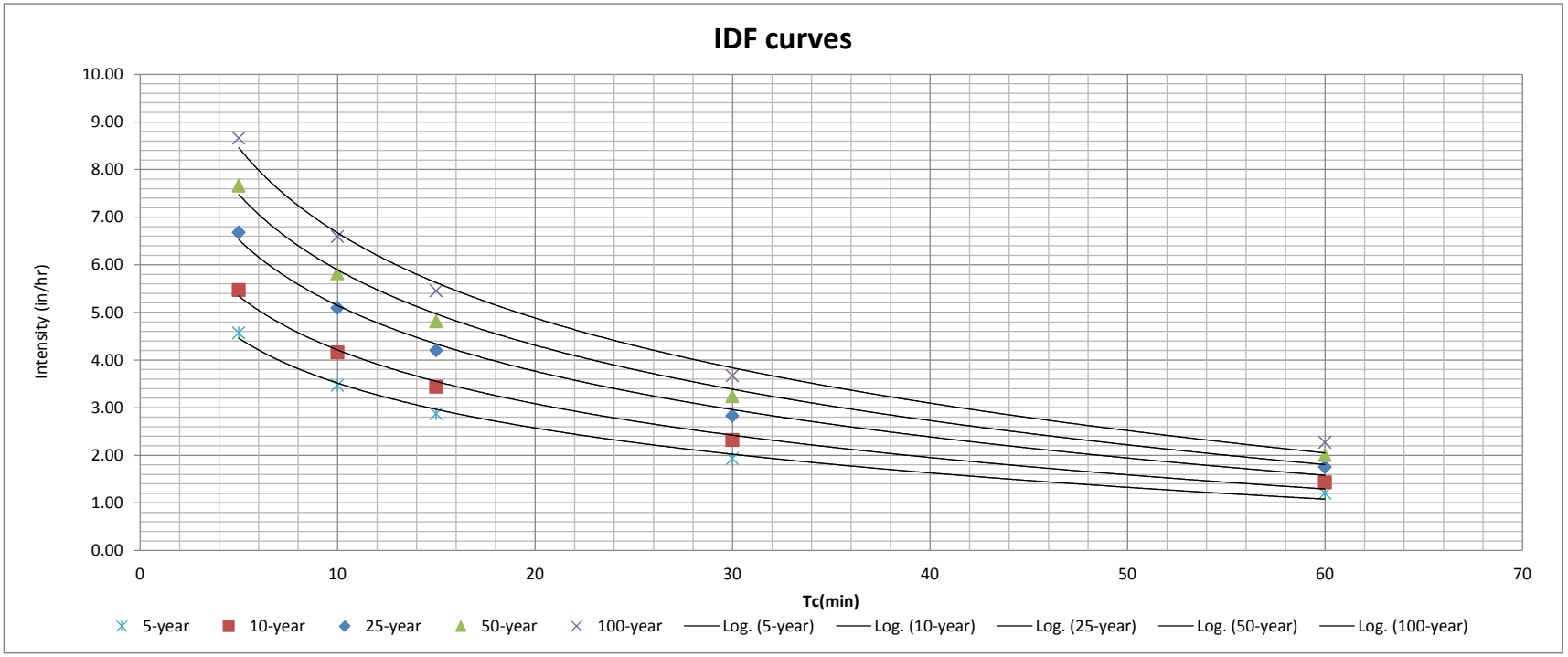
Example: **+34 40 50.12** for *34N 40' 50.12"*

| | Degrees | Minutes | Seconds |
|---|---|---|---|
| Latitude: | | | |
| Longitude: | | | |

Show Point

**IDF Curve Equations**

| Recurrence Interval (year) | Equation |
|---|---|
| 100 | -2.579ln(x) + 12.608 |
| 50 | -2.283ln(x) + 11.152 |
| 25 | -1.991ln(x) + 9.7295 |
| 10 | -1.629ln(x) + 7.9642 |
| 5 | -1.36ln(x) + 6.6473 |



Computed: **DGH** Date: **06.10.2014**
Checked: **SDK** Date: **06.11.2014**

Point precipitation frequency estimates (inches)
NOAA Atlas 14 Volume 1 Version 5
Data type: Precipitation depth
Time series type: Partial duration
Project area: Southwest
Location name: Rincon, New Mexico, US*
Station Name: -
Latitude: 32.6747°
Longitude: -107.0634°
Elevation: 4079 ft*
* source: Google Maps

PRECIPITATION FREQUENCY ESTIMATES

| by duration for ARI: | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 years |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-min: | 0.22 | 0.28 | 0.38 | 0.46 | 0.56 | 0.64 | 0.72 | 0.81 | 0.93 | 1.02 |
| 10-min: | 0.33 | 0.43 | 0.58 | 0.69 | 0.85 | 0.97 | 1.10 | 1.23 | 1.41 | 1.56 |
| 15-min: | 0.41 | 0.54 | 0.72 | 0.86 | 1.05 | 1.20 | 1.36 | 1.53 | 1.75 | 1.94 |
| 30-min: | 0.56 | 0.72 | 0.97 | 1.16 | 1.42 | 1.62 | 1.83 | 2.05 | 2.36 | 2.60 |
| 60-min: | 0.69 | 0.89 | 1.20 | 1.43 | 1.75 | 2.00 | 2.27 | 2.54 | 2.92 | 3.22 |
| 2-hr: | 0.79 | 1.02 | 1.36 | 1.63 | 1.99 | 2.28 | 2.58 | 2.89 | 3.31 | 3.65 |
| 3-hr: | 0.83 | 1.07 | 1.41 | 1.68 | 2.05 | 2.34 | 2.65 | 2.96 | 3.39 | 3.74 |
| 6-hr: | 0.95 | 1.21 | 1.57 | 1.84 | 2.22 | 2.51 | 2.81 | 3.12 | 3.53 | 3.87 |
| 12-hr: | 1.06 | 1.34 | 1.72 | 2.01 | 2.39 | 2.68 | 2.98 | 3.28 | 3.67 | 3.99 |
| 24-hr: | 1.17 | 1.48 | 1.88 | 2.20 | 2.63 | 2.99 | 3.36 | 3.75 | 4.31 | 4.76 |
| 2-day: | 1.27 | 1.60 | 2.03 | 2.37 | 2.85 | 3.23 | 3.64 | 4.08 | 4.69 | 5.20 |
| 3-day: | 1.37 | 1.73 | 2.19 | 2.56 | 3.07 | 3.48 | 3.92 | 4.37 | 5.03 | 5.57 |
| 4-day: | 1.47 | 1.86 | 2.36 | 2.75 | 3.30 | 3.73 | 4.19 | 4.67 | 5.37 | 5.95 |
| 7-day: | 1.72 | 2.17 | 2.75 | 3.21 | 3.83 | 4.33 | 4.86 | 5.41 | 6.19 | 6.81 |
| 10-day: | 1.90 | 2.40 | 3.05 | 3.57 | 4.28 | 4.86 | 5.46 | 6.10 | 7.00 | 7.73 |
| 20-day: | 2.42 | 3.05 | 3.84 | 4.45 | 5.26 | 5.89 | 6.54 | 7.21 | 8.12 | 8.83 |
| 30-day: | 2.88 | 3.63 | 4.53 | 5.21 | 6.11 | 6.79 | 7.49 | 8.18 | 9.12 | 9.84 |
| 45-day: | 3.49 | 4.38 | 5.41 | 6.18 | 7.18 | 7.92 | 8.65 | 9.38 | 10.32 | 11.03 |
| 60-day: | 4.09 | 5.14 | 6.34 | 7.22 | 8.35 | 9.18 | 10.00 | 10.80 | 11.84 | 12.61 |

Date/time (GMT): Wed Jun 11 00:42:51 2014
pyRunTime: 0.0624089241028

| | | | |
|---|---|---|---|
| Computed: | **DGH** | Date: | **06.10.2014** |
| Checked: | **SDK** | Date: | **06.11.2014** |



Point precipitation frequency estimates (inches/hour)
NOAA Atlas 14 Volume 1 Version 5
Data type: Precipitation intensity
Time series type: Partial duration
Project area: Southwest
Location name: Rincon, New Mexico, US*
Station Name: -
Latitude: 32.6747°
Longitude: -107.0634°
Elevation: 4079 ft*
* source: Google Maps

PRECIPITATION FREQUENCY ESTIMATES

| by duration for ARI: | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 years |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-min: | 2.63 | 3.41 | 4.57 | 5.47 | 6.68 | 7.66 | 8.66 | 9.71 | 11.15 | 12.30 |
| 10-min: | 2.00 | 2.59 | 3.47 | 4.16 | 5.09 | 5.82 | 6.59 | 7.38 | 8.48 | 9.36 |
| 15-min: | 1.65 | 2.14 | 2.87 | 3.44 | 4.20 | 4.81 | 5.45 | 6.10 | 7.01 | 7.74 |
| 30-min: | 1.11 | 1.44 | 1.93 | 2.32 | 2.83 | 3.24 | 3.67 | 4.11 | 4.72 | 5.21 |
| 60-min: | 0.69 | 0.89 | 1.20 | 1.43 | 1.75 | 2.00 | 2.27 | 2.54 | 2.92 | 3.22 |
| 2-hr: | 0.39 | 0.51 | 0.68 | 0.81 | 1.00 | 1.14 | 1.29 | 1.45 | 1.66 | 1.83 |
| 3-hr: | 0.28 | 0.36 | 0.47 | 0.56 | 0.68 | 0.78 | 0.88 | 0.99 | 1.13 | 1.25 |
| 6-hr: | 0.16 | 0.20 | 0.26 | 0.31 | 0.37 | 0.42 | 0.47 | 0.52 | 0.59 | 0.65 |
| 12-hr: | 0.09 | 0.11 | 0.14 | 0.17 | 0.20 | 0.22 | 0.25 | 0.27 | 0.30 | 0.33 |
| 24-hr: | 0.05 | 0.06 | 0.08 | 0.09 | 0.11 | 0.12 | 0.14 | 0.16 | 0.18 | 0.20 |
| 2-day: | 0.03 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.08 | 0.10 | 0.11 |
| 3-day: | 0.02 | 0.02 | 0.03 | 0.04 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 |
| 4-day: | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 | 0.05 | 0.06 | 0.06 |
| 7-day: | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 |
| 10-day: | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 |
| 20-day: | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 |
| 30-day: | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 45-day: | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 60-day: | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

Date/time (GMT): Wed Jun 11 01:20:01 2014
pyRunTime: 0.053985118866

Computed: DGH Date: 06.06.2014
Checked: SDK Date: 06.11.2014

| Subbasin | Total Area (ac) | Composite "C" [a,b,c,d] |
|---|---|---|
| RN1 | 6.790 | 0.44 |
| RN2 | 1.862 | 0.56 |
| RN3 | 2.287 | 0.50 |
| RN4 | 4.553 | 0.47 |
| RN5 | 2.391 | 0.44 |
| RN6 | 3.207 | 0.88 |
| RN7 | 3.622 | 0.69 |
| RN8 | 10.524 | 0.49 |
| RN9 | 4.555 | 0.51 |
| RN10 | 5.802 | 0.52 |
| RN11 | 1.270 | 0.57 |
| RN12 | 2.359 | 0.68 |
| RN13 | 2.595 | 0.61 |
| RN14 | 3.884 | 0.51 |

| Subbasin | Total Area (ac) | Composite "C" [a,b,c,d] |
|---|---|---|
| RN15 | 0.984 | 0.60 |
| RN16 | 1.296 | 0.68 |
| RN17 | 2.434 | 0.61 |
| RN18 | 2.204 | 0.60 |
| RN19 | 0.910 | 0.60 |
| RN20 | 1.445 | 0.62 |
| RN21 | 1.870 | 0.62 |
| RN22 | 2.723 | 0.61 |
| RN23 | 4.184 | 0.47 |
| RN24 | 0.930 | 0.61 |
| RN25 | 1.080 | 0.58 |
| RN26 | 2.547 | 0.19 |
| RN27 | 7.621 | 0.31 |
| RN28 | 1.251 | 0.25 |

Notes
a - Computations for composite "C" values based on Figures 3-11 and 3-16 of the NMSHTD Hydrology Manual (NMSHTD, 1995).
Specifically, the rainfall depth associated with a 1-hour duration for the 100-year recurrence interval storm was used in determination of "C" values for the analysis. Documentation of this process is provided in the "NMSHTD 'C' Plots" tab.
b - "Dirt (including ROW)" land cover areas were attributed a "C" value of 0.40 to establish a value best representative of the cover condition. This value is specified for "bare soil" conditions within "Hydrology and Hydraulic Systems (Gupta, 2008).
c - Gravel (including ROW) land covers were attributed "C" of 0.70. Determination of this value was based on the specified runoff coefficient for "poor asphalt" conditions within "Hydrology and Hydraulic Systems (Gupta, 2008).
d - Residential areas were attributed "C" values for the "Suburban" condition in Figure 3-16, based upon findings of approximately 20% of impervious cover within the square blocks analyzed.

**RN1**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 20 | B | 1.234 | 0.30 |
| | 40 | B | 0.866 | 0.20 |
| | 70 | B | 0.151 | 0.05 |
| Dirt (including ROW) | -- | -- | 3.431 | 0.40 |
| Impervious | -- | -- | 1.108 | 0.95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **6.790** | **0.44** |

**RN2**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 20 | B | 0.004 | 0.30 |
| | 30 | B | 0.193 | 0.25 |
| Dirt (including ROW) | -- | -- | 1.071 | 0.40 |
| Impervious | -- | -- | 0.594 | 0.95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.862** | **0.56** |

**RN3**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 30 | B | 0.310 | 0.25 |
| Dirt (including ROW) | -- | -- | 1.481 | 0.40 |
| Impervious | -- | -- | 0.495 | 0.95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.287** | **0.50** |

**RN4**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 20 | B | 3.017 | 0.30 |
| Dirt (including ROW) | -- | -- | 0.443 | 0.40 |
| Impervious | -- | -- | 1.093 | 0.95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **4.553** | **0.47** |

**RN5**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 20 | A/B | 1.546 | 0.30 |
| | 30 | A/B | 0.004 | 0.25 |
| Dirt (including ROW) | -- | -- | 0.399 | 0.40 |
| Impervious | -- | -- | 0.441 | 0.95 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.391** | **0.44** |

**RN6**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Commercial and business | -- | -- | 3.014 | 0.92 |
| Desert shrub | 30 | B | 0.193 | 0.25 |
| **Subbasin Composite Area & CN** | **--** | **--** | **3.207** | **0.88** |

**RN7**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Dirt (including ROW) | -- | -- | 0.157 | 0.40 |
| Gravel (including ROW) | -- | -- | 3.461 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.004 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **3.622** | **0.69** |

**RN8**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 40 | A/B | 4.138 | 0.20 |
| Dirt (including ROW) | -- | -- | 1.157 | 0.40 |
| Gravel (including ROW) | -- | -- | 4.412 | 0.70 |
| Impervious | -- | -- | 0.813 | 0.95 |
| Residential 3/4 acre lots | -- | -- | 0.004 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **10.524** | **0.49** |

**RN9**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 40 | A/B | 0.821 | 0.20 |
| Dirt (including ROW) | -- | -- | 1.484 | 0.40 |
| Gravel (including ROW) | -- | -- | 2.016 | 0.70 |
| Impervious | -- | -- | 0.029 | 0.95 |
| Residential 1/4 acre lots | -- | -- | 0.205 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **4.555** | **0.51** |

**RN10**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Commercial and business | -- | -- | 0.674 | 0.92 |
| Desert shrub | 30 | A/B | 0.205 | 0.25 |
| | 40 | A/B | 0.156 | 0.20 |
| Dirt (including ROW) | -- | -- | 2.759 | 0.40 |
| Gravel (including ROW) | -- | -- | 0.270 | 0.70 |
| Residential 1/4 acre lots | -- | -- | 1.637 | 0.60 |
| Residential 3/4 acre lots | -- | -- | 0.078 | 0.60 |
| Residential 1/2 acre lots | -- | -- | 0.024 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **5.802** | **0.52** |

**RN11**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 30 | A/B | 0.161 | 0.25 |
| Impervious | -- | -- | 0.196 | 0.70 |
| Residential 1/4 acre lots | -- | -- | 0.796 | 0.60 |
| Residential 3/4 acre lots | -- | -- | 0.117 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.270** | **0.57** |

**RN12**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Commercial and business | -- | -- | 0.426 | 0.92 |
| Gravel (including ROW) | -- | -- | 0.437 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 1.497 | 0.60 |
| Residential 1/2 acre lots | -- | -- | 0.644 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.359** | **0.68** |

**RN13**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Gravel (including ROW) | -- | -- | 0.150 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 2.446 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.595** | **0.61** |

**RN14**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Desert shrub | 40 | A/B | 0.081 | 0.20 |
| Dirt (including ROW) | -- | -- | 2.222 | 0.40 |
| Gravel (including ROW) | -- | -- | 0.056 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.901 | 0.60 |
| Residential 1/2 acre lots | -- | -- | 0.624 | 0.82 |
| **Subbasin Composite Area & CN** | **--** | **--** | **3.884** | **0.51** |

**RN15**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Gravel (including ROW) | -- | -- | 0.127 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.984 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **0.984** | **0.60** |

**RN16**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Gravel (including ROW) | -- | -- | 1.012 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.284 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.296** | **0.68** |

**RN17**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Gravel (including ROW) | -- | -- | 0.151 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 2.283 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.434** | **0.61** |

**RN18**

| Cover Type | Percent Cover (%) | Hydrologic Soil Group | Area (ac) | C value |
|---|---|---|---|---|
| Residential 3/4 acre lots | -- | -- | 2.204 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.204** | **0.60** |

| RN19 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Residential 3/4 acre lots | -- | -- | 0.910 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **0.910** | **0.60** |

| RN20 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 80 | A/B | 0.005 | 0.00 |
| Gravel (including ROW) | -- | -- | 0.282 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 1.163 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.445** | **0.62** |

| RN21 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 80 | A/B | 0.035 | 0.00 |
| Gravel (including ROW) | -- | -- | 0.295 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 1.575 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.870** | **0.62** |

| RN22 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Gravel (including ROW) | -- | -- | 0.157 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 2.566 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.723** | **0.61** |

| RN23 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 80 | A/B | 0.538 | 0.00 |
| | 50 | A/B | 0.517 | 0.15 |
| Gravel (including ROW) | -- | -- | 0.319 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 2.811 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **4.184** | **0.47** |

| RN24 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 80 | A/B | 0.004 | 0.00 |
| Desert shrub | 50 | A/B | 0.013 | 0.15 |
| Dirt (including ROW) | -- | -- | 0.022 | 0.40 |
| Gravel (including ROW) | -- | -- | 0.217 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.674 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **0.930** | **0.61** |

| RN25 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 80 | A/B | 0.036 | 0.00 |
| Dirt (including ROW) | -- | -- | 0.075 | 0.40 |
| Gravel (including ROW) | -- | -- | 0.105 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.864 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.080** | **0.58** |

| RN26 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 80 | A/B | 1.503 | 0.00 |
| Dirt (including ROW) | -- | -- | 0.807 | 0.40 |
| Gravel (including ROW) | -- | -- | 0.238 | 0.70 |
| **Subbasin Composite Area & CN** | **--** | **--** | **2.547** | **0.19** |

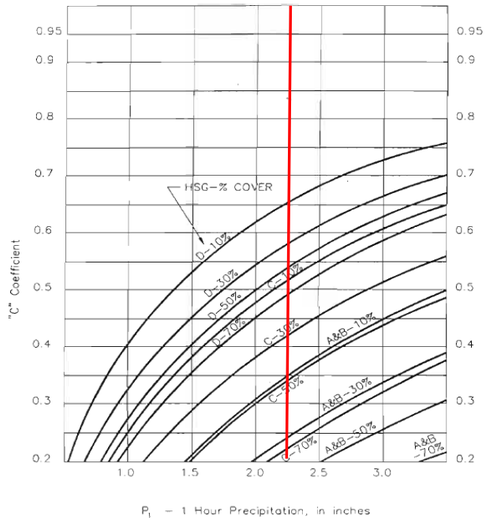
| RN27 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 30 | A/B | 5.940 | 0.25 |
| Dirt (including ROW) | -- | -- | 0.937 | 0.40 |
| Gravel (including ROW) | -- | -- | 0.683 | 0.70 |
| Residential 3/4 acre lots | -- | -- | 0.061 | 0.60 |
| **Subbasin Composite Area & CN** | **--** | **--** | **7.621** | **0.31** |

| RN28 | | | | |
|---|---|---|---|---|
| **Cover Type** | **Percent Cover (%)** | **Hydrologic Soil Group** | **Area (ac)** | **C value** |
| Desert shrub | 30 | A/B | 1.248 | 0.25 |
| Dirt (including ROW) | -- | -- | 0.004 | 0.40 |
| **Subbasin Composite Area & CN** | **--** | **--** | **1.251** | **0.25** |

| Basin ID | Land Use | Percent Cover (%) | Hydrologic Soil Group | Percent Impervious (%) | Rational "C" Coefficient | Area (Ac) |
|---|---|---|---|---|---|---|
| RN1 | Impervious | | B | 100 | 0.95 | 1.108 |
| RN1 | Dirt (including ROW) | | B | 0 | 0.4 | 2.347 |
| RN1 | Dirt (including ROW) | | B | 0 | 0.4 | 0.502 |
| RN1 | Desert shrub | 70 | B | 0 | 0.05 | 0.151 |
| RN1 | Desert shrub | 40 | B | 0 | 0.2 | 0.866 |
| RN1 | Dirt (including ROW) | | B | 0 | 0.4 | 0.582 |
| RN1 | Desert shrub | 20 | B | 0 | 0.3 | 1.234 |
| RN10 | Gravel (including ROW) | | B | 0 | 0.7 | 0.130 |
| RN10 | Gravel (including ROW) | | A | 0 | 0.7 | 0.139 |
| RN10 | Dirt (including ROW) | | B | 0 | 0.4 | 0.104 |
| RN10 | Dirt (including ROW) | | A | 0 | 0.4 | 2.656 |
| RN10 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.077 |
| RN10 | Residential 3/4 acre lots | | A | 20 | 0.6 | 0.001 |
| RN10 | Commercial and business | | A | 85 | 0.92 | 0.000 |
| RN10 | Commercial and business | | B | 85 | 0.92 | 0.526 |
| RN10 | Commercial and business | | A | 85 | 0.92 | 0.147 |
| RN10 | Residential 1/4 acre lots | | B | 20 | 0.6 | 0.278 |
| RN10 | Residential 1/4 acre lots | | A | 20 | 0.6 | 1.358 |
| RN10 | Gravel (including ROW) | | A | 0 | 0.7 | 0.001 |
| RN10 | Desert shrub | 40 | B | 0 | 0.2 | 0.140 |
| RN10 | Desert shrub | 40 | A | 0 | 0.2 | 0.016 |
| RN10 | Desert shrub | 30 | A | 0 | 0.25 | 0.205 |
| RN10 | Residential 1/2 acre lots | | B | 20 | 0.6 | 0.003 |
| RN10 | Residential 1/2 acre lots | | A | 20 | 0.6 | 0.021 |
| RN11 | Gravel (including ROW) | | B | 0 | 0.7 | 0.196 |
| RN11 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.114 |
| RN11 | Residential 1/4 acre lots | | B | 20 | 0.6 | 0.299 |
| RN11 | Residential 1/4 acre lots | | A | 20 | 0.6 | 0.497 |
| RN11 | Desert shrub | 30 | B | 0 | 0.25 | 0.024 |
| RN11 | Desert shrub | 30 | A | 0 | 0.25 | 0.137 |
| RN11 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.004 |
| RN12 | Gravel (including ROW) | | B | 0 | 0.7 | 0.398 |
| RN12 | Residential 3/4 acre lots | | B | 20 | 0.6 | 1.397 |
| RN12 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.004 |
| RN12 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.001 |
| RN12 | Commercial and business | | B | 85 | 0.92 | 0.425 |
| RN12 | Commercial and business | | A | 85 | 0.92 | 0.000 |
| RN12 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.095 |
| RN12 | Gravel (including ROW) | | B | 0 | 0.7 | 0.025 |
| RN12 | Gravel (including ROW) | | A | 0 | 0.7 | 0.001 |
| RN12 | Residential 1/2 acre lots | | B | 20 | 0.6 | 0.583 |
| RN12 | Residential 1/2 acre lots | | A | 20 | 0.6 | 0.061 |
| RN12 | Gravel (including ROW) | | B | 0 | 0.7 | 0.013 |
| RN13 | Gravel (including ROW) | | B | 0 | 0.7 | 0.150 |
| RN13 | Residential 3/4 acre lots | | B | 20 | 0.6 | 2.338 |
| RN13 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.104 |
| RN13 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.004 |
| RN14 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.901 |
| RN14 | Gravel (including ROW) | | B | 0 | 0.7 | 0.034 |
| RN14 | Gravel (including ROW) | | B | 0 | 0.7 | 0.022 |
| RN14 | Desert shrub | 40 | B | 0 | 0.2 | 0.078 |
| RN14 | Dirt (including ROW) | | B | 0 | 0.4 | 2.219 |
| RN14 | Residential 1/2 acre lots | | B | 70 | 0.82 | 0.624 |
| RN14 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.000 |
| RN14 | Desert shrub | 40 | B | 0 | 0.2 | 0.003 |
| RN14 | Dirt (including ROW) | | B | 0 | 0.4 | 0.003 |
| RN15 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.984 |
| RN15 | Gravel (including ROW) | | B | 0 | 0.7 | 0.000 |
| RN15 | Gravel (including ROW) | | B | 0 | 0.7 | 0.127 |
| RN16 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.233 |
| RN16 | Gravel (including ROW) | | B | 0 | 0.7 | 0.193 |
| RN16 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.051 |
| RN16 | Gravel (including ROW) | | B | 0 | 0.7 | 0.819 |
| RN17 | Gravel (including ROW) | | B | 0 | 0.7 | 0.151 |
| RN17 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.031 |
| RN17 | Residential 3/4 acre lots | | B | 20 | 0.6 | 2.253 |
| RN18 | Residential 3/4 acre lots | | B | 20 | 0.6 | 2.204 |
| RN19 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.910 |
| RN19 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.000 |
| RN2 | Impervious | | B | 100 | 0.95 | 0.594 |
| RN2 | Dirt (including ROW) | | B | 0 | 0.4 | 0.849 |
| RN2 | Dirt (including ROW) | | B | 0 | 0.4 | 0.223 |
| RN2 | Desert shrub | 30 | B | 0 | 0.25 | 0.193 |
| RN2 | Desert shrub | 20 | B | 0 | 0.3 | 0.004 |
| RN20 | Residential 3/4 acre lots | | B | 20 | 0.6 | 1.126 |
| RN20 | Gravel (including ROW) | | B | 0 | 0.7 | 0.282 |
| RN20 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.004 |
| RN20 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.033 |
| RN20 | Desert shrub | 80 | B | 0 | 0 | 0.005 |
| RN21 | Gravel (including ROW) | | B | 0 | 0.7 | 0.295 |
| RN21 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.002 |
| RN21 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.043 |
| RN21 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.087 |
| RN21 | Residential 3/4 acre lots | | B | 20 | 0.6 | 1.443 |
| RN21 | Desert shrub | 80 | B | 0 | 0 | 0.035 |

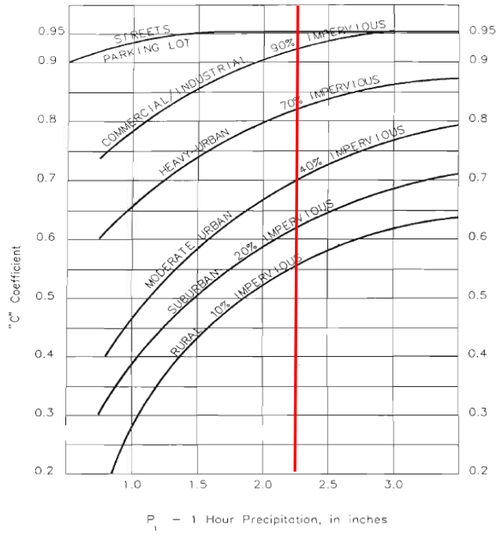
| Basin ID | Land Use | Percent Cover (%) | Hydrologic Soil Group | Percent Impervious (%) | Rational "C" Coefficient | Area (Ac) |
|---|---|---|---|---|---|---|
| RN22 | Gravel (including ROW) | | B | 0 | 0.7 | 0.157 |
| RN22 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.110 |
| RN22 | Residential 3/4 acre lots | | B | 20 | 0.6 | 2.457 |
| RN23 | Residential 3/4 acre lots | | B | 20 | 0.6 | 2.726 |
| RN23 | Gravel (including ROW) | | B | 0 | 0.7 | 0.319 |
| RN23 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.085 |
| RN23 | Desert shrub | 50 | B | 0 | 0.15 | 0.517 |
| RN23 | Desert shrub | 80 | B | 0 | 0 | 0.538 |
| RN24 | Residential 3/4 acre lots | | A | 20 | 0.6 | 0.002 |
| RN24 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.241 |
| RN24 | Gravel (including ROW) | | A | 0 | 0.7 | 0.003 |
| RN24 | Gravel (including ROW) | | B | 0 | 0.7 | 0.214 |
| RN24 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.029 |
| RN24 | Desert shrub | 80 | A | 0 | 0 | 0.001 |
| RN24 | Desert shrub | 80 | B | 0 | 0 | 0.003 |
| RN24 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.402 |
| RN24 | Dirt (including ROW) | | A | 0 | 0.4 | 0.002 |
| RN24 | Dirt (including ROW) | | B | 0 | 0.4 | 0.020 |
| RN24 | Desert shrub | 50 | B | 0 | 0.15 | 0.013 |
| RN25 | Residential 3/4 acre lots | | A | 20 | 0.6 | 0.509 |
| RN25 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.355 |
| RN25 | Gravel (including ROW) | | A | 0 | 0.7 | 0.105 |
| RN25 | Desert shrub | 80 | A | 0 | 0 | 0.036 |
| RN25 | Dirt (including ROW) | | A | 0 | 0.4 | 0.075 |
| RN26 | Gravel (including ROW) | | A | 0 | 0.7 | 0.020 |
| RN26 | Gravel (including ROW) | | B | 0 | 0.7 | 0.218 |
| RN26 | Desert shrub | 80 | A | 0 | 0 | 1.330 |
| RN26 | Desert shrub | 80 | B | 0 | 0 | 0.172 |
| RN26 | Dirt (including ROW) | | A | 0 | 0.4 | 0.323 |
| RN26 | Dirt (including ROW) | | B | 0 | 0.4 | 0.484 |
| RN27 | Desert shrub | 30 | A | 0 | 0.25 | 0.347 |
| RN27 | Desert shrub | 30 | B | 0 | 0.25 | 5.593 |
| RN27 | Residential 3/4 acre lots | | A | 20 | 0.6 | 0.005 |
| RN27 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.056 |
| RN27 | Gravel (including ROW) | | A | 0 | 0.7 | 0.139 |
| RN27 | Gravel (including ROW) | | B | 0 | 0.7 | 0.545 |
| RN27 | Dirt (including ROW) | | A | 0 | 0.4 | 0.078 |
| RN27 | Dirt (including ROW) | | B | 0 | 0.4 | 0.000 |
| RN27 | Dirt (including ROW) | | A | 0 | 0.4 | 0.033 |
| RN27 | Dirt (including ROW) | | B | 0 | 0.4 | 0.021 |
| RN27 | Dirt (including ROW) | | A | 0 | 0.4 | 0.316 |
| RN27 | Dirt (including ROW) | | B | 0 | 0.4 | 0.490 |
| RN28 | Desert shrub | 30 | B | 0 | 0.25 | 1.248 |
| RN28 | Dirt (including ROW) | | B | 0 | 0.4 | 0.004 |
| RN3 | Impervious | | B | 100 | 0.95 | 0.495 |
| RN3 | Dirt (including ROW) | | B | 0 | 0.4 | 1.481 |
| RN3 | Desert shrub | 30 | B | 0 | 0.25 | 0.310 |
| RN4 | Dirt (including ROW) | | B | 0 | 0.4 | 0.087 |
| RN4 | Desert shrub | 20 | B | 0 | 0.3 | 3.017 |
| RN4 | Impervious | | B | 100 | 0.95 | 0.463 |
| RN4 | Impervious | | B | 100 | 0.95 | 0.535 |
| RN4 | Impervious | | B | 100 | 0.95 | 0.035 |
| RN4 | Dirt (including ROW) | | B | 0 | 0.4 | 0.356 |
| RN4 | Impervious | | B | 100 | 0.95 | 0.030 |
| RN4 | Impervious | | B | 100 | 0.95 | 0.030 |
| RN5 | Desert shrub | 20 | B | 0 | 0.3 | 0.781 |
| RN5 | Desert shrub | 20 | A | 0 | 0.3 | 0.765 |
| RN5 | Impervious | | B | 100 | 0.95 | 0.072 |
| RN5 | Impervious | | B | 100 | 0.95 | 0.204 |
| RN5 | Impervious | | A | 100 | 0.95 | 0.165 |
| RN5 | Dirt (including ROW) | | B | 0 | 0.4 | 0.393 |
| RN5 | Dirt (including ROW) | | A | 0 | 0.4 | 0.006 |
| RN5 | Desert shrub | 30 | B | 0 | 0.25 | 0.002 |
| RN5 | Desert shrub | 30 | A | 0 | 0.25 | 0.002 |
| RN6 | Dirt (including ROW) | | B | 0 | 0.4 | 0.000 |
| RN6 | Dirt (including ROW) | | A | 0 | 0.4 | 0.000 |
| RN6 | Commercial and business | | B | 85 | 0.92 | 0.075 |
| RN6 | Commercial and business | | A | 85 | 0.92 | 2.939 |
| RN6 | Desert shrub | 30 | B | 0 | 0.25 | 0.008 |
| RN6 | Desert shrub | 30 | A | 0 | 0.25 | 0.186 |
| RN7 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.004 |
| RN7 | Gravel (including ROW) | | B | 0 | 0.7 | 3.461 |
| RN7 | Dirt (including ROW) | | B | 0 | 0.4 | 0.102 |
| RN7 | Dirt (including ROW) | | B | 0 | 0.4 | 0.055 |
| RN8 | Residential 3/4 acre lots | | B | 20 | 0.6 | 0.004 |
| RN8 | Impervious | | B | 100 | 0.95 | 0.813 |
| RN8 | Dirt (including ROW) | | A | 0 | 0.4 | 0.692 |
| RN8 | Gravel (including ROW) | | B | 0 | 0.7 | 3.371 |
| RN8 | Gravel (including ROW) | | A | 0 | 0.7 | 1.041 |
| RN8 | Desert shrub | 40 | B | 0 | 0.2 | 4.003 |
| RN8 | Desert shrub | 40 | A | 0 | 0.2 | 0.135 |
| RN8 | Dirt (including ROW) | | B | 0 | 0.4 | 0.465 |
| RN8 | Gravel (including ROW) | | B | 0 | 0.7 | 0.000 |
| RN9 | Impervious | | B | 100 | 0.95 | 0.029 |
| RN9 | Gravel (including ROW) | | A | 0 | 0.7 | 0.000 |
| RN9 | Dirt (including ROW) | | A | 0 | 0.4 | 1.484 |
| RN9 | Residential 1/4 acre lots | | A | 20 | 0.6 | 0.205 |
| RN9 | Gravel (including ROW) | | B | 0 | 0.7 | 1.605 |
| RN9 | Gravel (including ROW) | | A | 0 | 0.7 | 0.377 |
| RN9 | Desert shrub | 40 | B | 0 | 0.2 | 0.673 |
| RN9 | Desert shrub | 40 | A | 0 | 0.2 | 0.149 |
| RN9 | Gravel (including ROW) | | B | 0 | 0.7 | 0.034 |

Computed: DGH Date: 06.06.2014
Checked: SDK Date: 06.11.2014




As a Function of Rainfall Depth, Hydrologic Soil Group (HSG), and % of Vegetation Cover
Adapted from Arizona DOT Highway Drainage Design Manual, 1993

**Figure 3–11**
**Rational "C" Coefficient**
**Upland Rangeland**
**(Grass & Brush)**




As a Function of Rainfall Depth, and Type of Development
Adapted from Arizona DOT Highway Drainage Design Manual, 1993

**Figure 3–16**
**Rational "C" Coefficient**
**Developed Watersheds**

**1-hr Precipitation per recurrence interval**

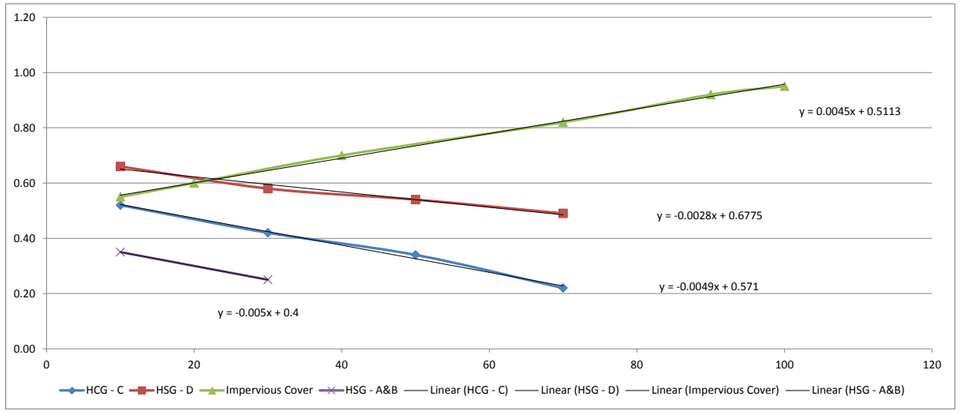
| Recurrence Interval (year) | 1-hr Precipitation (in) |
|---|---|
| **100** | **2.27** |
| 50 | 2.00 |
| 25 | 1.75 |
| 10 | 1.43 |
| 5 | 1.20 |

**NMSHTD Figure 3-11 "C" Values**

| HSG | % Cover | "C" Value | Equation |
|---|---|---|---|
| A | 10 | 0.35 | -- |
| | 30 | 0.25 | |
| B | 10 | 0.35 | -- |
| | 30 | 0.25 | |
| C | 10 | 0.52 | C |
| | 30 | 0.42 | |
| | 50 | 0.34 | |
| | 70 | 0.22 | |
| D | 10 | 0.66 | D |
| | 30 | 0.58 | |
| | 50 | 0.54 | |
| | 70 | 0.49 | |

**NMSHTD Figure 3-16 "C" Values**

| Cover Type | % Impervious | "C" Value |
|---|---|---|
| Streets/Parking | 100 | 0.95 |
| Comm/Ind. | 90 | 0.92 |
| Heavy Urban | 70 | 0.82 |
| Moderate Urban | 40 | 0.70 |
| Suburban | 20 | 0.60 |
| Rural | 10 | 0.55 |




| % Cover | "C" per HSG | | | |
|---|---|---|---|---|
| | A | B | C | D |
| **0** | 0.40 | 0.40 | 0.57 | 0.68 |
| **10** | 0.35 | 0.35 | 0.52 | 0.65 |
| **20** | 0.30 | 0.30 | 0.47 | 0.62 |
| **30** | 0.25 | 0.25 | 0.42 | 0.59 |
| **40** | 0.20 | 0.20 | 0.38 | 0.57 |
| **50** | 0.15 | 0.15 | 0.33 | 0.54 |
| **60** | 0.10 | 0.10 | 0.28 | 0.51 |
| **70** | 0.05 | 0.05 | 0.23 | 0.48 |
| **80** | 0.00 | 0.00 | 0.18 | 0.45 |
| **90** | 0.00 | 0.00 | 0.13 | 0.43 |
| **100** | 0.00 | 0.00 | 0.08 | 0.40 |

Computed: **DGH** Date: **05.18.2014**
Checked: **SDK** Date: **05.20.2014**

| Subbasin | Tt sub-parts (min) | Composite Tc (min) | Design Tc (min) |
|---|---|---|---|
| RN1 | RN1.1, RN1.2 | 4.9 | 5.0 |
| RN2 | RN2.1, RN2.2 | 2.8 | 5.0 |
| RN3 | RN3.1, RN3.2 | 5.6 | 5.6 |
| RN4 | RN4.1, RN4.2 | 11.8 | 11.8 |
| RN5 | RN5.1, RN5.2 | 6.3 | 6.3 |
| RN6 | RN6.1, RN6.2 | 6.5 | 6.5 |
| RN7 | RN7.1, RN7.2 | 13.6 | 13.6 |
| RN8 | RN8.1, RN8.2 | 22.5 | 22.5 |
| RN9 | RN9.1, RN9.2 | 10.4 | 10.4 |
| RN10 | RN10.1, RN10.2 | 6.7 | 6.7 |
| RN11 | RN11.1, RN11.2 | 4.7 | 5.0 |
| RN12 | RN12.1, RN12.2 | 10.9 | 10.9 |
| RN13 | RN13.1, RN13.2 | 9.2 | 9.2 |
| RN14 | RN14.1, RN14.2 | 8.0 | 8.0 |

| Subbasin | Tt sub-parts (min) | Composite Tc (min) | Design Tc (min) |
|---|---|---|---|
| RN15 | RN15.1, RN15.2 | 6.6 | 6.6 |
| RN16 | RN16.1, RN16.2 | 13.8 | 13.8 |
| RN17 | RN17.1, RN17.2 | 7.6 | 7.6 |
| RN18 | RN18.1, RN18.2 | 5.4 | 5.4 |
| RN19 | RN19.1, RN19.2 | 4.9 | 5.0 |
| RN20 | RN20.1, RN20.2 | 5.3 | 5.3 |
| RN21 | RN21.1, RN21.2 | 7.3 | 7.3 |
| RN22 | RN22.1, RN22.2 | 5.1 | 5.1 |
| RN23 | RN23.1, RN23.2 | 10.5 | 10.5 |
| RN24 | RN24.1, RN24.2 | 3.9 | 5.0 |
| RN25 | RN25.1, RN25.2 | 3.8 | 5.0 |
| RN26 | RN26.1, RN26.2 | 7.9 | 7.9 |
| RN27 | RN27.1, RN27.2 | 13.4 | 13.4 |
| RN28 | RN28.1, RN28.2 | 2.1 | 5.0 |

| RN1 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN1.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4150 |
| Low Elevation, ft | 4123 |
| Length, ft | 300 |
| Slope (Percent) | 9.0 |
| Velocity, ft/s (from Upland Graph) | 3.1 |
| Tt=L/(60*V), min | 1.6 |
| **Shallow concentrated flow** | |
| Segment ID | RN1.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4123 |
| Low Elevation, ft | 4096 |
| Length, ft | 478 |
| Slope (Percent) | 5.6 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.4 |
| Tt=L/(60*V), min | 3.3 |
| Total Travel Time, min | 4.9 |

| RN2 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN2.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4120 |
| Low Elevation, ft | 4105 |
| Length, ft | 300 |
| Slope (Percent) | 5.0 |
| Velocity, ft/s (from Upland Graph) | 2.3 |
| Tt=L/(60*V), min | 2.2 |
| **Shallow concentrated flow** | |
| Segment ID | RN2.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4105 |
| Low Elevation, ft | 4104 |
| Length, ft | 48 |
| Slope (Percent) | 2.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.4 |
| Tt=L/(60*V), min | 0.6 |
| Total Travel Time, min | 2.8 |

| RN3 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN3.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4114.5 |
| Low Elevation, ft | 4106.5 |
| Length, ft | 300 |
| Slope (Percent) | 2.7 |
| Velocity, ft/s (from Upland Graph) | 1.6 |
| Tt=L/(60*V), min | 3.0 |
| **Shallow concentrated flow** | |
| Segment ID | RN3.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4106.5 |
| Low Elevation, ft | 4104 |
| Length, ft | 183 |
| Slope (Percent) | 1.4 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.2 |
| Tt=L/(60*V), min | 2.6 |
| Total Travel Time, min | 5.6 |

| RN4 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN4.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4107 |
| Low Elevation, ft | 4090.5 |
| Length, ft | 300 |
| Slope (Percent) | 5.5 |
| Velocity, ft/s (from Upland Graph) | 2.4 |
| Tt=L/(60*V), min | 2.1 |
| **Shallow concentrated flow** | |
| Segment ID | RN4.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4090.5 |
| Low Elevation, ft | 4084 |
| Length, ft | 603 |
| Slope (Percent) | 1.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.0 |
| Tt=L/(60*V), min | 9.7 |
| Total Travel Time, min | 11.8 |

| RN5 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN5.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4113.5 |
| Low Elevation, ft | 4097 |
| Length, ft | 300 |
| Slope (Percent) | 5.5 |
| Velocity, ft/s (from Upland Graph) | 2.4 |
| Tt=L/(60*V), min | 2.1 |
| **Shallow concentrated flow** | |
| Segment ID | RN5.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4097 |
| Low Elevation, ft | 4082 |
| Length, ft | 462 |
| Slope (Percent) | 3.2 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.8 |
| Tt=L/(60*V), min | 4.2 |
| Total Travel Time, min | 6.3 |

| RN6 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN6.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4087 |
| Low Elevation, ft | 4084 |
| Length, ft | 300 |
| Slope (Percent) | 1.0 |
| Velocity, ft/s (from Upland Graph) | 1.0 |
| Tt=L/(60*V), min | 5.0 |
| **Shallow concentrated flow** | |
| Segment ID | RN6.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4084 |
| Low Elevation, ft | 4080 |
| Length, ft | 145 |
| Slope (Percent) | 2.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.7 |
| Tt=L/(60*V), min | 1.4 |
| Total Travel Time, min | 6.5 |

| RN7 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN7.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4092 |
| Low Elevation, ft | 4090 |
| Length, ft | 300 |
| Slope (Percent) | 0.7 |
| Velocity, ft/s (from Upland Graph) | 0.8 |
| Tt=L/(60*V), min | 6.2 |
| **Shallow concentrated flow** | |
| Segment ID | RN7.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4090 |
| Low Elevation, ft | 4079.5 |
| Length, ft | 592 |
| Slope (Percent) | 1.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.3 |
| Tt=L/(60*V), min | 7.4 |
| Total Travel Time, min | 13.6 |

| RN8 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN8.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4100.5 |
| Low Elevation, ft | 4092.5 |
| Length, ft | 300 |
| Slope (Percent) | 2.7 |
| Velocity, ft/s (from Upland Graph) | 1.6 |
| Tt=L/(60*V), min | 3.0 |
| **Shallow concentrated flow** | |
| Segment ID | RN8.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4092.5 |
| Low Elevation, ft | 4078 |
| Length, ft | 1255 |
| Slope (Percent) | 1.2 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.1 |
| Tt=L/(60*V), min | 19.5 |
| Total Travel Time, min | 22.5 |

| RN9 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN9.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4098 |
| Low Elevation, ft | 4086 |
| Length, ft | 300 |
| Slope (Percent) | 4.0 |
| Velocity, ft/s (from Upland Graph) | 2.0 |
| Tt=L/(60*V), min | 2.5 |
| **Shallow concentrated flow** | |
| Segment ID | RN9.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4086 |
| Low Elevation, ft | 4073.5 |
| Length, ft | 660 |
| Slope (Percent) | 1.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.4 |
| Tt=L/(60*V), min | 8.0 |
| Total Travel Time, min | 10.4 |

| RN10 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN10.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4104 |
| Low Elevation, ft | 4087 |
| Length, ft | 300 |
| Slope (Percent) | 5.7 |
| Velocity, ft/s (from Upland Graph) | 2.4 |
| Tt=L/(60*V), min | 2.1 |
| **Shallow concentrated flow** | |
| Segment ID | RN10.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4087 |
| Low Elevation, ft | 4071.7 |
| Length, ft | 492 |
| Slope (Percent) | 3.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.8 |
| Tt=L/(60*V), min | 4.6 |
| Total Travel Time, min | 6.7 |

| RN11 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN11.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4078 |
| Low Elevation, ft | 4072.5 |
| Length, ft | 300 |
| Slope (Percent) | 1.8 |
| Velocity, ft/s (from Upland Graph) | 1.4 |
| Tt=L/(60*V), min | 3.7 |
| **Shallow concentrated flow** | |
| Segment ID | RN11.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4072.5 |
| Low Elevation, ft | 4072 |
| Length, ft | 57 |
| Slope (Percent) | 0.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 0.9 |
| Tt=L/(60*V), min | 1.0 |
| Total Travel Time, min | 4.7 |

| RN12 | |
|---|---|
| **Sheet Flow** | |
| Segment ID | RN12.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4077.5 |
| Low Elevation, ft | 4073 |
| Length, ft | 300 |
| Slope (Percent) | 1.5 |
| Velocity, ft/s (from Upland Graph) | 1.2 |
| Tt=L/(60*V), min | 4.1 |
| **Shallow concentrated flow** | |
| Segment ID | RN12.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4073 |
| Low Elevation, ft | 4069 |
| Length, ft | 404 |
| Slope (Percent) | 1.0 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.0 |
| Tt=L/(60*V), min | 6.8 |
| Total Travel Time, min | 10.9 |

| RN13 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN13.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4072 |
| Low Elevation, ft | 4068 |
| Length, ft | 300 |
| Slope (Percent) | 1.3 |
| Velocity, ft/s (from Upland Graph) | 1.2 |
| Tt=L/(60*V), min | 4.3 |
| Shallow concentrated flow | |
| Segment ID | RN13.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4068 |
| Low Elevation, ft | 4066 |
| Length, ft | 255 |
| Slope (Percent) | 0.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 0.9 |
| Tt=L/(60*V), min | 4.8 |
| Total Travel Time, min | 9.2 |

| RN14 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN14.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4086 |
| Low Elevation, ft | 4083 |
| Length, ft | 300 |
| Slope (Percent) | 1.0 |
| Velocity, ft/s (from Upland Graph) | 1.0 |
| Tt=L/(60*V), min | 5.0 |
| Shallow concentrated flow | |
| Segment ID | RN14.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4083 |
| Low Elevation, ft | 4080.5 |
| Length, ft | 202 |
| Slope (Percent) | 1.2 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.1 |
| Tt=L/(60*V), min | 3.0 |
| Total Travel Time, min | 8.0 |

| RN15 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN15.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4079.5 |
| Low Elevation, ft | 4077 |
| Length, ft | 300 |
| Slope (Percent) | 0.8 |
| Velocity, ft/s (from Upland Graph) | 0.9 |
| Tt=L/(60*V), min | 5.5 |
| Shallow concentrated flow | |
| Segment ID | RN15.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4077 |
| Low Elevation, ft | 4076 |
| Length, ft | 76 |
| Slope (Percent) | 1.3 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.1 |
| Tt=L/(60*V), min | 1.1 |
| Total Travel Time, min | 6.6 |

| RN16 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN16.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4075.5 |
| Low Elevation, ft | 4075 |
| Length, ft | 300 |
| Slope (Percent) | 0.2 |
| Velocity, ft/s (from Upland Graph) | 0.4 |
| Tt=L/(60*V), min | 12.5 |
| Shallow concentrated flow | |
| Segment ID | RN16.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4075 |
| Low Elevation, ft | 4074.5 |
| Length, ft | 67 |
| Slope (Percent) | 0.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 0.9 |
| Tt=L/(60*V), min | 1.3 |
| Total Travel Time, min | 13.8 |

| RN17 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN17.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4073 |
| Low Elevation, ft | 4070 |
| Length, ft | 300 |
| Slope (Percent) | 1.0 |
| Velocity, ft/s (from Upland Graph) | 1.0 |
| Tt=L/(60*V), min | 5.0 |
| Shallow concentrated flow | |
| Segment ID | RN17.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4070 |
| Low Elevation, ft | 4065 |
| Length, ft | 233 |
| Slope (Percent) | 2.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.5 |
| Tt=L/(60*V), min | 2.6 |
| Total Travel Time, min | 7.6 |

| RN18 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN18.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4068 |
| Low Elevation, ft | 4064.5 |
| Length, ft | 300 |
| Slope (Percent) | 1.2 |
| Velocity, ft/s (from Upland Graph) | 1.1 |
| Tt=L/(60*V), min | 4.6 |
| Shallow concentrated flow | |
| Segment ID | RN18.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4064.5 |
| Low Elevation, ft | 4064 |
| Length, ft | 48 |
| Slope (Percent) | 1.0 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.0 |
| Tt=L/(60*V), min | 0.8 |
| Total Travel Time, min | 5.4 |

| RN19 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN19.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4081 |
| Low Elevation, ft | 4076 |
| Length, ft | 300 |
| Slope (Percent) | 1.7 |
| Velocity, ft/s (from Upland Graph) | 1.3 |
| Tt=L/(60*V), min | 3.9 |
| Shallow concentrated flow | |
| Segment ID | RN19.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4076 |
| Low Elevation, ft | 4074.5 |
| Length, ft | 82 |
| Slope (Percent) | 1.8 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.4 |
| Tt=L/(60*V), min | 1.0 |
| Total Travel Time, min | 4.9 |

| RN20 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN20.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4080 |
| Low Elevation, ft | 4076.2 |
| Length, ft | 300 |
| Slope (Percent) | 1.3 |
| Velocity, ft/s (from Upland Graph) | 1.1 |
| Tt=L/(60*V), min | 4.4 |
| Shallow concentrated flow | |
| Segment ID | RN20.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4076.2 |
| Low Elevation, ft | 4073 |
| Length, ft | 92 |
| Slope (Percent) | 3.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.9 |
| Tt=L/(60*V), min | 0.8 |
| Total Travel Time, min | 5.3 |

| RN21 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN21.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4076 |
| Low Elevation, ft | 4073.5 |
| Length, ft | 300 |
| Slope (Percent) | 0.8 |
| Velocity, ft/s (from Upland Graph) | 0.9 |
| Tt=L/(60*V), min | 5.5 |
| Shallow concentrated flow | |
| Segment ID | RN21.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4073.5 |
| Low Elevation, ft | 4068 |
| Length, ft | 188 |
| Slope (Percent) | 2.9 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.7 |
| Tt=L/(60*V), min | 1.8 |
| Total Travel Time, min | 7.3 |

| RN22 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN22.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4068 |
| Low Elevation, ft | 4064.5 |
| Length, ft | 300 |
| Slope (Percent) | 1.2 |
| Velocity, ft/s (from Upland Graph) | 1.1 |
| Tt=L/(60*V), min | 4.6 |
| Shallow concentrated flow | |
| Segment ID | RN22.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4064.5 |
| Low Elevation, ft | 4064 |
| Length, ft | 34 |
| Slope (Percent) | 1.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.2 |
| Tt=L/(60*V), min | 0.5 |
| Total Travel Time, min | 5.1 |

| RN23 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN23.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4080 |
| Low Elevation, ft | 4077 |
| Length, ft | 300 |
| Slope (Percent) | 1.0 |
| Velocity, ft/s (from Upland Graph) | 1.0 |
| Tt=L/(60*V), min | 5.0 |
| Shallow concentrated flow | |
| Segment ID | RN23.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4077 |
| Low Elevation, ft | 4067.5 |
| Length, ft | 467 |
| Slope (Percent) | 2.0 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.4 |
| Tt=L/(60*V), min | 5.4 |
| Total Travel Time, min | 10.5 |

| RN24 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN24.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4072 |
| Low Elevation, ft | 4066 |
| Length, ft | 300 |
| Slope (Percent) | 2.0 |
| Velocity, ft/s (from Upland Graph) | 1.4 |
| Tt=L/(60*V), min | 3.5 |
| Shallow concentrated flow | |
| Segment ID | RN24.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4066 |
| Low Elevation, ft | 4065 |
| Length, ft | 39 |
| Slope (Percent) | 2.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.6 |
| Tt=L/(60*V), min | 0.4 |
| Total Travel Time, min | 3.9 |

| RN25 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN25.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4071.5 |
| Low Elevation, ft | 4066 |
| Length, ft | 300 |
| Slope (Percent) | 1.8 |
| Velocity, ft/s (from Upland Graph) | 1.4 |
| Tt=L/(60*V), min | 3.7 |
| Shallow concentrated flow | |
| Segment ID | RN25.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4066 |
| Low Elevation, ft | 4065 |
| Length, ft | 20 |
| Slope (Percent) | 5.0 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 2.3 |
| Tt=L/(60*V), min | 0.1 |
| Total Travel Time, min | 3.8 |

| RN26 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN26.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4065 |
| Low Elevation, ft | 4063.5 |
| Length, ft | 300 |
| Slope (Percent) | 0.5 |
| Velocity, ft/s (from Upland Graph) | 0.7 |
| Tt=L/(60*V), min | 7.1 |
| Shallow concentrated flow | |
| Segment ID | RN26.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4063.5 |
| Low Elevation, ft | 4063 |
| Length, ft | 47 |
| Slope (Percent) | 1.1 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.0 |
| Tt=L/(60*V), min | 0.8 |
| Total Travel Time, min | 7.9 |

| RN27 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN27.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4130 |
| Low Elevation, ft | 4092 |
| Length, ft | 300 |
| Slope (Percent) | 12.7 |
| Velocity, ft/s (from Upland Graph) | 3.6 |
| Tt=L/(60*V), min | 1.4 |
| Shallow concentrated flow | |
| Segment ID | RN27.2 |
| Surface Description | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4092 |
| Low Elevation, ft | 4063 |
| Length, ft | 1153 |
| Slope (Percent) | 2.5 |
| Velocity (ft/s) Natural Flow only (Small Upland Gullies) | 1.6 |
| Tt=L/(60*V), min | 12.1 |
| Total Travel Time, min | 13.4 |

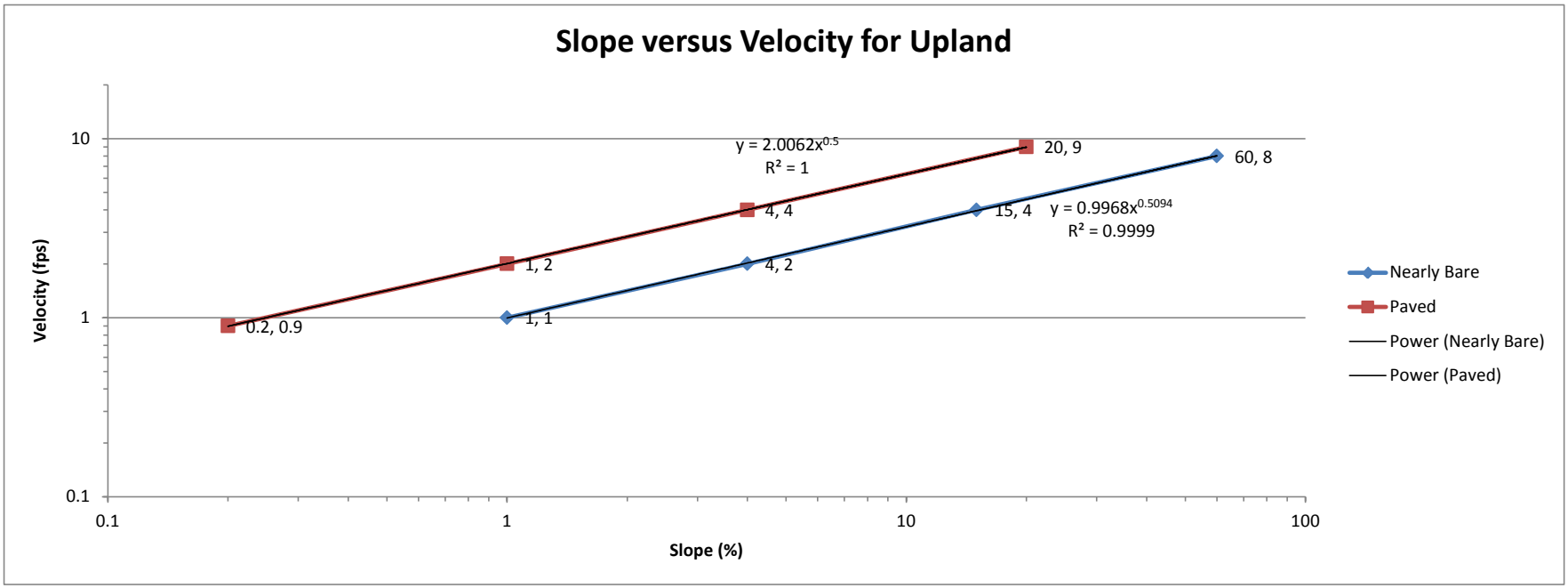
| RN28 | |
|---|---|
| Sheet Flow | |
| Segment ID | RN28.1 |
| Surface Description (from Upland Graph) | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4110 |
| Low Elevation, ft | 4096 |
| Length, ft | 92 |
| Slope (Percent) | 15.3 |
| Velocity, ft/s (from Upland Graph) | 4.0 |
| Tt=L/(60*V), min | 0.4 |
| Shallow concentrated flow | |
| Segment ID | RN28.2 |
| Pipe Diameter/Material | Small Upland Gullies (Shallow Concentrated Flow) |
| High Elevation, ft | 4096 |
| Low Elevation, ft | 4070 |
| Length, ft | 300 |
| Slope (Percent) | 8.7 |
| Velocity, ft/s (from graphs) | 3.0 |
| Tt=L/(60*V), min | 1.7 |
| Total Travel Time, min | 2.1 |

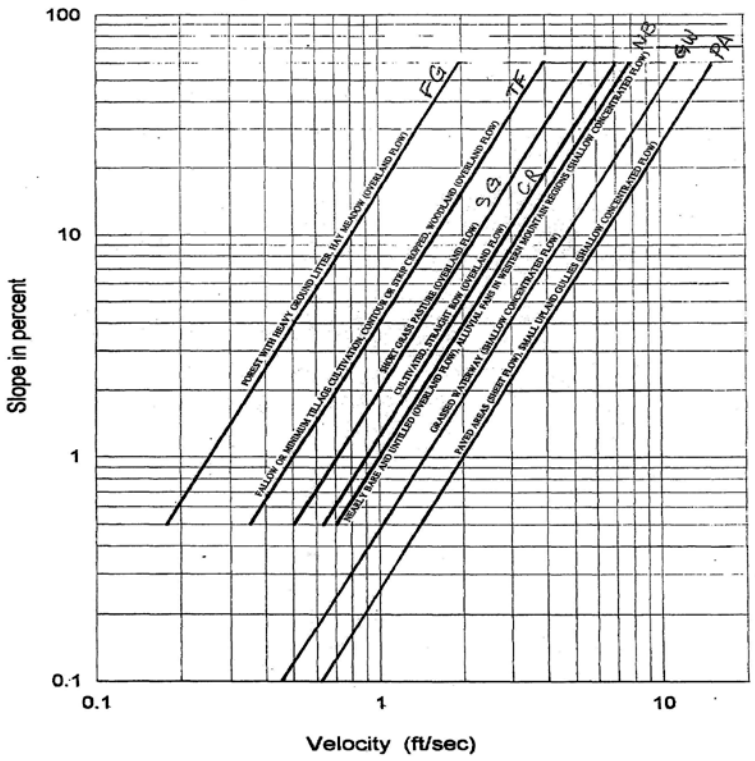
Computed: **DGH** Date: **05.18.2014**
Checked: **SDK** Date: **05.20.2014**

| Flow ID | Flow Type | Start Elevation (ft) | End Elevation (ft) | Length (ft) | Slope (ft/ft) | Slope (%) | Velocity Equation | Velocity [Pg. 3-33 NMSHTD, (ft/s)] |
|---|---|---|---|---|---|---|---|---|
| RN1.1 | Sheet Flow | 4150.0 | 4123.0 | 300 | 0.090 | 9.0 | Bare Ground | 3.1 |
| RN1.2 | Shallow Concentrated | 4123.0 | 4096.0 | 478 | 0.056 | 5.6 | Bare Ground | 2.4 |
| RN2.1 | Sheet Flow | 4120.0 | 4105.0 | 300 | 0.050 | 5.0 | Bare Ground | 2.3 |
| RN2.2 | Shallow Concentrated | 4105.0 | 4104.0 | 48 | 0.021 | 2.1 | Bare Ground | 1.4 |
| RN3.1 | Sheet Flow | 4114.5 | 4106.5 | 300 | 0.027 | 2.7 | Bare Ground | 1.6 |
| RN3.2 | Shallow Concentrated | 4106.5 | 4104.0 | 183 | 0.014 | 1.4 | Bare Ground | 1.2 |
| RN4.1 | Sheet Flow | 4107.0 | 4090.5 | 300 | 0.055 | 5.5 | Bare Ground | 2.4 |
| RN4.2 | Shallow Concentrated | 4090.5 | 4084.0 | 603 | 0.011 | 1.1 | Bare Ground | 1.0 |
| RN5.1 | Sheet Flow | 4113.5 | 4097.0 | 300 | 0.055 | 5.5 | Bare Ground | 2.4 |
| RN5.2 | Shallow Concentrated | 4097.0 | 4082.0 | 462 | 0.032 | 3.2 | Bare Ground | 1.8 |
| RN6.1 | Sheet Flow | 4087.0 | 4084.0 | 300 | 0.010 | 1.0 | Bare Ground | 1.0 |
| RN6.2 | Shallow Concentrated | 4084.0 | 4080.0 | 145 | 0.028 | 2.8 | Bare Ground | 1.7 |
| RN7.1 | Sheet Flow | 4092.0 | 4090.0 | 300 | 0.007 | 0.7 | Bare Ground | 0.8 |
| RN7.2 | Shallow Concentrated | 4090.0 | 4079.5 | 592 | 0.018 | 1.8 | Bare Ground | 1.3 |
| RN8.1 | Sheet Flow | 4100.5 | 4092.5 | 300 | 0.027 | 2.7 | Bare Ground | 1.6 |
| RN8.2 | Shallow Concentrated | 4092.5 | 4078.0 | 1255 | 0.012 | 1.2 | Bare Ground | 1.1 |
| RN9.1 | Sheet Flow | 4098.0 | 4086.0 | 300 | 0.040 | 4.0 | Bare Ground | 2.0 |
| RN9.2 | Shallow Concentrated | 4086.0 | 4073.5 | 660 | 0.019 | 1.9 | Bare Ground | 1.4 |
| RN10.1 | Sheet Flow | 4104.0 | 4087.0 | 300 | 0.057 | 5.7 | Bare Ground | 2.4 |
| RN10.2 | Shallow Concentrated | 4087.0 | 4071.7 | 492 | 0.031 | 3.1 | Bare Ground | 1.8 |
| RN11.1 | Sheet Flow | 4078.0 | 4072.5 | 300 | 0.018 | 1.8 | Bare Ground | 1.4 |
| RN11.2 | Shallow Concentrated | 4072.5 | 4072.0 | 57 | 0.009 | 0.9 | Bare Ground | 0.9 |
| RN12.1 | Sheet Flow | 4077.5 | 4073.0 | 300 | 0.015 | 1.5 | Bare Ground | 1.2 |
| RN12.2 | Shallow Concentrated | 4073.0 | 4069.0 | 404 | 0.010 | 1.0 | Bare Ground | 1.0 |
| RN13.1 | Sheet Flow | 4072.0 | 4068.0 | 300 | 0.013 | 1.3 | Bare Ground | 1.2 |
| RN13.2 | Shallow Concentrated | 4068.0 | 4066.0 | 255 | 0.008 | 0.8 | Bare Ground | 0.9 |
| RN14.1 | Sheet Flow | 4086.0 | 4083.0 | 300 | 0.010 | 1.0 | Bare Ground | 1.0 |
| RN14.2 | Shallow Concentrated | 4083.0 | 4080.5 | 202 | 0.012 | 1.2 | Bare Ground | 1.1 |
| RN15.1 | Sheet Flow | 4079.5 | 4077.0 | 300 | 0.008 | 0.8 | Bare Ground | 0.9 |
| RN15.2 | Shallow Concentrated | 4077.0 | 4076.0 | 76 | 0.013 | 1.3 | Bare Ground | 1.1 |
| RN16.1 | Sheet Flow | 4075.5 | 4075.0 | 300 | 0.002 | 0.2 | Bare Ground | 0.4 |
| RN16.2 | Shallow Concentrated | 4075.0 | 4074.5 | 67 | 0.008 | 0.8 | Bare Ground | 0.9 |
| RN17.1 | Sheet Flow | 4073.0 | 4070.0 | 300 | 0.010 | 1.0 | Bare Ground | 1.0 |
| RN17.2 | Shallow Concentrated | 4070.0 | 4065.0 | 233 | 0.021 | 2.1 | Bare Ground | 1.5 |
| RN18.1 | Sheet Flow | 4068.0 | 4064.5 | 300 | 0.012 | 1.2 | Bare Ground | 1.1 |
| RN18.2 | Shallow Concentrated | 4064.5 | 4064.0 | 48 | 0.010 | 1.0 | Bare Ground | 1.0 |
| RN19.1 | Sheet Flow | 4081.0 | 4076.0 | 300 | 0.017 | 1.7 | Bare Ground | 1.3 |
| RN19.2 | Shallow Concentrated | 4076.0 | 4074.5 | 82 | 0.018 | 1.8 | Bare Ground | 1.4 |
| RN20.1 | Sheet Flow | 4080.0 | 4076.2 | 300 | 0.013 | 1.3 | Bare Ground | 1.1 |
| RN20.2 | Shallow Concentrated | 4076.2 | 4073.0 | 92 | 0.035 | 3.5 | Bare Ground | 1.9 |
| RN21.1 | Sheet Flow | 4076.0 | 4073.5 | 300 | 0.008 | 0.8 | Bare Ground | 0.9 |
| RN21.2 | Shallow Concentrated | 4073.5 | 4068.0 | 188 | 0.029 | 2.9 | Bare Ground | 1.7 |
| RN22.1 | Sheet Flow | 4068.0 | 4064.5 | 300 | 0.012 | 1.2 | Bare Ground | 1.1 |
| RN22.2 | Shallow Concentrated | 4064.5 | 4064.0 | 34 | 0.015 | 1.5 | Bare Ground | 1.2 |
| RN23.1 | Sheet Flow | 4080.0 | 4077.0 | 300 | 0.010 | 1.0 | Bare Ground | 1.0 |
| RN23.2 | Shallow Concentrated | 4077.0 | 4067.5 | 467 | 0.020 | 2.0 | Bare Ground | 1.4 |
| RN24.1 | Sheet Flow | 4072.0 | 4066.0 | 300 | 0.020 | 2.0 | Bare Ground | 1.4 |
| RN24.2 | Shallow Concentrated | 4066.0 | 4065.0 | 39 | 0.025 | 2.5 | Bare Ground | 1.6 |
| RN25.1 | Sheet Flow | 4071.5 | 4066.0 | 300 | 0.018 | 1.8 | Bare Ground | 1.4 |
| RN25.2 | Shallow Concentrated | 4066.0 | 4065.0 | 20 | 0.050 | 5.0 | Bare Ground | 2.3 |
| RN26.1 | Sheet Flow | 4065.0 | 4063.5 | 300 | 0.005 | 0.5 | Bare Ground | 0.7 |
| RN26.2 | Shallow Concentrated | 4063.5 | 4063.0 | 47 | 0.011 | 1.1 | Bare Ground | 1.0 |
| RN27.1 | Sheet Flow | 4130.0 | 4092.0 | 300 | 0.127 | 12.7 | Bare Ground | 3.6 |
| RN27.2 | Shallow Concentrated | 4092.0 | 4063.0 | 1153 | 0.025 | 2.5 | Bare Ground | 1.6 |
| RN28.1 | Sheet Flow | 4110.0 | 4096.0 | 92 | 0.153 | 15.3 | Bare Ground | 4.0 |
| RN28.2 | Shallow Concentrated | 4096.0 | 4070.0 | 300 | 0.087 | 8.7 | Bare Ground | 3.0 |

| | | |
|---|---|---|
| Computed: | DGH | Date: 05.18.2014 |
| Checked: | SDK | Date: 05.20.2014 |

| | *Slope* | *Velocity* | |
|---|---|---|---|
| **Nearly Bare** | 1 | 1 | **1x^0.5094** |
| | 4 | 2 | |
| | 15 | 4 | |
| | 60 | 8 | |
| **Paved Area (Shallow Concentrated Flow)** | 0.2 | 0.9 | **2x^0.5021** |
| | 1 | 2 | |
| | 4 | 4 | |
| | 20 | 9 | |






Note: For watercourses with slopes less than 0.5 percent, use the overland flow velocity given for 0.5 percent, except for shallow concentrated flow where a flatter slope may be considered.

**Figure 3–10**
Flow Velocities for Overland and Shallow Concentrated Flows

Modified from SCS, NEH–4, 1972

## Development of the NRCS-New Mexico Type IIa Rainfall Distributions [1]

During the 1950's and 1960's, the Watershed Planning Staff of the Soil Conservation Service found that the standard type II rainfall distribution did not represent the historic floods which were causing damage in many communities around New Mexico. The SCS Curve Number method of developing flood hydrographs predicted the appropriate volume of floodwater, but the peak discharge rates were not large enough to cause out-of-bank flow. Without out-of-bank or dike over-topping, the project hydrology did not indicate damage in the communities, even when recorded flood damage was occurring. Since the predicted runoff volume matched the level of damage but the peak rates were not matching the field measured flood peaks, the SCS hydrologists investigated changes to the rainfall distribution.

It appeared that storm intensity was a principal factor in developing peak flow rates from small watersheds. SCS hydrologists completed a study relating the percent of daily rainfall (24-hour duration) to the one hour duration storm. Data from all 1-hour recording stations in New Mexico was used in the analysis. Limited 1-hour storm data was available for some areas of the state. Orographic influences were included in the data. The study compared the maximum 1-hour storm events from all rain gages to the maximum 24-hour storm for the same gage, and the resulting ratios of 1-hour rainfall to 24-hour rainfall were plotted. When the ratios approximating 0.60, 0.65, 0.70, and 0.75 were grouped together, their plotted locations correlated with the major land resource and subresource areas of New Mexico. Therefore, these resource areas were adopted as the defining areas for four storm intensities experienced across New Mexico. The following table displays the ratio and resource areas to which they apply. The map on page 7 displays these regions. The second table relates the four ratios of storm intensity to the NRCS Common Resource Areas for New Mexico.

**Percent of Daily Rainfall Occurring in One Hour by Major Land Resource Areas**

| Percent of 24 hour storm occurring in one hour | Major Land Resource and Subresource Areas |
|---|---|
| 60 | HV-1, HV-2, RM-1,RM-2 |
| 65 | AN-1, AN-2, AN-3, HP-3, SD-3, WP-1 |
| 70 | HP-1, HP-2, CP-2, CP-3, CP-4, ND-1, WP-2 |
| 75 | CP-1, SA-1, SD-1, SD-2, WP-3 |

**Rainfall Distribution by Common Resource Area, 2003**

| Rainfall Distribution | New Mexico Common Resource |
|---|---|
| 60 | 36.NM1, 48A.NM1, 49.NM1, 51.NM1 |
| 65 | 35.NM8, 39.NM1, 39.NM2, 42.NM3, 77C.NM1, 77C.NM2, 77D.NM1 |
| 70 | 35.NM1, 35.NM2, 35.NM3, 35.NM6, 36.NM2, 70B.NM1, 70C.NM1, 70D.NM1, 77B.NM1 |
| 75 | 38.NM1, 38.NM2, 41.NM1, 41.NM2, 42.NM1, 42.NM2, 42.NM4, 70A.NM1 |

The daily rainfall distributions were established for each major land resource and subresource area. The Standard Type II rainfall distribution contains about 38 percent of the 24-hour rainfall in the most intense hour. While in New Mexico a higher percentage occurred during the most intense hour of rainfall. Distribution curves for use in design hydrographs were assumed to conform to the following power curve:

[1] This information is NRCS internal and unpublished documentation supporting its four Type IIa storm distributions.

$y = kx^a$ Where y is the precipitation at any time divided by the total precipitation, and x is time in hours.

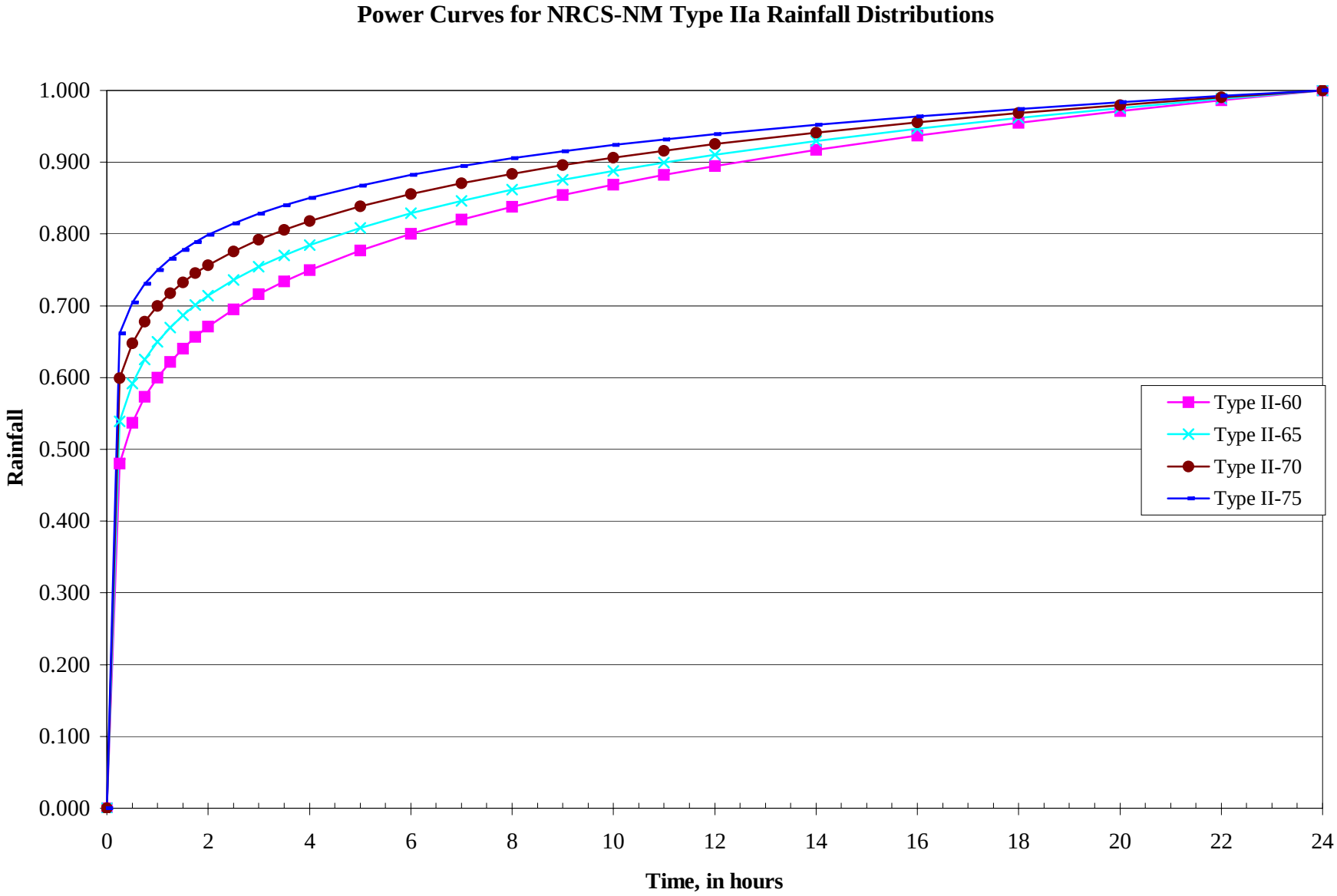
Hence y nests the most intense 1-hour rainfall within the 24-hour storm. For example, the type II-60 distribution would contain 60-percent of the 24-hour rainfall in its most intense hour. For the type II-60, boundary conditions are: when x = 1 hour, y = 0.60 (60%), and when x = 24 hours, y = 1.00 (100%). Using these boundary conditions and solving for k and a, k = 0.60 and a = 0.160735. This same process was used for the type II-65, II-70, and II-75 distributions. The resulting equations are shown in the table below. These equations were solved for values of time ranging from zero to 24 hours, and the results are tabulated in the second table on this page. A graph displaying the power curves appears on the next page.

**Power Curves for NRCS-NM Type IIa Rainfall Distributions**

| Distribution | Equation |
|---|---|
| II-60 | $y = 0.60\ x^{0.160735}$ |
| II-65 | $y = 0.65\ x^{0.135549}$ |
| II-70 | $y = 0.70\ x^{0.112231}$ |
| II-75 | $y = 0.75\ x^{0.090521}$ |

**Tabulation of the Power Curves for NRCS-NM Rainfall Type IIa Distributions**

| | | | Type II-60 y =0.60 x^0.160735 | | Type II-65 y =0.65 * x^0.135549 | | Type II-70 y =0.70* x^0.112231 | | Type II-75 y =0.75 * x^0.090521 | |
|---|---|---|---|---|---|---|---|---|---|---|
| n | Time in hours x | Change in time delta x | Rainfall y | Change in rainfall delta y | Rainfall y | Change in rainfall delta y | Rainfall y | Change in rainfall delta y | Rainfall y | Change in rainfall delta y |
| 1 | 0.00 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | |
| 2 | 0.25 | 0.250 | 0.480 | 0.480 | 0.539 | 0.539 | 0.599 | 0.599 | 0.662 | 0.662 |
| 3 | 0.50 | 0.250 | 0.537 | 0.057 | 0.592 | 0.053 | 0.648 | 0.048 | 0.704 | 0.043 |
| 4 | 0.75 | 0.250 | 0.573 | 0.036 | 0.625 | 0.033 | 0.678 | 0.030 | 0.731 | 0.026 |
| 5 | 1.00 | 0.250 | 0.600 | 0.027 | 0.650 | 0.025 | 0.700 | 0.022 | 0.750 | 0.019 |
| 6 | 1.25 | 0.250 | 0.622 | 0.022 | 0.670 | 0.020 | 0.718 | 0.018 | 0.765 | 0.015 |
| 7 | 1.50 | 0.250 | 0.640 | 0.018 | 0.687 | 0.017 | 0.733 | 0.015 | 0.778 | 0.013 |
| 8 | 1.75 | 0.250 | 0.656 | 0.016 | 0.701 | 0.015 | 0.745 | 0.013 | 0.789 | 0.011 |
| 9 | 2.00 | 0.250 | 0.671 | 0.014 | 0.714 | 0.013 | 0.757 | 0.011 | 0.799 | 0.010 |
| 10 | 2.50 | 0.500 | 0.695 | 0.024 | 0.736 | 0.022 | 0.776 | 0.019 | 0.815 | 0.016 |
| 11 | 3.00 | 0.500 | 0.716 | 0.021 | 0.754 | 0.018 | 0.792 | 0.016 | 0.828 | 0.014 |
| 12 | 3.50 | 0.500 | 0.734 | 0.018 | 0.770 | 0.016 | 0.806 | 0.014 | 0.840 | 0.012 |
| 13 | 4.00 | 0.500 | 0.750 | 0.016 | 0.784 | 0.014 | 0.818 | 0.012 | 0.850 | 0.010 |
| 14 | 5.00 | 1.000 | 0.777 | 0.027 | 0.808 | 0.024 | 0.839 | 0.021 | 0.868 | 0.017 |
| 15 | 6.00 | 1.000 | 0.800 | 0.023 | 0.829 | 0.020 | 0.856 | 0.017 | 0.882 | 0.014 |
| 16 | 7.00 | 1.000 | 0.820 | 0.020 | 0.846 | 0.017 | 0.871 | 0.015 | 0.894 | 0.012 |
| 17 | 8.00 | 1.000 | 0.838 | 0.018 | 0.862 | 0.015 | 0.884 | 0.013 | 0.905 | 0.011 |
| 18 | 9.00 | 1.000 | 0.854 | 0.016 | 0.876 | 0.014 | 0.896 | 0.012 | 0.915 | 0.010 |
| 19 | 10.00 | 1.000 | 0.869 | 0.015 | 0.888 | 0.013 | 0.906 | 0.011 | 0.924 | 0.009 |
| 20 | 11.00 | 1.000 | 0.882 | 0.013 | 0.900 | 0.012 | 0.916 | 0.010 | 0.932 | 0.008 |
| 21 | 12.00 | 1.000 | 0.895 | 0.012 | 0.910 | 0.011 | 0.925 | 0.009 | 0.939 | 0.007 |
| 22 | 14.00 | 2.000 | 0.917 | 0.022 | 0.930 | 0.019 | 0.941 | 0.016 | 0.952 | 0.013 |
| 23 | 16.00 | 2.000 | 0.937 | 0.020 | 0.947 | 0.017 | 0.956 | 0.014 | 0.964 | 0.012 |
| 24 | 18.00 | 2.000 | 0.955 | 0.018 | 0.962 | 0.015 | 0.968 | 0.013 | 0.974 | 0.010 |
| 25 | 20.00 | 2.000 | 0.971 | 0.016 | 0.976 | 0.014 | 0.980 | 0.012 | 0.984 | 0.009 |
| 26 | 22.00 | 2.000 | 0.986 | 0.015 | 0.988 | 0.013 | 0.990 | 0.011 | 0.992 | 0.009 |
| 27 | 24.00 | 2.000 | 1.000 | 0.014 | 1.000 | 0.012 | 1.000 | 0.010 | 1.000 | 0.008 |


Power Curves for NRCS-NM Type IIa Rainfall Distributions
Rainfall
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0
2
4
6
8
10
12
14
16
18
20
22
24
Time, in hours
Type II-60
Type II-65
Type II-70
Type II-75

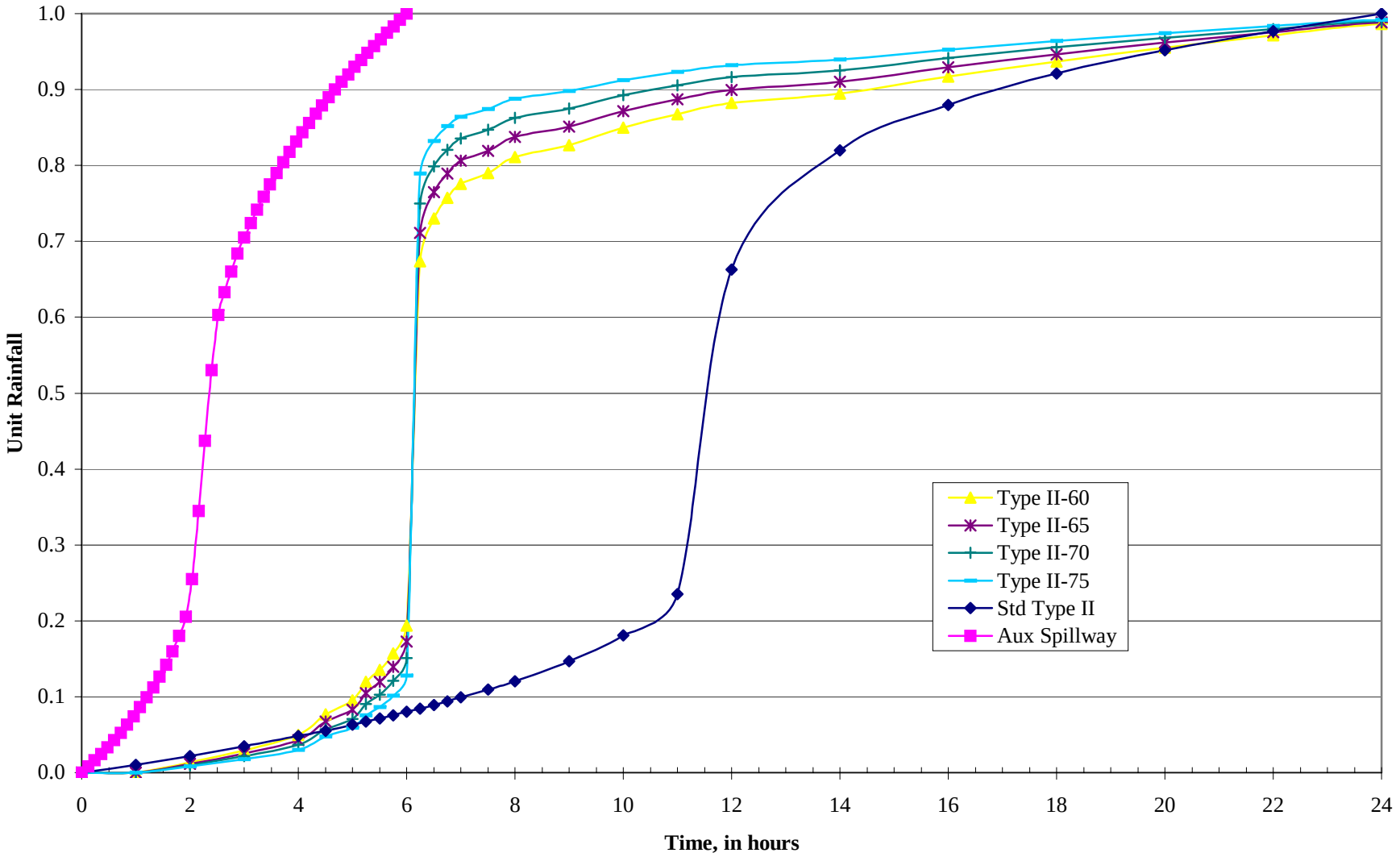
The power curves are not rainfall distributions, and in addition, the SCS (NRCS) uses an initial abstraction for infiltration and capture. This procedure does not allow the most intense portion of a storm to occur in the first hour of excess rainfall. Therefore, each rainfall increment was rearranged using the procedure on pages 21.9 and 21.10 of Section 4 (Hydrology) of the SCS National Engineering Handbook. This rearrangement is shown in the following table. The New Mexico SCS hydrologists picked the sixth hour as a reasonable time for the peak to occur. The four type IIa distributions are displayed in graphical form on page 5. For comparison, the national standard type II distribution and the Type B (auxiliary spillway distribution) are also displayed.

The Type B auxiliary spillway distribution is found in Chapter 21, Section 4 (Hydrology), SCS National Engineering Handbook. The text discussing this distribution is on page 21.50. The graphical representation of the distribution is on Figure 2-6 (page 2-18) in Technical Release No. 60, which is entitled Earth Dams and Reservoirs. The Type B distribution in tabular form is in the February 1992, Draft Technical Release No. 20, titled Computer Program for Project Formulation Hydrology, in appendix G on page G-15. The tabular form is also displayed on page 6 of this document.

**Tabulation of the NRCS-NM Rainfall Type IIa Distributions**

| Arranged n | delta x | Accumul Time | delta y | Type II-60 | delta y | Type II-65 | delta y | Type II-70 | delta y | Type II-75 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.00 | | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 |
| 19 | 1.00 | 1.00 | 0.0134 | 0.0134 | 0.0115 | 0.0115 | 0.0097 | 0.0097 | 0.0080 | 0.0080 |
| 17 | 1.00 | 2.00 | 0.0160 | 0.0294 | 0.0139 | 0.0254 | 0.0118 | 0.0215 | 0.0097 | 0.0177 |
| 15 | 1.00 | 3.00 | 0.0201 | 0.0495 | 0.0175 | 0.0429 | 0.0149 | 0.0364 | 0.0124 | 0.0301 |
| 13 | 1.00 | 4.00 | 0.0274 | 0.0769 | 0.0241 | 0.0670 | 0.0207 | 0.0572 | 0.0173 | 0.0475 |
| 11 | 0.50 | 4.50 | 0.0180 | 0.0948 | 0.0159 | 0.0829 | 0.0138 | 0.0710 | 0.0116 | 0.0591 |
| 9 | 0.50 | 5.00 | 0.0245 | 0.1193 | 0.0219 | 0.1049 | 0.0192 | 0.0902 | 0.0163 | 0.0754 |
| 7 | 0.25 | 5.25 | 0.0161 | 0.1354 | 0.0145 | 0.1194 | 0.0128 | 0.1030 | 0.0109 | 0.0863 |
| 5 | 0.25 | 5.50 | 0.0219 | 0.1573 | 0.0200 | 0.1393 | 0.0178 | 0.1207 | 0.0153 | 0.1016 |
| 3 | 0.25 | 5.75 | 0.0361 | 0.1935 | 0.0334 | 0.1727 | 0.0302 | 0.1509 | 0.0263 | 0.1280 |
| 1 | 0.25 | 6.00 | 0.4802 | 0.6736 | 0.5386 | 0.7114 | 0.5991 | 0.7500 | 0.6615 | 0.7895 |
| 2 | 0.25 | 6.25 | 0.0566 | 0.7302 | 0.0531 | 0.7645 | 0.0485 | 0.7985 | 0.0428 | 0.8323 |
| 4 | 0.25 | 6.50 | 0.0271 | 0.7573 | 0.0249 | 0.7893 | 0.0222 | 0.8207 | 0.0193 | 0.8516 |
| 6 | 0.25 | 6.75 | 0.0185 | 0.7758 | 0.0168 | 0.8061 | 0.0148 | 0.8356 | 0.0127 | 0.8644 |
| 8 | 0.25 | 7.00 | 0.0142 | 0.7901 | 0.0128 | 0.8189 | 0.0113 | 0.8468 | 0.0096 | 0.8740 |
| 10 | 0.50 | 7.50 | 0.0207 | 0.8107 | 0.0184 | 0.8373 | 0.0160 | 0.8629 | 0.0136 | 0.8875 |
| 12 | 0.50 | 8.00 | 0.0159 | 0.8266 | 0.0141 | 0.8514 | 0.0122 | 0.8750 | 0.0102 | 0.8977 |
| 14 | 1.00 | 9.00 | 0.0231 | 0.8498 | 0.0202 | 0.8716 | 0.0173 | 0.8924 | 0.0144 | 0.9122 |
| 16 | 1.00 | 10.00 | 0.0178 | 0.8676 | 0.0155 | 0.8871 | 0.0131 | 0.9055 | 0.0109 | 0.9230 |
| 18 | 1.00 | 11.00 | 0.0146 | 0.8821 | 0.0126 | 0.8996 | 0.0107 | 0.9162 | 0.0088 | 0.9318 |
| 20 | 1.00 | 12.00 | 0.0124 | 0.8946 | 0.0107 | 0.9103 | 0.0090 | 0.9252 | 0.0074 | 0.9392 |
| 21 | 2.00 | 14.00 | 0.0224 | 0.9170 | 0.0192 | 0.9295 | 0.0161 | 0.9413 | 0.0132 | 0.9524 |
| 22 | 2.00 | 16.00 | 0.0199 | 0.9369 | 0.0170 | 0.9465 | 0.0142 | 0.9555 | 0.0116 | 0.9640 |
| 23 | 2.00 | 18.00 | 0.0179 | 0.9548 | 0.0152 | 0.9618 | 0.0127 | 0.9682 | 0.0103 | 0.9743 |
| 24 | 2.00 | 20.00 | 0.0163 | 0.9711 | 0.0138 | 0.9756 | 0.0115 | 0.9797 | 0.0093 | 0.9836 |
| 25 | 2.00 | 22.00 | 0.0150 | 0.9861 | 0.0127 | 0.9883 | 0.0105 | 0.9903 | 0.0085 | 0.9922 |
| 26 | 2.00 | 24.00 | 0.0139 | 1.0000 | 0.0117 | 1.0000 | 0.0097 | 1.0000 | 0.0078 | 1.0000 |

## NRCS-NM Rainfall Distribution Curves



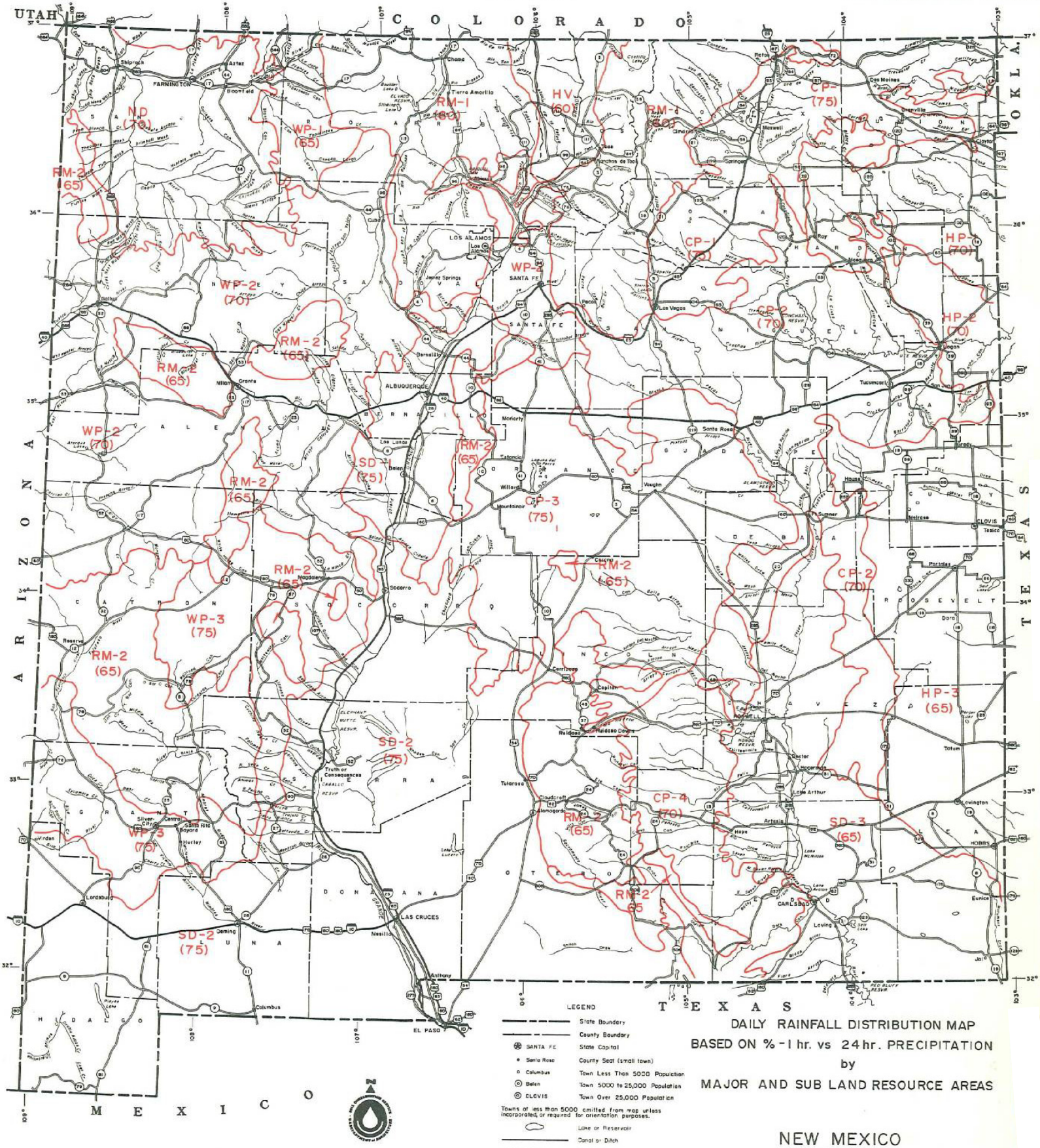
**Type B, 6-hour Distribution for Auxiliary Spillway Design**

| Unit Time | Time in hours | UnitRainfall |
|---|---|---|
| 0.00 | 0.00 | 0.0000 |
| 0.02 | 0.12 | 0.0080 |
| 0.04 | 0.24 | 0.0162 |
| 0.06 | 0.36 | 0.0246 |
| 0.08 | 0.48 | 0.0333 |
| 0.10 | 0.60 | 0.0425 |
| 0.12 | 0.72 | 0.0524 |
| 0.14 | 0.84 | 0.0630 |
| 0.16 | 0.96 | 0.0743 |
| 0.18 | 1.08 | 0.0863 |
| 0.20 | 1.20 | 0.0990 |
| 0.22 | 1.32 | 0.1124 |
| 0.24 | 1.44 | 0.1265 |
| 0.26 | 1.56 | 0.1420 |
| 0.28 | 1.68 | 0.1595 |
| 0.30 | 1.80 | 0.1800 |
| 0.32 | 1.92 | 0.2050 |
| 0.34 | 2.04 | 0.2550 |
| 0.36 | 2.16 | 0.3450 |
| 0.38 | 2.28 | 0.4370 |
| 0.40 | 2.40 | 0.5300 |
| 0.42 | 2.52 | 0.6030 |
| 0.44 | 2.64 | 0.6330 |
| 0.46 | 2.76 | 0.6600 |
| 0.48 | 2.88 | 0.6840 |
| 0.50 | 3.00 | 0.7050 |
| 0.52 | 3.12 | 0.7240 |
| 0.54 | 3.24 | 0.7420 |
| 0.56 | 3.36 | 0.7590 |
| 0.58 | 3.48 | 0.7750 |
| 0.60 | 3.60 | 0.7900 |
| 0.62 | 3.72 | 0.8043 |
| 0.64 | 3.84 | 0.8180 |
| 0.66 | 3.96 | 0.8312 |
| 0.68 | 4.08 | 0.8439 |
| 0.70 | 4.20 | 0.8561 |
| 0.72 | 4.32 | 0.8678 |
| 0.74 | 4.44 | 0.8790 |
| 0.76 | 4.56 | 0.8898 |
| 0.78 | 4.68 | 0.9002 |
| 0.80 | 4.80 | 0.9103 |
| 0.82 | 4.92 | 0.9201 |
| 0.84 | 5.04 | 0.9297 |
| 0.86 | 5.16 | 0.9391 |
| 0.88 | 5.28 | 0.9483 |
| 0.90 | 5.40 | 0.9573 |
| 0.92 | 5.52 | 0.9661 |
| 0.94 | 5.64 | 0.9747 |
| 0.96 | 5.76 | 0.9832 |
| 0.98 | 5.88 | 0.9916 |
| 1.00 | 6.00 | 1.0000 |

U.S. DEPARTMENT OF AGRICULTURE

NEW MEXICO

SOIL CONSERVATION SERVICE




LEGEND

- State Boundary
- County Boundary
- SANTA FE — State Capital
- Santa Rosa — County Seat (small town)
- Columbus — Town Less Than 5000 Population
- Belen — Town 5000 to 25,000 Population
- CLOVIS — Town Over 25,000 Population

Towns of less than 5000 omitted from map unless incorporated, or required for orientation purposes.

- Lake or Reservoir
- Canal or Ditch
- Large Stream
- Small Stream
- Water Spreading
- Interstate Highway
- Federal Highway
- State Highway

EXIBIT NO 2 - 3

# DAILY RAINFALL DISTRIBUTION MAP

## BASED ON % - 1 hr. vs 24 hr. PRECIPITATION

## by

## MAJOR AND SUB LAND RESOURCE AREAS

## NEW MEXICO

October 1973

0 0 10 20 30 Miles

SCALE 1:1 500 000

ALBERS EQUAL-AREA PROJECTION

| % of 1 hr / 24 hr | MAJOR AND SUB LAND RESOURCE AREAS |
|---|---|
| 60 | HV, RM-1 |
| 65 | HP 3, CP 4, SD 3, WP 1, RM 2 |
| 70 | HP 1, HP 2, CP 2, CP 3, WP 2, ND |
| 75 | CP 1, SD 1, SD 2, WP 3 |

USGS National Atlas 1:1,000,000 Albers Equal-Area projection (1967) used as source for base map and adapted for SCS use.

M7-P-21418-12A








# APPENDIX C

*Hydraulic Evaluation*

# Worksheet for STA 11+05

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+24 | 4078.00 |
| 0+42 | 4075.00 |
| 0+82 | 4075.00 |
| 1+00 | 4078.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+24, 4078.00) | (1+00, 4078.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.12 | ft |
| Elevation Range | 4075.00 to 4078.00 ft | |
| Flow Area | 111.56 | ft² |
| Wetted Perimeter | 65.75 | ft |
| Hydraulic Radius | 1.70 | ft |
| Top Width | 65.40 | ft |
| Normal Depth | 2.12 | ft |
| Critical Depth | 1.83 | ft |
| Critical Slope | 0.02591 | ft/ft |

# Worksheet for STA 11+05

## Results

| | | | |
|---|---|---|---|
| Velocity | | 5.83 | ft/s |
| Velocity Head | | 0.53 | ft |
| Specific Energy | | 2.64 | ft |
| Froude Number | | 0.79 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.12 | ft |
| Critical Depth | 1.83 | ft |
| Channel Slope | 0.01538 | ft/ft |
| Critical Slope | 0.02591 | ft/ft |

# Rating Table for STA 11+05

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+24 | 4078.00 |
| 0+42 | 4075.00 |
| 0+82 | 4075.00 |
| 1+00 | 4078.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+24, 4078.00) | (1+00, 4078.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4075.00 | | 0.00 | | |
| 25.00 | 4075.32 | 1.86 | 13.43 | 43.90 | 43.85 |
| 50.00 | 4075.48 | 2.41 | 20.73 | 45.88 | 45.80 |
| 75.00 | 4075.61 | 2.80 | 26.80 | 47.46 | 47.36 |
| 100.00 | 4075.73 | 3.10 | 32.22 | 48.84 | 48.72 |
| 125.00 | 4075.83 | 3.36 | 37.20 | 50.07 | 49.93 |
| 150.00 | 4075.92 | 3.58 | 41.87 | 51.19 | 51.04 |
| 175.00 | 4076.01 | 3.78 | 46.30 | 52.24 | 52.07 |
| 200.00 | 4076.09 | 3.96 | 50.54 | 53.22 | 53.04 |
| 225.00 | 4076.16 | 4.12 | 54.61 | 54.14 | 53.95 |

# Rating Table for STA 11+05

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 250.00 | 4076.24 | 4.27 | 58.55 | 55.02 | 54.82 |
| 275.00 | 4076.30 | 4.41 | 62.38 | 55.87 | 55.65 |
| 300.00 | 4076.37 | 4.54 | 66.10 | 56.67 | 56.45 |
| 325.00 | 4076.43 | 4.66 | 69.73 | 57.45 | 57.21 |
| 350.00 | 4076.50 | 4.78 | 73.28 | 58.20 | 57.95 |
| 375.00 | 4076.56 | 4.89 | 76.76 | 58.93 | 58.67 |
| 400.00 | 4076.61 | 4.99 | 80.17 | 59.63 | 59.36 |
| 425.00 | 4076.67 | 5.09 | 83.52 | 60.31 | 60.04 |
| 450.00 | 4076.72 | 5.18 | 86.81 | 60.98 | 60.69 |
| 475.00 | 4076.78 | 5.27 | 90.05 | 61.62 | 61.33 |
| 500.00 | 4076.83 | 5.36 | 93.25 | 62.25 | 61.95 |
| 525.00 | 4076.88 | 5.45 | 96.40 | 62.87 | 62.56 |
| 550.00 | 4076.93 | 5.53 | 99.50 | 63.47 | 63.15 |
| 575.00 | 4076.98 | 5.61 | 102.57 | 64.06 | 63.73 |
| 600.00 | 4077.02 | 5.68 | 105.60 | 64.64 | 64.30 |
| 625.00 | 4077.07 | 5.76 | 108.60 | 65.20 | 64.86 |
| 650.00 | 4077.12 | 5.83 | 111.56 | 65.75 | 65.40 |
| 675.00 | 4077.16 | 5.90 | 114.49 | 66.30 | 65.94 |
| 700.00 | 4077.21 | 5.96 | 117.39 | 66.83 | 66.46 |

# Cross Section for STA 11+05

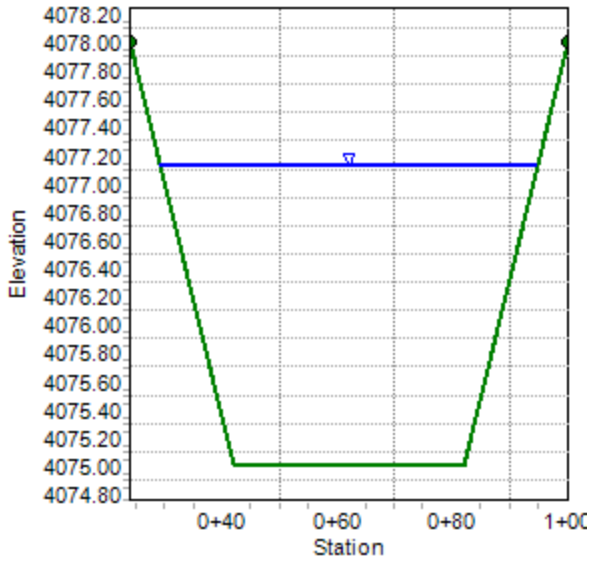
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Normal Depth | 2.12 | ft |
| Discharge | 650.00 | ft³/s |

## Cross Section Image



# Worksheet for STA 7+40

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 1+00 | 4072.00 |
| 1+16 | 4069.38 |
| 1+51 | 4069.38 |
| 1+67 | 4072.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (1+00, 4072.00) | (1+67, 4072.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.25 | ft |
| Elevation Range | 4069.38 to 4072.00 ft | |
| Flow Area | 109.56 | ft² |
| Wetted Perimeter | 62.83 | ft |
| Hydraulic Radius | 1.74 | ft |
| Top Width | 62.46 | ft |
| Normal Depth | 2.25 | ft |
| Critical Depth | 1.96 | ft |
| Critical Slope | 0.02563 | ft/ft |

# Worksheet for STA 7+40

## Results

| | | | |
|---|---|---|---|
| Velocity | | 5.93 | ft/s |
| Velocity Head | | 0.55 | ft |
| Specific Energy | | 2.80 | ft |
| Froude Number | | 0.79 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.25 | ft |
| Critical Depth | 1.96 | ft |
| Channel Slope | 0.01538 | ft/ft |
| Critical Slope | 0.02563 | ft/ft |

# Rating Table for STA 7+40

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 1+00 | 4072.00 |
| 1+16 | 4069.38 |
| 1+51 | 4069.38 |
| 1+67 | 4072.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (1+00, 4072.00) | (1+67, 4072.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4069.38 | | 0.00 | | |
| 25.00 | 4069.73 | 1.94 | 12.86 | 39.29 | 39.23 |
| 50.00 | 4069.90 | 2.51 | 19.91 | 41.45 | 41.37 |
| 75.00 | 4070.04 | 2.91 | 25.81 | 43.18 | 43.08 |
| 100.00 | 4070.16 | 3.22 | 31.09 | 44.68 | 44.55 |
| 125.00 | 4070.27 | 3.48 | 35.97 | 46.01 | 45.87 |
| 150.00 | 4070.37 | 3.70 | 40.55 | 47.23 | 47.07 |
| 175.00 | 4070.46 | 3.90 | 44.90 | 48.36 | 48.19 |
| 200.00 | 4070.55 | 4.07 | 49.08 | 49.42 | 49.23 |
| 225.00 | 4070.63 | 4.24 | 53.09 | 50.42 | 50.22 |

# Rating Table for STA 7+40

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 250.00 | 4070.70 | 4.39 | 56.98 | 51.37 | 51.16 |
| 275.00 | 4070.78 | 4.53 | 60.75 | 52.27 | 52.05 |
| 300.00 | 4070.85 | 4.66 | 64.43 | 53.14 | 52.90 |
| 325.00 | 4070.91 | 4.78 | 68.02 | 53.98 | 53.73 |
| 350.00 | 4070.98 | 4.89 | 71.53 | 54.78 | 54.52 |
| 375.00 | 4071.04 | 5.00 | 74.99 | 55.56 | 55.29 |
| 400.00 | 4071.10 | 5.10 | 78.37 | 56.31 | 56.03 |
| 425.00 | 4071.16 | 5.20 | 81.69 | 57.04 | 56.75 |
| 450.00 | 4071.22 | 5.30 | 84.95 | 57.75 | 57.45 |
| 475.00 | 4071.27 | 5.39 | 88.17 | 58.44 | 58.13 |
| 500.00 | 4071.33 | 5.47 | 91.34 | 59.11 | 58.79 |
| 525.00 | 4071.38 | 5.56 | 94.47 | 59.76 | 59.44 |
| 550.00 | 4071.43 | 5.64 | 97.56 | 60.40 | 60.07 |
| 575.00 | 4071.48 | 5.71 | 100.61 | 61.03 | 60.69 |
| 600.00 | 4071.53 | 5.79 | 103.63 | 61.64 | 61.29 |
| 625.00 | 4071.58 | 5.86 | 106.61 | 62.24 | 61.88 |
| 650.00 | 4071.63 | 5.93 | 109.56 | 62.83 | 62.46 |
| 675.00 | 4071.67 | 6.00 | 112.48 | 63.40 | 63.03 |
| 700.00 | 4071.72 | 6.07 | 115.38 | 63.97 | 63.59 |

# Cross Section for STA 7+40

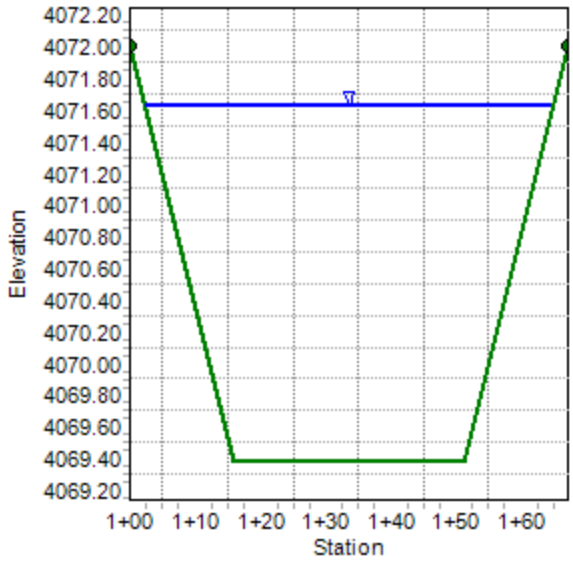
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Normal Depth | 2.25 | ft |
| Discharge | 650.00 | ft³/s |

## Cross Section Image



# Worksheet for STA 5+55

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4070.00 |
| 0+14 | 4066.53 |
| 0+39 | 4066.53 |
| 0+54 | 4070.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4070.00) | (0+54, 4070.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.71 | ft |
| Elevation Range | 4066.53 to 4070.00 ft | |
| Flow Area | 98.64 | ft² |
| Wetted Perimeter | 48.32 | ft |
| Hydraulic Radius | 2.04 | ft |
| Top Width | 47.68 | ft |
| Normal Depth | 2.71 | ft |
| Critical Depth | 2.40 | ft |
| Critical Slope | 0.02438 | ft/ft |

# Worksheet for STA 5+55

## Results

| | | | |
|---|---|---|---|
| Velocity | | 6.59 | ft/s |
| Velocity Head | | 0.67 | ft |
| Specific Energy | | 3.39 | ft |
| Froude Number | | 0.81 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.71 | ft |
| Critical Depth | 2.40 | ft |
| Channel Slope | 0.01538 | ft/ft |
| Critical Slope | 0.02438 | ft/ft |

# Rating Table for STA 5+55

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4070.00 |
| 0+14 | 4066.53 |
| 0+39 | 4066.53 |
| 0+54 | 4070.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4070.00) | (0+54, 4070.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4066.53 | | 0.00 | | |
| 25.00 | 4066.95 | 2.21 | 11.32 | 28.63 | 28.53 |
| 50.00 | 4067.17 | 2.84 | 17.60 | 30.47 | 30.32 |
| 75.00 | 4067.34 | 3.28 | 22.87 | 31.93 | 31.74 |
| 100.00 | 4067.48 | 3.62 | 27.61 | 33.19 | 32.96 |
| 125.00 | 4067.61 | 3.91 | 31.98 | 34.31 | 34.05 |
| 150.00 | 4067.73 | 4.15 | 36.11 | 35.33 | 35.05 |
| 175.00 | 4067.84 | 4.37 | 40.03 | 36.28 | 35.97 |
| 200.00 | 4067.95 | 4.57 | 43.79 | 37.17 | 36.84 |
| 225.00 | 4068.04 | 4.75 | 47.41 | 38.01 | 37.65 |

# Rating Table for STA 5+55

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 250.00 | 4068.14 | 4.91 | 50.93 | 38.80 | 38.42 |
| 275.00 | 4068.22 | 5.06 | 54.34 | 39.56 | 39.16 |
| 300.00 | 4068.31 | 5.20 | 57.67 | 40.28 | 39.86 |
| 325.00 | 4068.39 | 5.33 | 60.92 | 40.98 | 40.54 |
| 350.00 | 4068.47 | 5.46 | 64.11 | 41.65 | 41.19 |
| 375.00 | 4068.54 | 5.58 | 67.24 | 42.29 | 41.82 |
| 400.00 | 4068.61 | 5.69 | 70.29 | 42.92 | 42.42 |
| 425.00 | 4068.69 | 5.80 | 73.31 | 43.53 | 43.02 |
| 450.00 | 4068.75 | 5.90 | 76.28 | 44.11 | 43.59 |
| 475.00 | 4068.82 | 6.00 | 79.20 | 44.69 | 44.15 |
| 500.00 | 4068.89 | 6.09 | 82.08 | 45.24 | 44.69 |
| 525.00 | 4068.95 | 6.18 | 84.92 | 45.79 | 45.22 |
| 550.00 | 4069.01 | 6.27 | 87.73 | 46.32 | 45.73 |
| 575.00 | 4069.07 | 6.35 | 90.50 | 46.84 | 46.24 |
| 600.00 | 4069.13 | 6.43 | 93.24 | 47.34 | 46.73 |
| 625.00 | 4069.19 | 6.51 | 95.96 | 47.84 | 47.21 |
| 650.00 | 4069.24 | 6.59 | 98.64 | 48.32 | 47.68 |
| 675.00 | 4069.30 | 6.66 | 101.29 | 48.80 | 48.15 |
| 700.00 | 4069.35 | 6.74 | 103.92 | 49.27 | 48.60 |

# Cross Section for STA 5+55

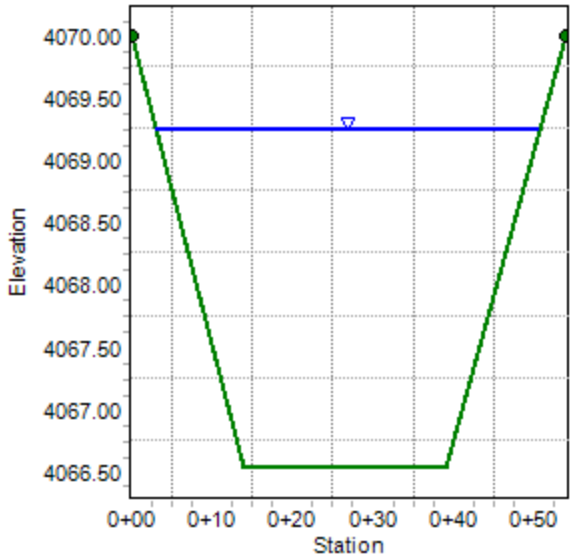
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Normal Depth | 2.71 | ft |
| Discharge | 650.00 | ft³/s |

## Cross Section Image



# Worksheet for STA 2+88

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4068.00 |
| 1+29 | 4066.00 |
| 1+51 | 4062.42 |
| 1+81 | 4062.42 |
| 2+06 | 4066.50 |
| 4+00 | 4068.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4068.00) | (4+00, 4068.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.40 | ft |
| Elevation Range | 4062.42 to 4068.00 ft | |
| Flow Area | 107.47 | ft² |
| Wetted Perimeter | 59.87 | ft |
| Hydraulic Radius | 1.80 | ft |
| Top Width | 59.48 | ft |
| Normal Depth | 2.40 | ft |

# Worksheet for STA 2+88

## Results

| | | | |
|---|---|---|---|
| Critical Depth | | 2.10 | ft |
| Critical Slope | | 0.02535 | ft/ft |
| Velocity | | 6.05 | ft/s |
| Velocity Head | | 0.57 | ft |
| Specific Energy | | 2.97 | ft |
| Froude Number | | 0.79 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | | |
|---|---|---|---|
| Downstream Depth | | 0.00 | ft |
| Length | | 0.00 | ft |
| Number Of Steps | | 0 | |

## GVF Output Data

| | | | |
|---|---|---|---|
| Upstream Depth | | 0.00 | ft |
| Profile Description | | | |
| Profile Headloss | | 0.00 | ft |
| Downstream Velocity | | Infinity | ft/s |
| Upstream Velocity | | Infinity | ft/s |
| Normal Depth | | 2.40 | ft |
| Critical Depth | | 2.10 | ft |
| Channel Slope | | 0.01538 | ft/ft |
| Critical Slope | | 0.02535 | ft/ft |

# Rating Table for STA 2+88

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Discharge | 650.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4068.00 |
| 1+29 | 4066.00 |
| 1+51 | 4062.42 |
| 1+81 | 4062.42 |
| 2+06 | 4066.50 |
| 4+00 | 4068.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4068.00) | (4+00, 4068.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4062.42 | | 0.00 | | |
| 25.00 | 4062.80 | 2.04 | 12.23 | 34.71 | 34.65 |
| 50.00 | 4062.99 | 2.63 | 19.04 | 37.07 | 36.98 |
| 75.00 | 4063.14 | 3.03 | 24.77 | 38.95 | 38.83 |
| 100.00 | 4063.27 | 3.34 | 29.92 | 40.56 | 40.43 |
| 125.00 | 4063.39 | 3.60 | 34.68 | 42.00 | 41.85 |
| 150.00 | 4063.49 | 3.83 | 39.17 | 43.32 | 43.14 |
| 175.00 | 4063.59 | 4.03 | 43.44 | 44.53 | 44.34 |

# Rating Table for STA 2+88

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 200.00 | 4063.68 | 4.21 | 47.54 | 45.67 | 45.46 |
| 225.00 | 4063.77 | 4.37 | 51.50 | 46.74 | 46.52 |
| 250.00 | 4063.85 | 4.52 | 55.33 | 47.75 | 47.52 |
| 275.00 | 4063.93 | 4.66 | 59.07 | 48.72 | 48.48 |
| 300.00 | 4064.00 | 4.78 | 62.70 | 49.64 | 49.39 |
| 325.00 | 4064.07 | 4.91 | 66.25 | 50.53 | 50.26 |
| 350.00 | 4064.14 | 5.02 | 69.73 | 51.38 | 51.10 |
| 375.00 | 4064.21 | 5.13 | 73.14 | 52.20 | 51.92 |
| 400.00 | 4064.27 | 5.23 | 76.49 | 53.00 | 52.70 |
| 425.00 | 4064.33 | 5.33 | 79.78 | 53.77 | 53.46 |
| 450.00 | 4064.39 | 5.42 | 83.02 | 54.52 | 54.20 |
| 475.00 | 4064.45 | 5.51 | 86.22 | 55.25 | 54.92 |
| 500.00 | 4064.51 | 5.60 | 89.36 | 55.96 | 55.62 |
| 525.00 | 4064.56 | 5.68 | 92.47 | 56.65 | 56.30 |
| 550.00 | 4064.62 | 5.76 | 95.54 | 57.32 | 56.97 |
| 575.00 | 4064.67 | 5.83 | 98.57 | 57.98 | 57.61 |
| 600.00 | 4064.72 | 5.91 | 101.57 | 58.62 | 58.25 |
| 625.00 | 4064.77 | 5.98 | 104.54 | 59.25 | 58.87 |
| 650.00 | 4064.82 | 6.05 | 107.47 | 59.87 | 59.48 |
| 675.00 | 4064.87 | 6.12 | 110.38 | 60.47 | 60.08 |
| 700.00 | 4064.92 | 6.18 | 113.23 | 61.06 | 60.66 |

# Cross Section for STA 2+88

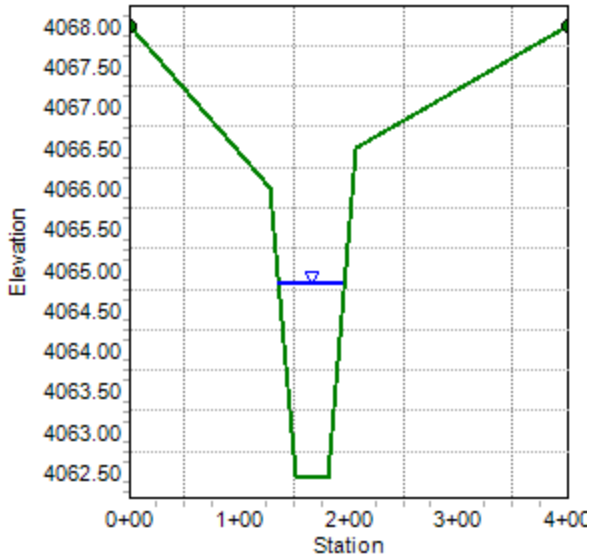
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01538 | ft/ft |
| Normal Depth | 2.40 | ft |
| Discharge | 650.00 | ft³/s |

## Cross Section Image



Job No. 035-230142

# Computation

| | | |
|---|---|---|
| Project: Rincon Drainage Master Plan | Computed: MTH | Date: 10-16-2015 |
| Subject: Proposed East Channel Basin | Checked: DAP | Date: 1-27-2016 |
| Task: Drainage Basin Volume Calculations | Sheet: 1 of 1 | |

## VOLUME EXCAVATED

Conic Section Formula:

$$V_{1\text{-}2} = ( ( E_1 - E_2 ) / 3 ) * ( A_1 + A_2 + ( A_1 * A_2 )^{1/2} )$$

| | |
|---|---|
| $V_{1\text{-}2}$ | Storage Volume in cubic feet. |
| $A_1$ | Top surface area in square feet. |
| $A_2$ | Bottom surface area in square feet. |
| $E_1$ | Top elevation in feet. |
| $E_2$ | Bottom elevation in feet. |

| *RETENTION BASIN* | *ELEVATION* | *SURFACE AREA* | *VOLUME PROVIDED* | | *Excavation:* |
|---|---|---|---|---|---|
| | *(ft)* | *($ft^2$)* | *($ft^3$)* | *(Ac-ft)* | *($yd^3$)* |
| Option1 | | | | | |
| ***BASIN*** | 4,064 | 85,953 | 82,683 | 1.90 | |
| ***4-ft deep*** | 4,063 | 79,455 | 76,300 | 1.75 | |
| ***6:1 Side Slopes*** | 4,062 | 73,188 | 70,147 | 1.61 | |
| | 4,061 | 67,150 | 64,225 | 1.47 | |
| | 4,060 | 61,343 | | | |
| | | *Subtotal:* | 293,355 | 6.73 | **10,865** |
| Option 2 | | | | | |
| ***BASIN*** | 4,064 | 85,953 | 83,765 | 1.92 | |
| ***6-ft deep*** | 4,063 | 81,596 | 79,459 | 1.82 | |
| ***4:1 Side Slopes*** | 4,062 | 77,341 | 75,255 | 1.73 | |
| | 4,061 | 73,188 | 71,153 | 1.63 | |
| | 4,060 | 69,137 | 67,153 | 1.54 | |
| | 4,059 | 65,188 | 63,256 | 1.45 | |
| | 4,058 | 61,343 | | | |
| | | *Subtotal:* | 440,040 | 10.10 | **16,297** |

# Worksheet for NM-140 Roadside Ditch

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00600 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 40.00 | $ft^3/s$ |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.41 | ft |
| Flow Area | 11.58 | $ft^2$ |
| Wetted Perimeter | 10.76 | ft |
| Hydraulic Radius | 1.08 | ft |
| Top Width | 9.63 | ft |
| Critical Depth | 1.90 | ft |
| Critical Slope | 0.02107 | ft/ft |
| Velocity | 3.45 | ft/s |
| Velocity Head | 0.19 | ft |
| Specific Energy | 2.59 | ft |
| Froude Number | 0.56 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.41 | ft |
| Critical Depth | 1.90 | ft |
| Channel Slope | 0.00600 | ft/ft |
| Critical Slope | 0.02107 | ft/ft |

# Rating Table for NM-140 Roadside Ditch

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00600 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 40.00 | ft³/s |

| Discharge (ft³/s) | Normal Depth (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 10.00 | 1.43 | 2.44 | 4.09 | 6.40 | 5.72 |
| 12.00 | 1.53 | 2.56 | 4.69 | 6.85 | 6.13 |
| 14.00 | 1.62 | 2.66 | 5.27 | 7.26 | 6.49 |
| 16.00 | 1.71 | 2.75 | 5.83 | 7.63 | 6.83 |
| 18.00 | 1.78 | 2.83 | 6.36 | 7.98 | 7.14 |
| 20.00 | 1.86 | 2.90 | 6.89 | 8.30 | 7.42 |
| 22.00 | 1.92 | 2.97 | 7.40 | 8.60 | 7.69 |
| 24.00 | 1.99 | 3.04 | 7.90 | 8.89 | 7.95 |
| 26.00 | 2.05 | 3.10 | 8.38 | 9.16 | 8.19 |
| 28.00 | 2.11 | 3.16 | 8.86 | 9.42 | 8.42 |
| 30.00 | 2.16 | 3.21 | 9.33 | 9.66 | 8.64 |
| 32.00 | 2.21 | 3.27 | 9.80 | 9.90 | 8.85 |
| 34.00 | 2.26 | 3.32 | 10.25 | 10.13 | 9.06 |
| 36.00 | 2.31 | 3.36 | 10.70 | 10.35 | 9.25 |
| 38.00 | 2.36 | 3.41 | 11.14 | 10.56 | 9.44 |
| 40.00 | 2.41 | 3.45 | 11.58 | 10.76 | 9.63 |
| 42.00 | 2.45 | 3.50 | 12.02 | 10.96 | 9.80 |
| 44.00 | 2.49 | 3.54 | 12.44 | 11.15 | 9.98 |
| 46.00 | 2.54 | 3.58 | 12.86 | 11.34 | 10.14 |
| 48.00 | 2.58 | 3.61 | 13.28 | 11.52 | 10.31 |
| 50.00 | 2.62 | 3.65 | 13.69 | 11.70 | 10.47 |

# Cross Section for NM-140 Roadside Ditch

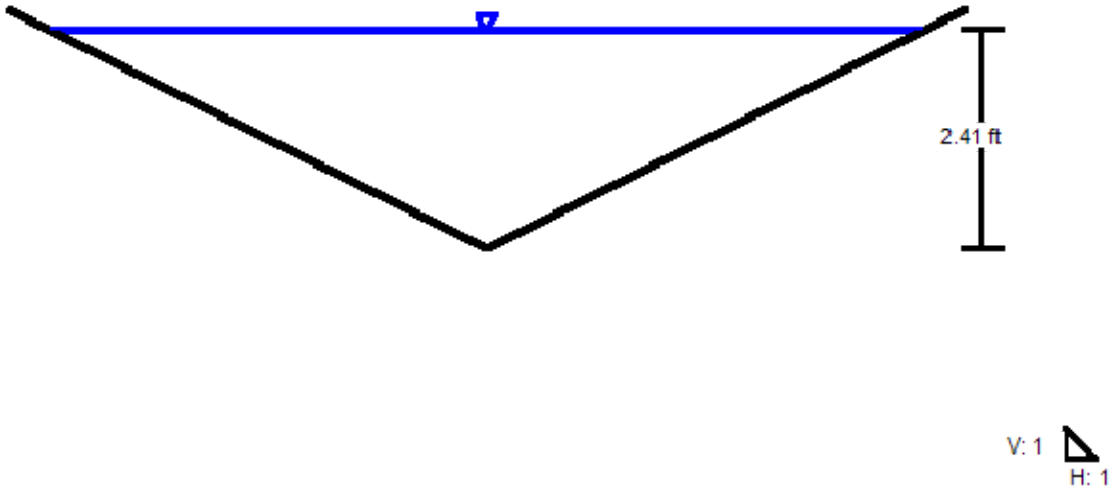
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00600 | ft/ft |
| Normal Depth | 2.41 | ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 40.00 | ft³/s |

## Cross Section Image



# Worksheet for RN4 Ditch - 25 Yr

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.01647 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 10.00 | $ft^3/s$ |

## Results

| | | |
|---|---|---|
| Normal Depth | 1.24 | ft |
| Flow Area | 3.10 | $ft^2$ |
| Wetted Perimeter | 5.57 | ft |
| Hydraulic Radius | 0.56 | ft |
| Top Width | 4.98 | ft |
| Critical Depth | 1.09 | ft |
| Critical Slope | 0.03310 | ft/ft |
| Velocity | 3.23 | ft/s |
| Velocity Head | 0.16 | ft |
| Specific Energy | 1.41 | ft |
| Froude Number | 0.72 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.24 | ft |
| Critical Depth | 1.09 | ft |
| Channel Slope | 0.01647 | ft/ft |
| Critical Slope | 0.03310 | ft/ft |

# Rating Table for RN4 Ditch - 25 Yr

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.01647 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 10.00 | ft³/s |

| Discharge (ft³/s) | Normal Depth (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | | | | | |
| 2.00 | 0.68 | 2.16 | 0.93 | 3.04 | 2.72 |
| 4.00 | 0.88 | 2.57 | 1.56 | 3.95 | 3.53 |
| 6.00 | 1.03 | 2.84 | 2.11 | 4.60 | 4.11 |
| 8.00 | 1.14 | 3.05 | 2.62 | 5.12 | 4.58 |
| 10.00 | 1.24 | 3.23 | 3.10 | 5.57 | 4.98 |
| 12.00 | 1.33 | 3.38 | 3.55 | 5.96 | 5.33 |
| 14.00 | 1.41 | 3.51 | 3.99 | 6.32 | 5.65 |
| 16.00 | 1.48 | 3.63 | 4.41 | 6.64 | 5.94 |
| 18.00 | 1.55 | 3.74 | 4.82 | 6.94 | 6.21 |
| 20.00 | 1.61 | 3.84 | 5.21 | 7.22 | 6.46 |

# Cross Section for RN4 Ditch - 25 Yr

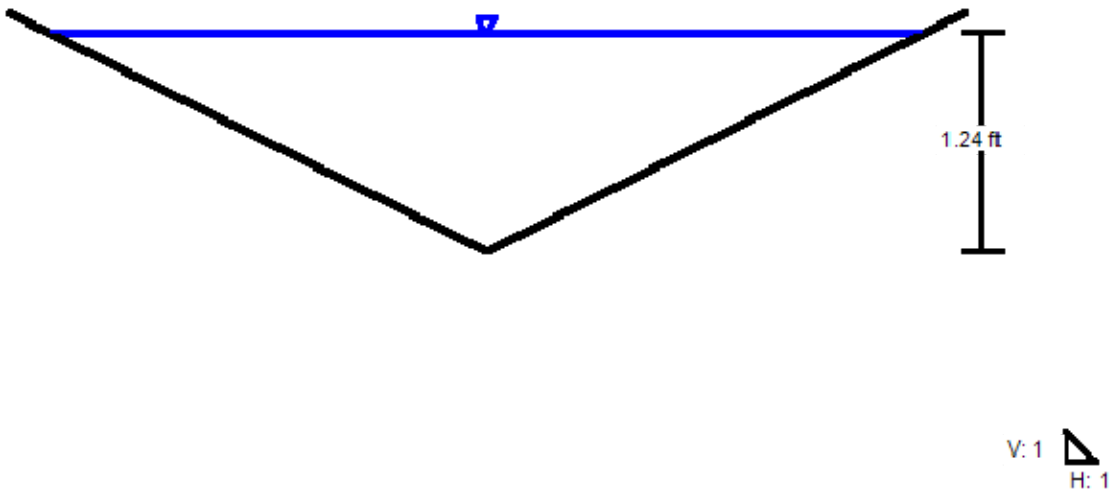
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.01647 | ft/ft |
| Normal Depth | 1.24 | ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 10.00 | ft³/s |

## Cross Section Image



# Worksheet for RN5 Ditch - 25 Yr

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.03500 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 6.00 | $ft^3/s$ |

## Results

| | | |
|---|---|---|
| Normal Depth | 0.89 | ft |
| Flow Area | 1.59 | $ft^2$ |
| Wetted Perimeter | 3.99 | ft |
| Hydraulic Radius | 0.40 | ft |
| Top Width | 3.57 | ft |
| Critical Depth | 0.89 | ft |
| Critical Slope | 0.03543 | ft/ft |
| Velocity | 3.77 | ft/s |
| Velocity Head | 0.22 | ft |
| Specific Energy | 1.11 | ft |
| Froude Number | 0.99 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.89 | ft |
| Critical Depth | 0.89 | ft |
| Channel Slope | 0.03500 | ft/ft |
| Critical Slope | 0.03543 | ft/ft |

# Rating Table for RN5 Ditch - 25 Yr

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.03500 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 6.00 | ft³/s |

| Discharge (ft³/s) | Normal Depth (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | | | | | |
| 1.00 | 0.46 | 2.41 | 0.42 | 2.04 | 1.82 |
| 2.00 | 0.59 | 2.86 | 0.70 | 2.64 | 2.36 |
| 3.00 | 0.69 | 3.17 | 0.95 | 3.08 | 2.75 |
| 4.00 | 0.77 | 3.40 | 1.18 | 3.43 | 3.07 |
| 5.00 | 0.83 | 3.60 | 1.39 | 3.73 | 3.33 |
| 6.00 | 0.89 | 3.77 | 1.59 | 3.99 | 3.57 |
| 7.00 | 0.95 | 3.92 | 1.79 | 4.23 | 3.78 |
| 8.00 | 0.99 | 4.05 | 1.98 | 4.44 | 3.98 |
| 9.00 | 1.04 | 4.17 | 2.16 | 4.65 | 4.16 |
| 10.00 | 1.08 | 4.28 | 2.34 | 4.83 | 4.32 |

# Cross Section for RN5 Ditch - 25 Yr

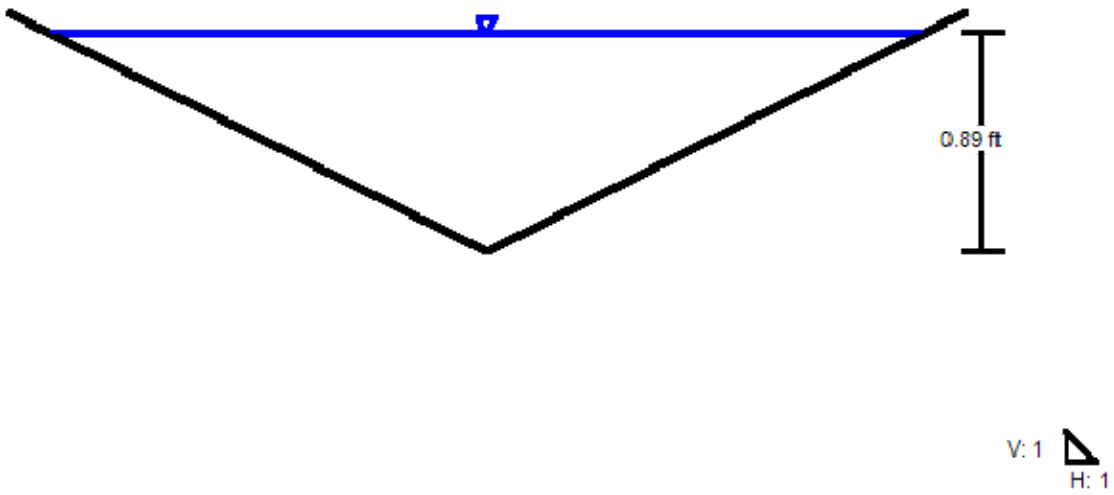
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.03500 | ft/ft |
| Normal Depth | 0.89 | ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 6.00 | ft³/s |

## Cross Section Image



# Worksheet for Factory Roadside Ditch

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00667 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 90.00 | $ft^3/s$ |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.20 | ft |
| Flow Area | 20.45 | $ft^2$ |
| Wetted Perimeter | 14.30 | ft |
| Hydraulic Radius | 1.43 | ft |
| Top Width | 12.79 | ft |
| Critical Depth | 2.63 | ft |
| Critical Slope | 0.01891 | ft/ft |
| Velocity | 4.40 | ft/s |
| Velocity Head | 0.30 | ft |
| Specific Energy | 3.50 | ft |
| Froude Number | 0.61 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.20 | ft |
| Critical Depth | 2.63 | ft |
| Channel Slope | 0.00667 | ft/ft |
| Critical Slope | 0.01891 | ft/ft |

# Rating Table for Factory Roadside Ditch

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00667 | ft/ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 90.00 | ft³/s |

| Discharge (ft³/s) | Normal Depth (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 10.00 | 1.40 | 2.54 | 3.94 | 6.27 | 5.61 |
| 15.00 | 1.63 | 2.81 | 5.34 | 7.31 | 6.53 |
| 20.00 | 1.82 | 3.02 | 6.62 | 8.14 | 7.28 |
| 25.00 | 1.98 | 3.19 | 7.83 | 8.85 | 7.91 |
| 30.00 | 2.12 | 3.34 | 8.97 | 9.47 | 8.47 |
| 35.00 | 2.24 | 3.47 | 10.07 | 10.04 | 8.98 |
| 40.00 | 2.36 | 3.59 | 11.13 | 10.55 | 9.44 |
| 45.00 | 2.47 | 3.70 | 12.16 | 11.03 | 9.86 |
| 50.00 | 2.57 | 3.80 | 13.16 | 11.47 | 10.26 |
| 55.00 | 2.66 | 3.89 | 14.14 | 11.89 | 10.63 |
| 60.00 | 2.75 | 3.98 | 15.09 | 12.28 | 10.99 |
| 65.00 | 2.83 | 4.06 | 16.02 | 12.66 | 11.32 |
| 70.00 | 2.91 | 4.13 | 16.94 | 13.02 | 11.64 |
| 75.00 | 2.99 | 4.20 | 17.84 | 13.36 | 11.95 |
| 80.00 | 3.06 | 4.27 | 18.72 | 13.68 | 12.24 |
| 85.00 | 3.13 | 4.34 | 19.59 | 14.00 | 12.52 |
| 90.00 | 3.20 | 4.40 | 20.45 | 14.30 | 12.79 |
| 95.00 | 3.26 | 4.46 | 21.30 | 14.59 | 13.05 |
| 100.00 | 3.33 | 4.52 | 22.14 | 14.88 | 13.31 |

# Cross Section for Factory Roadside Ditch

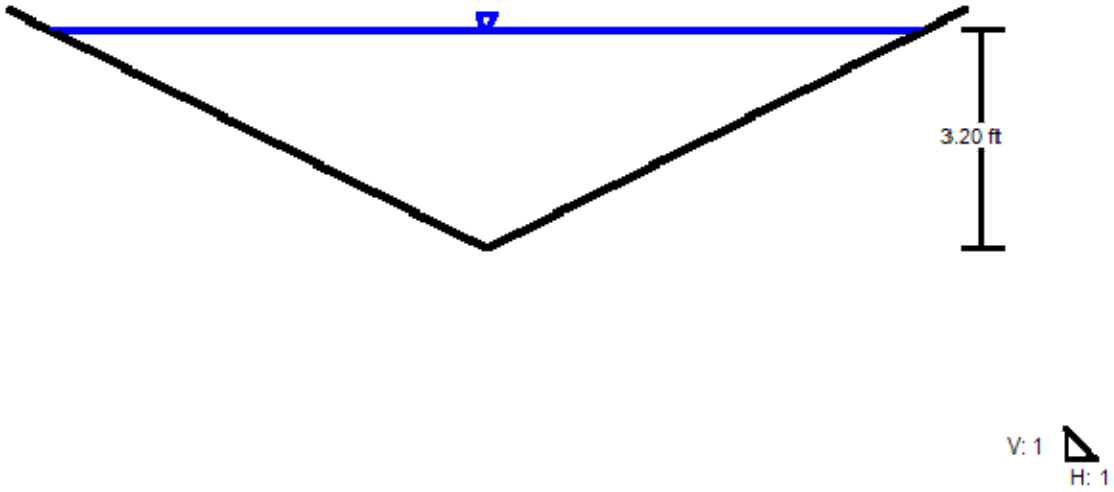
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00667 | ft/ft |
| Normal Depth | 3.20 | ft |
| Left Side Slope | 2.00 | ft/ft (H:V) |
| Right Side Slope | 2.00 | ft/ft (H:V) |
| Discharge | 90.00 | ft³/s |

## Cross Section Image



# Worksheet for Proposed East Channel Cross Section 1

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 47.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4094.00 |
| 0+15 | 4090.00 |
| 0+19 | 4089.00 |
| 0+27 | 4087.00 |
| 0+47 | 4087.00 |
| 0+55 | 4089.00 |
| 0+65 | 4089.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4094.00) | (0+27, 4087.00) | 0.080 |
| (0+27, 4087.00) | (0+47, 4087.00) | 0.030 |
| (0+47, 4087.00) | (0+65, 4089.00) | 0.080 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 1.21 | ft |
| Elevation Range | 4087.00 to 4094.00 ft | |
| Flow Area | 30.10 | ft² |
| Wetted Perimeter | 29.99 | ft |

# Worksheet for Proposed East Channel Cross Section 1

## Results

| | | | |
|---|---|---|---|
| Hydraulic Radius | | 1.00 | ft |
| Top Width | | 29.69 | ft |
| Normal Depth | | 1.21 | ft |
| Critical Depth | | 0.54 | ft |
| Critical Slope | | 0.05092 | ft/ft |
| Velocity | | 1.56 | ft/s |
| Velocity Head | | 0.04 | ft |
| Specific Energy | | 1.25 | ft |
| Froude Number | | 0.27 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.21 | ft |
| Critical Depth | 0.54 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.05092 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 1

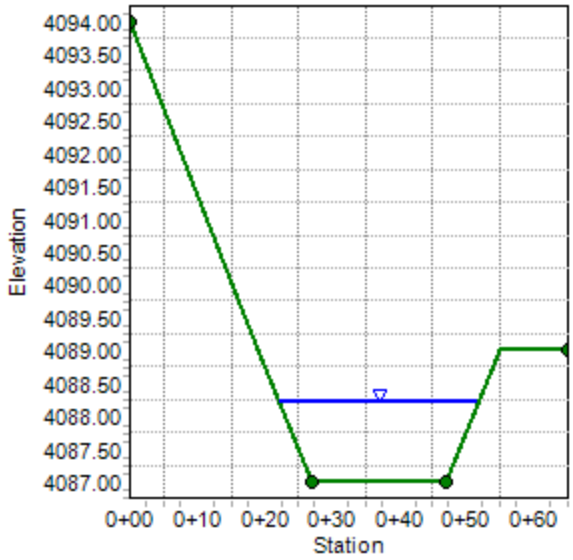
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 1.21 | ft |
| Discharge | 47.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 1

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 47.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4094.00 |
| 0+15 | 4090.00 |
| 0+19 | 4089.00 |
| 0+27 | 4087.00 |
| 0+47 | 4087.00 |
| 0+55 | 4089.00 |
| 0+65 | 4089.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4094.00) | (0+27, 4087.00) | 0.080 |
| (0+27, 4087.00) | (0+47, 4087.00) | 0.030 |
| (0+47, 4087.00) | (0+65, 4089.00) | 0.080 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4087.00 | | 0.00 | | |
| 2.00 | 4087.15 | 0.65 | 3.10 | 21.24 | 21.20 |
| 4.00 | 4087.24 | 0.81 | 4.95 | 21.95 | 21.89 |
| 6.00 | 4087.31 | 0.92 | 6.56 | 22.55 | 22.47 |
| 8.00 | 4087.37 | 1.00 | 8.03 | 23.08 | 22.99 |

# Rating Table for Proposed East Channel Cross Section 1

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 10.00 | 4087.43 | 1.06 | 9.43 | 23.58 | 23.47 |
| 12.00 | 4087.49 | 1.12 | 10.76 | 24.04 | 23.92 |
| 14.00 | 4087.54 | 1.16 | 12.05 | 24.48 | 24.35 |
| 16.00 | 4087.59 | 1.20 | 13.30 | 24.90 | 24.75 |
| 18.00 | 4087.64 | 1.24 | 14.51 | 25.30 | 25.14 |
| 20.00 | 4087.69 | 1.27 | 15.70 | 25.69 | 25.52 |
| 22.00 | 4087.74 | 1.30 | 16.87 | 26.06 | 25.88 |
| 24.00 | 4087.78 | 1.33 | 18.01 | 26.42 | 26.23 |
| 26.00 | 4087.82 | 1.36 | 19.13 | 26.78 | 26.57 |
| 28.00 | 4087.86 | 1.38 | 20.24 | 27.12 | 26.90 |
| 30.00 | 4087.90 | 1.41 | 21.33 | 27.45 | 27.23 |
| 32.00 | 4087.94 | 1.43 | 22.41 | 27.77 | 27.54 |
| 34.00 | 4087.98 | 1.45 | 23.47 | 28.09 | 27.85 |
| 36.00 | 4088.02 | 1.47 | 24.52 | 28.40 | 28.15 |
| 38.00 | 4088.06 | 1.49 | 25.56 | 28.70 | 28.44 |
| 40.00 | 4088.09 | 1.50 | 26.58 | 29.00 | 28.73 |
| 42.00 | 4088.13 | 1.52 | 27.60 | 29.29 | 29.01 |
| 44.00 | 4088.16 | 1.54 | 28.61 | 29.57 | 29.29 |
| 46.00 | 4088.19 | 1.55 | 29.61 | 29.85 | 29.56 |
| 48.00 | 4088.23 | 1.57 | 30.60 | 30.13 | 29.83 |
| 50.00 | 4088.26 | 1.58 | 31.58 | 30.40 | 30.09 |

# Worksheet for Proposed East Channel Cross Section 2

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+14 | 4089.00 |
| 0+27 | 4085.88 |
| 0+47 | 4085.88 |
| 0+59 | 4089.00 |
| 0+69 | 4089.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+14, 4089.00) | (0+27, 4085.88) | 0.080 |
| (0+27, 4085.88) | (0+47, 4085.88) | 0.030 |
| (0+47, 4085.88) | (0+59, 4089.00) | 0.080 |
| (0+59, 4089.00) | (0+69, 4089.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.68 | ft |
| Elevation Range | 4085.88 to 4089.00 ft | |
| Flow Area | 82.23 | ft² |
| Wetted Perimeter | 42.08 | ft |
| Hydraulic Radius | 1.95 | ft |

# Worksheet for Proposed East Channel Cross Section 2

## Results

| | | | |
|---|---|---|---|
| Top Width | | 41.42 | ft |
| Normal Depth | | 2.68 | ft |
| Critical Depth | | 1.20 | ft |
| Critical Slope | | 0.05576 | ft/ft |
| Velocity | | 2.07 | ft/s |
| Velocity Head | | 0.07 | ft |
| Specific Energy | | 2.74 | ft |
| Froude Number | | 0.26 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.68 | ft |
| Critical Depth | 1.20 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.05576 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 2

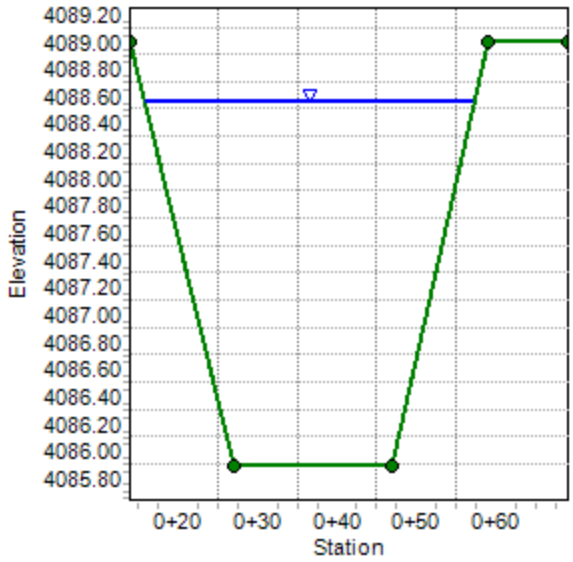
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 2.68 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 2

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+14 | 4089.00 |
| 0+27 | 4085.88 |
| 0+47 | 4085.88 |
| 0+59 | 4089.00 |
| 0+69 | 4089.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+14, 4089.00) | (0+27, 4085.88) | 0.080 |
| (0+27, 4085.88) | (0+47, 4085.88) | 0.030 |
| (0+47, 4085.88) | (0+59, 4089.00) | 0.080 |
| (0+59, 4089.00) | (0+69, 4089.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4085.88 | | 0.00 | | |
| 5.00 | 4086.15 | 0.87 | 5.77 | 22.25 | 22.19 |
| 10.00 | 4086.31 | 1.06 | 9.43 | 23.58 | 23.47 |
| 15.00 | 4086.44 | 1.18 | 12.68 | 24.69 | 24.55 |
| 20.00 | 4086.56 | 1.27 | 15.70 | 25.69 | 25.52 |
| 25.00 | 4086.68 | 1.35 | 18.58 | 26.60 | 26.40 |

# Rating Table for Proposed East Channel Cross Section 2

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 30.00 | 4086.78 | 1.41 | 21.32 | 27.45 | 27.22 |
| 35.00 | 4086.87 | 1.46 | 24.00 | 28.25 | 28.00 |
| 40.00 | 4086.97 | 1.50 | 26.58 | 29.00 | 28.73 |
| 45.00 | 4087.05 | 1.55 | 29.12 | 29.72 | 29.43 |
| 50.00 | 4087.14 | 1.58 | 31.59 | 30.40 | 30.09 |
| 55.00 | 4087.22 | 1.62 | 34.01 | 31.06 | 30.73 |
| 60.00 | 4087.29 | 1.65 | 36.39 | 31.69 | 31.34 |
| 65.00 | 4087.37 | 1.68 | 38.72 | 32.30 | 31.93 |
| 70.00 | 4087.44 | 1.71 | 41.03 | 32.89 | 32.50 |
| 75.00 | 4087.51 | 1.73 | 43.29 | 33.46 | 33.06 |
| 80.00 | 4087.57 | 1.76 | 45.53 | 34.01 | 33.59 |
| 85.00 | 4087.64 | 1.78 | 47.74 | 34.55 | 34.12 |
| 90.00 | 4087.70 | 1.80 | 49.93 | 35.07 | 34.62 |
| 95.00 | 4087.76 | 1.82 | 52.08 | 35.58 | 35.12 |
| 100.00 | 4087.83 | 1.84 | 54.22 | 36.08 | 35.60 |
| 105.00 | 4087.88 | 1.86 | 56.33 | 36.57 | 36.07 |
| 110.00 | 4087.94 | 1.88 | 58.42 | 37.04 | 36.53 |
| 115.00 | 4088.00 | 1.90 | 60.50 | 37.51 | 36.99 |
| 120.00 | 4088.05 | 1.92 | 62.55 | 37.96 | 37.43 |
| 125.00 | 4088.11 | 1.94 | 64.59 | 38.41 | 37.86 |
| 130.00 | 4088.16 | 1.95 | 66.61 | 38.85 | 38.28 |
| 135.00 | 4088.21 | 1.97 | 68.61 | 39.28 | 38.70 |
| 140.00 | 4088.26 | 1.98 | 70.60 | 39.70 | 39.11 |
| 145.00 | 4088.31 | 2.00 | 72.57 | 40.11 | 39.51 |
| 150.00 | 4088.36 | 2.01 | 74.53 | 40.52 | 39.91 |
| 155.00 | 4088.41 | 2.03 | 76.47 | 40.92 | 40.29 |
| 160.00 | 4088.46 | 2.04 | 78.40 | 41.31 | 40.67 |
| 165.00 | 4088.51 | 2.05 | 80.32 | 41.70 | 41.05 |
| 170.00 | 4088.55 | 2.07 | 82.23 | 42.08 | 41.42 |
| 175.00 | 4088.60 | 2.08 | 84.12 | 42.46 | 41.78 |
| 180.00 | 4088.64 | 2.09 | 86.00 | 42.83 | 42.14 |
| 185.00 | 4088.69 | 2.11 | 87.87 | 43.19 | 42.50 |
| 190.00 | 4088.73 | 2.12 | 89.74 | 43.55 | 42.85 |
| 195.00 | 4088.77 | 2.13 | 91.58 | 43.90 | 43.19 |
| 200.00 | 4088.82 | 2.14 | 93.42 | 44.25 | 43.53 |

# Worksheet for Proposed East Channel Cross Section 3

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4092.00 |
| 0+29 | 4084.96 |
| 0+44 | 4084.96 |
| 0+73 | 4090.00 |
| 1+05 | 4090.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4092.00) | (0+29, 4084.96) | 0.080 |
| (0+29, 4084.96) | (0+44, 4084.96) | 0.030 |
| (0+44, 4084.96) | (0+73, 4090.00) | 0.080 |
| (0+73, 4090.00) | (1+05, 4090.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.00 | ft |
| Elevation Range | 4084.96 to 4092.00 ft | |
| Flow Area | 89.65 | ft² |
| Wetted Perimeter | 45.29 | ft |
| Hydraulic Radius | 1.98 | ft |

# Worksheet for Proposed East Channel Cross Section 3

## Results

| | | | |
|---|---|---|---|
| Top Width | | 44.67 | ft |
| Normal Depth | | 3.00 | ft |
| Critical Depth | | 1.36 | ft |
| Critical Slope | | 0.06679 | ft/ft |
| Velocity | | 1.90 | ft/s |
| Velocity Head | | 0.06 | ft |
| Specific Energy | | 3.06 | ft |
| Froude Number | | 0.24 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.00 | ft |
| Critical Depth | 1.36 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.06679 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 3

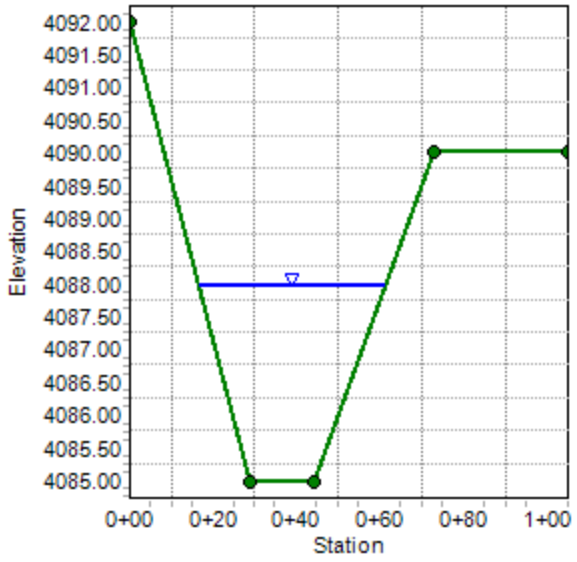
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 3.00 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 3

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4092.00 |
| 0+29 | 4084.96 |
| 0+44 | 4084.96 |
| 0+73 | 4090.00 |
| 1+05 | 4090.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4092.00) | (0+29, 4084.96) | 0.080 |
| (0+29, 4084.96) | (0+44, 4084.96) | 0.030 |
| (0+44, 4084.96) | (0+73, 4090.00) | 0.080 |
| (0+73, 4090.00) | (1+05, 4090.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4084.96 | | 0.00 | | |
| 5.00 | 4085.31 | 0.86 | 5.85 | 18.52 | 18.45 |
| 10.00 | 4085.51 | 1.02 | 9.83 | 20.59 | 20.47 |
| 15.00 | 4085.68 | 1.12 | 13.42 | 22.29 | 22.14 |
| 20.00 | 4085.83 | 1.19 | 16.77 | 23.76 | 23.58 |
| 25.00 | 4085.96 | 1.25 | 19.96 | 25.09 | 24.88 |

# Rating Table for Proposed East Channel Cross Section 3

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 30.00 | 4086.08 | 1.30 | 23.01 | 26.30 | 26.07 |
| 35.00 | 4086.19 | 1.35 | 25.96 | 27.41 | 27.16 |
| 40.00 | 4086.30 | 1.39 | 28.82 | 28.46 | 28.18 |
| 45.00 | 4086.39 | 1.42 | 31.63 | 29.44 | 29.15 |
| 50.00 | 4086.48 | 1.46 | 34.35 | 30.37 | 30.05 |
| 55.00 | 4086.57 | 1.49 | 37.02 | 31.25 | 30.92 |
| 60.00 | 4086.66 | 1.51 | 39.63 | 32.09 | 31.74 |
| 65.00 | 4086.74 | 1.54 | 42.20 | 32.90 | 32.53 |
| 70.00 | 4086.81 | 1.56 | 44.73 | 33.67 | 33.29 |
| 75.00 | 4086.89 | 1.59 | 47.22 | 34.42 | 34.02 |
| 80.00 | 4086.96 | 1.61 | 49.67 | 35.14 | 34.73 |
| 85.00 | 4087.03 | 1.63 | 52.09 | 35.83 | 35.41 |
| 90.00 | 4087.09 | 1.65 | 54.48 | 36.51 | 36.07 |
| 95.00 | 4087.16 | 1.67 | 56.84 | 37.16 | 36.71 |
| 100.00 | 4087.22 | 1.69 | 59.18 | 37.80 | 37.33 |
| 105.00 | 4087.28 | 1.71 | 61.48 | 38.41 | 37.94 |
| 110.00 | 4087.34 | 1.73 | 63.76 | 39.01 | 38.52 |
| 115.00 | 4087.40 | 1.74 | 66.02 | 39.60 | 39.10 |
| 120.00 | 4087.46 | 1.76 | 68.26 | 40.18 | 39.66 |
| 125.00 | 4087.51 | 1.77 | 70.48 | 40.73 | 40.21 |
| 130.00 | 4087.57 | 1.79 | 72.68 | 41.28 | 40.75 |
| 135.00 | 4087.62 | 1.80 | 74.86 | 41.82 | 41.27 |
| 140.00 | 4087.67 | 1.82 | 77.01 | 42.34 | 41.78 |
| 145.00 | 4087.72 | 1.83 | 79.17 | 42.86 | 42.29 |
| 150.00 | 4087.77 | 1.85 | 81.30 | 43.36 | 42.78 |
| 155.00 | 4087.82 | 1.86 | 83.40 | 43.85 | 43.26 |
| 160.00 | 4087.87 | 1.87 | 85.50 | 44.34 | 43.74 |
| 165.00 | 4087.92 | 1.88 | 87.58 | 44.82 | 44.21 |
| 170.00 | 4087.96 | 1.90 | 89.65 | 45.29 | 44.67 |
| 175.00 | 4088.01 | 1.91 | 91.70 | 45.75 | 45.12 |
| 180.00 | 4088.06 | 1.92 | 93.73 | 46.20 | 45.56 |
| 185.00 | 4088.10 | 1.93 | 95.77 | 46.65 | 46.00 |
| 190.00 | 4088.14 | 1.94 | 97.78 | 47.09 | 46.43 |
| 195.00 | 4088.19 | 1.95 | 99.79 | 47.52 | 46.86 |
| 200.00 | 4088.23 | 1.97 | 101.78 | 47.95 | 47.27 |

# Worksheet for Proposed East Channel Cross Section 4

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4096.00 |
| 0+35 | 4084.48 |
| 0+50 | 4084.48 |
| 0+79 | 4094.00 |
| 1+00 | 4094.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4096.00) | (0+35, 4084.48) | 0.080 |
| (0+35, 4084.48) | (0+50, 4084.48) | 0.030 |
| (0+50, 4084.48) | (0+79, 4094.00) | 0.080 |
| (0+79, 4094.00) | (1+00, 4094.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.18 | ft |
| Elevation Range | 4084.48 to 4096.00 ft | |
| Flow Area | 78.35 | ft² |
| Wetted Perimeter | 35.35 | ft |
| Hydraulic Radius | 2.22 | ft |

# Worksheet for Proposed East Channel Cross Section 4

## Results

| | | | |
|---|---|---|---|
| Top Width | | 34.33 | ft |
| Normal Depth | | 3.18 | ft |
| Critical Depth | | 1.43 | ft |
| Critical Slope | | 0.05770 | ft/ft |
| Velocity | | 2.17 | ft/s |
| Velocity Head | | 0.07 | ft |
| Specific Energy | | 3.25 | ft |
| Froude Number | | 0.25 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.18 | ft |
| Critical Depth | 1.43 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.05770 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 4

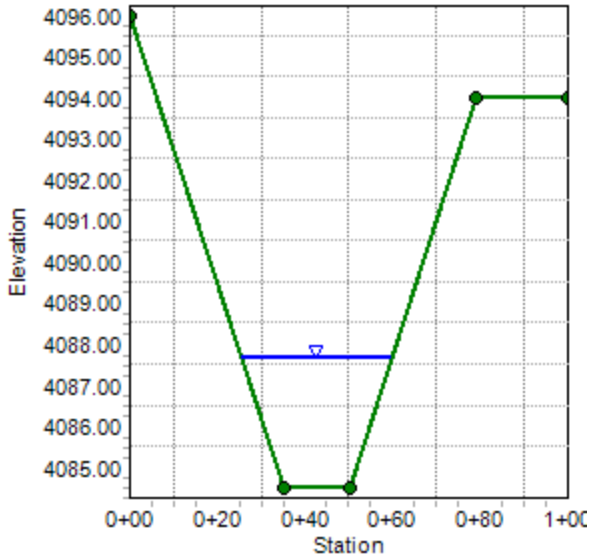
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 3.18 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 4

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4096.00 |
| 0+35 | 4084.48 |
| 0+50 | 4084.48 |
| 0+79 | 4094.00 |
| 1+00 | 4094.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4096.00) | (0+35, 4084.48) | 0.080 |
| (0+35, 4084.48) | (0+50, 4084.48) | 0.030 |
| (0+50, 4084.48) | (0+79, 4094.00) | 0.080 |
| (0+79, 4094.00) | (1+00, 4094.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4084.48 | | 0.00 | | |
| 5.00 | 4084.81 | 0.94 | 5.33 | 17.13 | 17.02 |
| 10.00 | 4085.01 | 1.14 | 8.79 | 18.39 | 18.22 |
| 15.00 | 4085.17 | 1.26 | 11.89 | 19.45 | 19.23 |
| 20.00 | 4085.32 | 1.35 | 14.78 | 20.39 | 20.12 |
| 25.00 | 4085.46 | 1.43 | 17.53 | 21.25 | 20.93 |

# Rating Table for Proposed East Channel Cross Section 4

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 30.00 | 4085.58 | 1.49 | 20.16 | 22.04 | 21.69 |
| 35.00 | 4085.69 | 1.54 | 22.71 | 22.78 | 22.39 |
| 40.00 | 4085.80 | 1.59 | 25.19 | 23.48 | 23.06 |
| 45.00 | 4085.91 | 1.63 | 27.61 | 24.14 | 23.69 |
| 50.00 | 4086.01 | 1.67 | 29.98 | 24.78 | 24.29 |
| 55.00 | 4086.10 | 1.70 | 32.29 | 25.38 | 24.86 |
| 60.00 | 4086.19 | 1.74 | 34.57 | 25.96 | 25.41 |
| 65.00 | 4086.28 | 1.77 | 36.81 | 26.52 | 25.94 |
| 70.00 | 4086.36 | 1.79 | 39.01 | 27.05 | 26.45 |
| 75.00 | 4086.44 | 1.82 | 41.18 | 27.57 | 26.95 |
| 80.00 | 4086.52 | 1.85 | 43.32 | 28.08 | 27.43 |
| 85.00 | 4086.60 | 1.87 | 45.42 | 28.57 | 27.89 |
| 90.00 | 4086.67 | 1.89 | 47.51 | 29.04 | 28.34 |
| 95.00 | 4086.74 | 1.92 | 49.58 | 29.51 | 28.78 |
| 100.00 | 4086.82 | 1.94 | 51.62 | 29.96 | 29.21 |
| 105.00 | 4086.88 | 1.96 | 53.64 | 30.40 | 29.63 |
| 110.00 | 4086.95 | 1.98 | 55.63 | 30.82 | 30.03 |
| 115.00 | 4087.02 | 2.00 | 57.61 | 31.24 | 30.43 |
| 120.00 | 4087.08 | 2.01 | 59.58 | 31.65 | 30.82 |
| 125.00 | 4087.14 | 2.03 | 61.52 | 32.06 | 31.20 |
| 130.00 | 4087.20 | 2.05 | 63.45 | 32.45 | 31.58 |
| 135.00 | 4087.26 | 2.07 | 65.36 | 32.83 | 31.94 |
| 140.00 | 4087.32 | 2.08 | 67.25 | 33.21 | 32.30 |
| 145.00 | 4087.38 | 2.10 | 69.13 | 33.58 | 32.65 |
| 150.00 | 4087.44 | 2.11 | 71.00 | 33.95 | 33.00 |
| 155.00 | 4087.49 | 2.13 | 72.85 | 34.30 | 33.34 |
| 160.00 | 4087.55 | 2.14 | 74.71 | 34.66 | 33.68 |
| 165.00 | 4087.60 | 2.16 | 76.53 | 35.01 | 34.00 |
| 170.00 | 4087.66 | 2.17 | 78.35 | 35.35 | 34.33 |
| 175.00 | 4087.71 | 2.18 | 80.16 | 35.68 | 34.65 |
| 180.00 | 4087.76 | 2.20 | 81.95 | 36.01 | 34.96 |
| 185.00 | 4087.81 | 2.21 | 83.73 | 36.34 | 35.27 |
| 190.00 | 4087.86 | 2.22 | 85.50 | 36.66 | 35.57 |
| 195.00 | 4087.91 | 2.23 | 87.27 | 36.97 | 35.87 |
| 200.00 | 4087.96 | 2.25 | 89.02 | 37.28 | 36.17 |

# Worksheet for Proposed East Channel Cross Section 5

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4098.00 |
| 0+28 | 4084.08 |
| 0+43 | 4084.08 |
| 0+71 | 4098.00 |
| 0+85 | 4098.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4098.00) | (0+28, 4084.08) | 0.080 |
| (0+28, 4084.08) | (0+43, 4084.08) | 0.030 |
| (0+43, 4084.08) | (0+71, 4098.00) | 0.080 |
| (0+71, 4098.00) | (0+85, 4098.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.27 | ft |
| Elevation Range | 4084.08 to 4098.00 ft | |
| Flow Area | 70.58 | ft² |
| Wetted Perimeter | 29.69 | ft |
| Hydraulic Radius | 2.38 | ft |

# Worksheet for Proposed East Channel Cross Section 5

## Results

| | | | |
|---|---|---|---|
| Top Width | | 28.16 | ft |
| Normal Depth | | 3.27 | ft |
| Critical Depth | | 1.48 | ft |
| Critical Slope | | 0.05091 | ft/ft |
| Velocity | | 2.41 | ft/s |
| Velocity Head | | 0.09 | ft |
| Specific Energy | | 3.36 | ft |
| Froude Number | | 0.27 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.27 | ft |
| Critical Depth | 1.48 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.05091 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 5

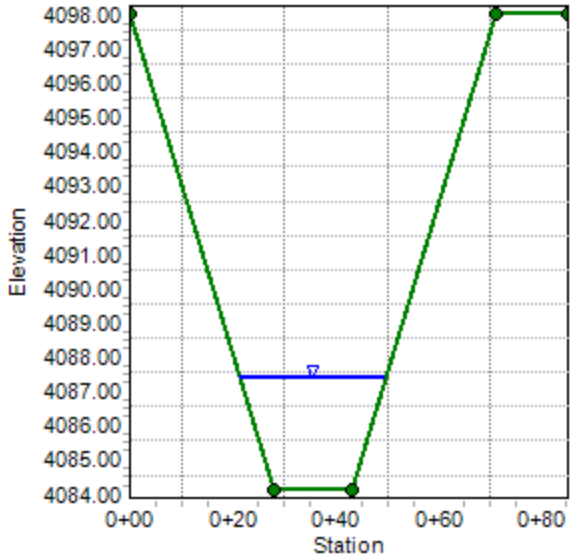
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 3.27 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 5

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4098.00 |
| 0+28 | 4084.08 |
| 0+43 | 4084.08 |
| 0+71 | 4098.00 |
| 0+85 | 4098.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4098.00) | (0+28, 4084.08) | 0.080 |
| (0+28, 4084.08) | (0+43, 4084.08) | 0.030 |
| (0+43, 4084.08) | (0+71, 4098.00) | 0.080 |
| (0+71, 4098.00) | (0+85, 4098.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4084.08 | | 0.00 | | |
| 5.00 | 4084.40 | 0.99 | 5.03 | 16.44 | 16.29 |
| 10.00 | 4084.59 | 1.22 | 8.17 | 17.29 | 17.05 |
| 15.00 | 4084.75 | 1.37 | 10.95 | 18.01 | 17.70 |
| 20.00 | 4084.89 | 1.48 | 13.54 | 18.66 | 18.27 |
| 25.00 | 4085.03 | 1.56 | 15.99 | 19.25 | 18.80 |

# Rating Table for Proposed East Channel Cross Section 5

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 30.00 | 4085.15 | 1.64 | 18.33 | 19.80 | 19.30 |
| 35.00 | 4085.27 | 1.70 | 20.61 | 20.33 | 19.77 |
| 40.00 | 4085.38 | 1.75 | 22.83 | 20.82 | 20.22 |
| 45.00 | 4085.48 | 1.80 | 24.99 | 21.30 | 20.64 |
| 50.00 | 4085.58 | 1.85 | 27.10 | 21.75 | 21.05 |
| 55.00 | 4085.68 | 1.89 | 29.17 | 22.19 | 21.44 |
| 60.00 | 4085.77 | 1.92 | 31.20 | 22.61 | 21.82 |
| 65.00 | 4085.87 | 1.96 | 33.20 | 23.02 | 22.18 |
| 70.00 | 4085.95 | 1.99 | 35.18 | 23.42 | 22.54 |
| 75.00 | 4086.04 | 2.02 | 37.12 | 23.80 | 22.88 |
| 80.00 | 4086.12 | 2.05 | 39.04 | 24.18 | 23.22 |
| 85.00 | 4086.20 | 2.08 | 40.93 | 24.54 | 23.54 |
| 90.00 | 4086.28 | 2.10 | 42.80 | 24.90 | 23.86 |
| 95.00 | 4086.36 | 2.13 | 44.66 | 25.24 | 24.17 |
| 100.00 | 4086.44 | 2.15 | 46.49 | 25.58 | 24.48 |
| 105.00 | 4086.51 | 2.17 | 48.30 | 25.91 | 24.77 |
| 110.00 | 4086.58 | 2.20 | 50.10 | 26.24 | 25.06 |
| 115.00 | 4086.65 | 2.22 | 51.88 | 26.55 | 25.35 |
| 120.00 | 4086.72 | 2.24 | 53.65 | 26.87 | 25.63 |
| 125.00 | 4086.79 | 2.26 | 55.40 | 27.17 | 25.90 |
| 130.00 | 4086.86 | 2.28 | 57.13 | 27.47 | 26.17 |
| 135.00 | 4086.92 | 2.29 | 58.86 | 27.76 | 26.43 |
| 140.00 | 4086.99 | 2.31 | 60.57 | 28.05 | 26.69 |
| 145.00 | 4087.05 | 2.33 | 62.26 | 28.34 | 26.94 |
| 150.00 | 4087.11 | 2.35 | 63.95 | 28.62 | 27.19 |
| 155.00 | 4087.17 | 2.36 | 65.62 | 28.89 | 27.44 |
| 160.00 | 4087.23 | 2.38 | 67.29 | 29.16 | 27.68 |
| 165.00 | 4087.29 | 2.39 | 68.94 | 29.43 | 27.92 |
| 170.00 | 4087.35 | 2.41 | 70.58 | 29.69 | 28.16 |
| 175.00 | 4087.41 | 2.42 | 72.21 | 29.95 | 28.39 |
| 180.00 | 4087.47 | 2.44 | 73.83 | 30.21 | 28.62 |
| 185.00 | 4087.52 | 2.45 | 75.45 | 30.46 | 28.85 |
| 190.00 | 4087.58 | 2.47 | 77.05 | 30.71 | 29.07 |
| 195.00 | 4087.63 | 2.48 | 78.64 | 30.96 | 29.29 |
| 200.00 | 4087.69 | 2.49 | 80.23 | 31.20 | 29.50 |

# Worksheet for Proposed East Channel Cross Section 6

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4098.00 |
| 0+29 | 4083.76 |
| 0+44 | 4083.76 |
| 0+73 | 4100.00 |
| 0+90 | 4100.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4098.00) | (0+29, 4083.76) | 0.080 |
| (0+29, 4083.76) | (0+44, 4083.76) | 0.030 |
| (0+44, 4083.76) | (0+73, 4100.00) | 0.080 |
| (0+73, 4100.00) | (0+90, 4100.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.28 | ft |
| Elevation Range | 4083.76 to 4100.00 ft | |
| Flow Area | 69.76 | ft² |
| Wetted Perimeter | 29.16 | ft |
| Hydraulic Radius | 2.39 | ft |

# Worksheet for Proposed East Channel Cross Section 6

## Results

| | | | |
|---|---|---|---|
| Top Width | | 27.54 | ft |
| Normal Depth | | 3.28 | ft |
| Critical Depth | | 1.48 | ft |
| Critical Slope | | 0.05018 | ft/ft |
| Velocity | | 2.44 | ft/s |
| Velocity Head | | 0.09 | ft |
| Specific Energy | | 3.37 | ft |
| Froude Number | | 0.27 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.28 | ft |
| Critical Depth | 1.48 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.05018 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 6

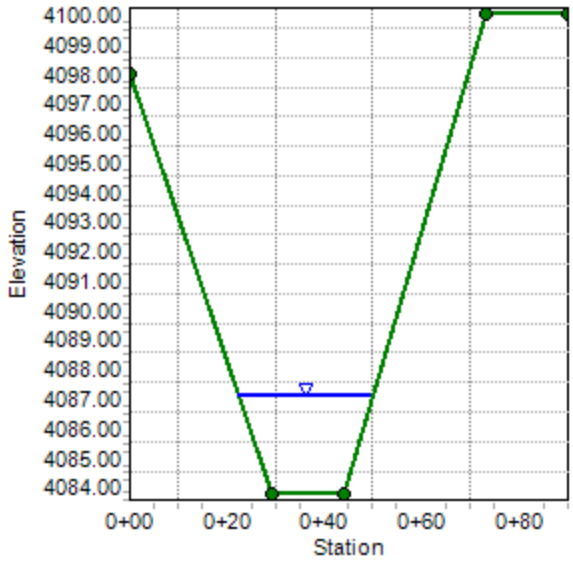
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 3.28 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 6

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4098.00 |
| 0+29 | 4083.76 |
| 0+44 | 4083.76 |
| 0+73 | 4100.00 |
| 0+90 | 4100.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4098.00) | (0+29, 4083.76) | 0.080 |
| (0+29, 4083.76) | (0+44, 4083.76) | 0.030 |
| (0+44, 4083.76) | (0+73, 4100.00) | 0.080 |
| (0+73, 4100.00) | (0+90, 4100.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4083.76 | | 0.00 | | |
| 5.00 | 4084.08 | 1.00 | 5.00 | 16.38 | 16.23 |
| 10.00 | 4084.27 | 1.23 | 8.12 | 17.19 | 16.94 |
| 15.00 | 4084.43 | 1.38 | 10.86 | 17.88 | 17.55 |
| 20.00 | 4084.57 | 1.49 | 13.41 | 18.50 | 18.10 |
| 25.00 | 4084.70 | 1.58 | 15.83 | 19.07 | 18.60 |

# Rating Table for Proposed East Channel Cross Section 6

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 30.00 | 4084.83 | 1.65 | 18.15 | 19.60 | 19.07 |
| 35.00 | 4084.94 | 1.72 | 20.40 | 20.10 | 19.52 |
| 40.00 | 4085.05 | 1.77 | 22.59 | 20.58 | 19.94 |
| 45.00 | 4085.16 | 1.82 | 24.72 | 21.04 | 20.35 |
| 50.00 | 4085.26 | 1.87 | 26.80 | 21.47 | 20.73 |
| 55.00 | 4085.36 | 1.91 | 28.84 | 21.89 | 21.11 |
| 60.00 | 4085.45 | 1.94 | 30.86 | 22.30 | 21.47 |
| 65.00 | 4085.54 | 1.98 | 32.83 | 22.70 | 21.82 |
| 70.00 | 4085.63 | 2.01 | 34.78 | 23.08 | 22.16 |
| 75.00 | 4085.72 | 2.04 | 36.70 | 23.45 | 22.48 |
| 80.00 | 4085.80 | 2.07 | 38.59 | 23.81 | 22.80 |
| 85.00 | 4085.88 | 2.10 | 40.47 | 24.16 | 23.12 |
| 90.00 | 4085.96 | 2.13 | 42.32 | 24.51 | 23.42 |
| 95.00 | 4086.04 | 2.15 | 44.15 | 24.84 | 23.72 |
| 100.00 | 4086.12 | 2.18 | 45.96 | 25.17 | 24.01 |
| 105.00 | 4086.19 | 2.20 | 47.75 | 25.49 | 24.29 |
| 110.00 | 4086.26 | 2.22 | 49.52 | 25.80 | 24.57 |
| 115.00 | 4086.33 | 2.24 | 51.28 | 26.11 | 24.84 |
| 120.00 | 4086.40 | 2.26 | 53.03 | 26.41 | 25.11 |
| 125.00 | 4086.47 | 2.28 | 54.76 | 26.71 | 25.37 |
| 130.00 | 4086.54 | 2.30 | 56.47 | 27.00 | 25.63 |
| 135.00 | 4086.61 | 2.32 | 58.18 | 27.28 | 25.88 |
| 140.00 | 4086.67 | 2.34 | 59.87 | 27.56 | 26.13 |
| 145.00 | 4086.74 | 2.36 | 61.55 | 27.84 | 26.37 |
| 150.00 | 4086.80 | 2.37 | 63.21 | 28.11 | 26.61 |
| 155.00 | 4086.86 | 2.39 | 64.87 | 28.38 | 26.85 |
| 160.00 | 4086.92 | 2.41 | 66.51 | 28.64 | 27.08 |
| 165.00 | 4086.98 | 2.42 | 68.14 | 28.90 | 27.31 |
| 170.00 | 4087.04 | 2.44 | 69.76 | 29.16 | 27.54 |
| 175.00 | 4087.10 | 2.45 | 71.38 | 29.41 | 27.76 |
| 180.00 | 4087.16 | 2.47 | 72.99 | 29.66 | 27.98 |
| 185.00 | 4087.21 | 2.48 | 74.58 | 29.90 | 28.20 |
| 190.00 | 4087.27 | 2.49 | 76.16 | 30.14 | 28.41 |
| 195.00 | 4087.32 | 2.51 | 77.74 | 30.38 | 28.62 |
| 200.00 | 4087.38 | 2.52 | 79.31 | 30.62 | 28.83 |

# Worksheet for Proposed East Channel Cross Section 7

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4094.00 |
| 0+22 | 4083.13 |
| 0+37 | 4083.13 |
| 0+59 | 4094.00 |
| 0+70 | 4094.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4094.00) | (0+22, 4083.13) | 0.080 |
| (0+22, 4083.13) | (0+37, 4083.13) | 0.030 |
| (0+37, 4083.13) | (0+59, 4094.00) | 0.080 |
| (0+59, 4094.00) | (0+70, 4094.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.27 | ft |
| Elevation Range | 4083.13 to 4094.00 ft | |
| Flow Area | 70.69 | ft² |
| Wetted Perimeter | 29.76 | ft |
| Hydraulic Radius | 2.37 | ft |

# Worksheet for Proposed East Channel Cross Section 7

## Results

| | | | |
|---|---|---|---|
| Top Width | | 28.24 | ft |
| Normal Depth | | 3.27 | ft |
| Critical Depth | | 1.48 | ft |
| Critical Slope | | 0.05100 | ft/ft |
| Velocity | | 2.41 | ft/s |
| Velocity Head | | 0.09 | ft |
| Specific Energy | | 3.36 | ft |
| Froude Number | | 0.27 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.27 | ft |
| Critical Depth | 1.48 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.05100 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 7

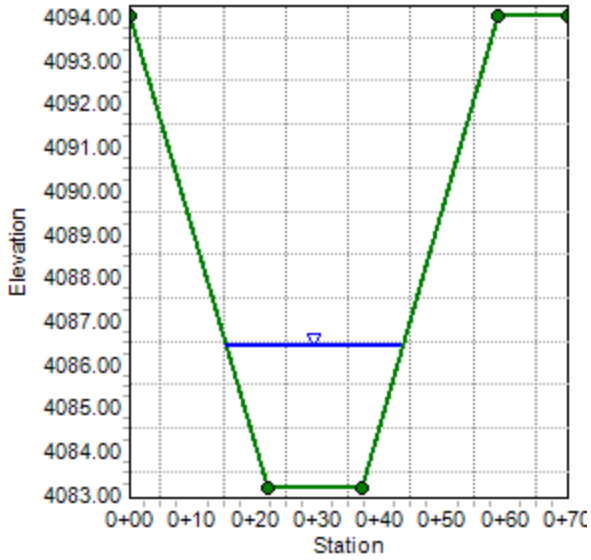
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 3.27 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 7

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4094.00 |
| 0+22 | 4083.13 |
| 0+37 | 4083.13 |
| 0+59 | 4094.00 |
| 0+70 | 4094.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4094.00) | (0+22, 4083.13) | 0.080 |
| (0+22, 4083.13) | (0+37, 4083.13) | 0.030 |
| (0+37, 4083.13) | (0+59, 4094.00) | 0.080 |
| (0+59, 4094.00) | (0+70, 4094.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4083.13 | | 0.00 | | |
| 5.00 | 4083.45 | 0.99 | 5.04 | 16.45 | 16.30 |
| 10.00 | 4083.64 | 1.22 | 8.18 | 17.30 | 17.07 |
| 15.00 | 4083.80 | 1.37 | 10.96 | 18.03 | 17.71 |
| 20.00 | 4083.94 | 1.48 | 13.55 | 18.68 | 18.30 |
| 25.00 | 4084.08 | 1.56 | 16.00 | 19.27 | 18.83 |

# Rating Table for Proposed East Channel Cross Section 7

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 30.00 | 4084.20 | 1.63 | 18.36 | 19.83 | 19.33 |
| 35.00 | 4084.32 | 1.70 | 20.64 | 20.36 | 19.80 |
| 40.00 | 4084.43 | 1.75 | 22.86 | 20.86 | 20.25 |
| 45.00 | 4084.53 | 1.80 | 25.02 | 21.33 | 20.68 |
| 50.00 | 4084.63 | 1.84 | 27.14 | 21.79 | 21.09 |
| 55.00 | 4084.73 | 1.88 | 29.21 | 22.23 | 21.48 |
| 60.00 | 4084.83 | 1.92 | 31.25 | 22.65 | 21.86 |
| 65.00 | 4084.92 | 1.95 | 33.25 | 23.06 | 22.23 |
| 70.00 | 4085.00 | 1.99 | 35.23 | 23.46 | 22.59 |
| 75.00 | 4085.09 | 2.02 | 37.17 | 23.85 | 22.93 |
| 80.00 | 4085.17 | 2.05 | 39.09 | 24.22 | 23.27 |
| 85.00 | 4085.25 | 2.07 | 40.99 | 24.59 | 23.60 |
| 90.00 | 4085.33 | 2.10 | 42.87 | 24.95 | 23.92 |
| 95.00 | 4085.41 | 2.12 | 44.72 | 25.29 | 24.23 |
| 100.00 | 4085.49 | 2.15 | 46.56 | 25.63 | 24.53 |
| 105.00 | 4085.56 | 2.17 | 48.37 | 25.97 | 24.83 |
| 110.00 | 4085.63 | 2.19 | 50.17 | 26.29 | 25.12 |
| 115.00 | 4085.70 | 2.21 | 51.96 | 26.61 | 25.41 |
| 120.00 | 4085.77 | 2.23 | 53.73 | 26.92 | 25.69 |
| 125.00 | 4085.84 | 2.25 | 55.48 | 27.23 | 25.96 |
| 130.00 | 4085.91 | 2.27 | 57.22 | 27.53 | 26.23 |
| 135.00 | 4085.97 | 2.29 | 58.94 | 27.83 | 26.50 |
| 140.00 | 4086.03 | 2.31 | 60.65 | 28.12 | 26.76 |
| 145.00 | 4086.10 | 2.33 | 62.35 | 28.40 | 27.01 |
| 150.00 | 4086.16 | 2.34 | 64.04 | 28.68 | 27.27 |
| 155.00 | 4086.22 | 2.36 | 65.72 | 28.96 | 27.51 |
| 160.00 | 4086.28 | 2.37 | 67.39 | 29.23 | 27.76 |
| 165.00 | 4086.34 | 2.39 | 69.04 | 29.50 | 28.00 |
| 170.00 | 4086.40 | 2.41 | 70.69 | 29.76 | 28.24 |
| 175.00 | 4086.46 | 2.42 | 72.32 | 30.02 | 28.47 |
| 180.00 | 4086.51 | 2.43 | 73.94 | 30.28 | 28.70 |
| 185.00 | 4086.57 | 2.45 | 75.56 | 30.53 | 28.93 |
| 190.00 | 4086.63 | 2.46 | 77.17 | 30.78 | 29.15 |
| 195.00 | 4086.68 | 2.48 | 78.76 | 31.03 | 29.37 |
| 200.00 | 4086.73 | 2.49 | 80.34 | 31.27 | 29.59 |

# Worksheet for Proposed East Channel Cross Section 8

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4088.00 |
| 0+22 | 4082.50 |
| 0+37 | 4082.50 |
| 0+59 | 4087.50 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4088.00) | (0+22, 4082.50) | 0.045 |
| (0+22, 4082.50) | (0+37, 4082.50) | 0.030 |
| (0+37, 4082.50) | (0+59, 4087.50) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.36 | ft |
| Elevation Range | 4082.50 to 4088.00 ft | |
| Flow Area | 58.63 | ft² |
| Wetted Perimeter | 35.34 | ft |
| Hydraulic Radius | 1.66 | ft |
| Top Width | 34.78 | ft |
| Normal Depth | 2.36 | ft |

# Worksheet for Proposed East Channel Cross Section 8

## Results

| | | | |
|---|---|---|---|
| Critical Depth | | 1.38 | ft |
| Critical Slope | | 0.02232 | ft/ft |
| Velocity | | 2.90 | ft/s |
| Velocity Head | | 0.13 | ft |
| Specific Energy | | 2.49 | ft |
| Froude Number | | 0.39 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.36 | ft |
| Critical Depth | 1.38 | ft |
| Channel Slope | 0.00300 | ft/ft |
| Critical Slope | 0.02232 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 8

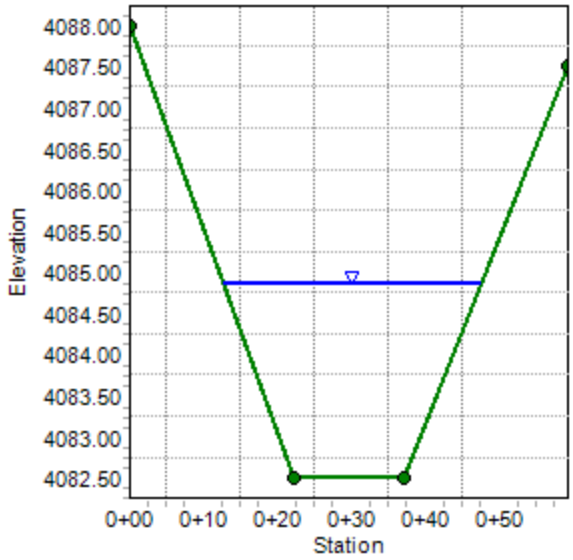
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Normal Depth | 2.36 | ft |
| Discharge | 170.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 8

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00300 | ft/ft |
| Discharge | 170.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4088.00 |
| 0+22 | 4082.50 |
| 0+37 | 4082.50 |
| 0+59 | 4087.50 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4088.00) | (0+22, 4082.50) | 0.045 |
| (0+22, 4082.50) | (0+37, 4082.50) | 0.030 |
| (0+37, 4082.50) | (0+59, 4087.50) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4082.50 | | 0.00 | | |
| 5.00 | 4082.79 | 1.05 | 4.77 | 17.54 | 17.47 |
| 10.00 | 4082.95 | 1.32 | 7.59 | 18.88 | 18.77 |
| 15.00 | 4083.08 | 1.50 | 10.02 | 19.97 | 19.83 |
| 20.00 | 4083.19 | 1.63 | 12.25 | 20.92 | 20.76 |
| 25.00 | 4083.28 | 1.74 | 14.35 | 21.77 | 21.59 |
| 30.00 | 4083.37 | 1.84 | 16.33 | 22.55 | 22.35 |
| 35.00 | 4083.46 | 1.92 | 18.24 | 23.28 | 23.05 |

# Rating Table for Proposed East Channel Cross Section 8

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 40.00 | 4083.54 | 1.99 | 20.09 | 23.96 | 23.72 |
| 45.00 | 4083.61 | 2.06 | 21.88 | 24.61 | 24.34 |
| 50.00 | 4083.68 | 2.12 | 23.63 | 25.22 | 24.94 |
| 55.00 | 4083.75 | 2.17 | 25.33 | 25.80 | 25.51 |
| 60.00 | 4083.82 | 2.22 | 27.00 | 26.36 | 26.05 |
| 65.00 | 4083.88 | 2.27 | 28.64 | 26.90 | 26.57 |
| 70.00 | 4083.94 | 2.31 | 30.24 | 27.41 | 27.08 |
| 75.00 | 4084.00 | 2.36 | 31.82 | 27.91 | 27.56 |
| 80.00 | 4084.05 | 2.40 | 33.38 | 28.40 | 28.03 |
| 85.00 | 4084.11 | 2.43 | 34.92 | 28.87 | 28.49 |
| 90.00 | 4084.16 | 2.47 | 36.43 | 29.32 | 28.93 |
| 95.00 | 4084.21 | 2.51 | 37.92 | 29.76 | 29.36 |
| 100.00 | 4084.26 | 2.54 | 39.39 | 30.19 | 29.78 |
| 105.00 | 4084.31 | 2.57 | 40.86 | 30.61 | 30.19 |
| 110.00 | 4084.36 | 2.60 | 42.30 | 31.02 | 30.59 |
| 115.00 | 4084.40 | 2.63 | 43.73 | 31.43 | 30.98 |
| 120.00 | 4084.45 | 2.66 | 45.14 | 31.82 | 31.36 |
| 125.00 | 4084.49 | 2.69 | 46.54 | 32.20 | 31.73 |
| 130.00 | 4084.54 | 2.71 | 47.93 | 32.58 | 32.10 |
| 135.00 | 4084.58 | 2.74 | 49.31 | 32.94 | 32.46 |
| 140.00 | 4084.62 | 2.76 | 50.67 | 33.31 | 32.81 |
| 145.00 | 4084.66 | 2.79 | 52.02 | 33.66 | 33.15 |
| 150.00 | 4084.70 | 2.81 | 53.36 | 34.01 | 33.49 |
| 155.00 | 4084.74 | 2.83 | 54.70 | 34.35 | 33.82 |
| 160.00 | 4084.78 | 2.86 | 56.02 | 34.68 | 34.15 |
| 165.00 | 4084.82 | 2.88 | 57.33 | 35.01 | 34.47 |
| 170.00 | 4084.86 | 2.90 | 58.63 | 35.34 | 34.78 |
| 175.00 | 4084.89 | 2.92 | 59.92 | 35.66 | 35.10 |
| 180.00 | 4084.93 | 2.94 | 61.21 | 35.97 | 35.40 |
| 185.00 | 4084.96 | 2.96 | 62.49 | 36.28 | 35.70 |
| 190.00 | 4085.00 | 2.98 | 63.76 | 36.59 | 36.00 |
| 195.00 | 4085.04 | 3.00 | 65.02 | 36.89 | 36.29 |
| 200.00 | 4085.07 | 3.02 | 66.27 | 37.19 | 36.58 |

# Worksheet for Proposed East Channel Cross Section 9

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00530 | ft/ft |
| Discharge | 338.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4080.00 |
| 0+35 | 4078.00 |
| 0+40 | 4076.00 |
| 0+55 | 4076.00 |
| 0+70 | 4078.00 |
| 0+85 | 4080.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4080.00) | (0+35, 4078.00) | 0.045 |
| (0+35, 4078.00) | (0+40, 4076.00) | 0.045 |
| (0+40, 4076.00) | (0+55, 4076.00) | 0.030 |
| (0+55, 4076.00) | (0+70, 4078.00) | 0.045 |
| (0+70, 4078.00) | (0+85, 4080.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.97 | ft |
| Elevation Range | 4076.00 to 4080.00 ft | |
| Flow Area | 95.44 | ft² |

# Worksheet for Proposed East Channel Cross Section 9

## Results

| | | | |
|---|---|---|---|
| Wetted Perimeter | | 59.75 | ft |
| Hydraulic Radius | | 1.60 | ft |
| Top Width | | 59.14 | ft |
| Normal Depth | | 2.97 | ft |
| Critical Depth | | 2.00 | ft |
| Critical Slope | | 0.02300 | ft/ft |
| Velocity | | 3.54 | ft/s |
| Velocity Head | | 0.19 | ft |
| Specific Energy | | 3.16 | ft |
| Froude Number | | 0.49 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.97 | ft |
| Critical Depth | 2.00 | ft |
| Channel Slope | 0.00530 | ft/ft |
| Critical Slope | 0.02300 | ft/ft |

# Cross Section for Proposed East Channel Cross Section 9

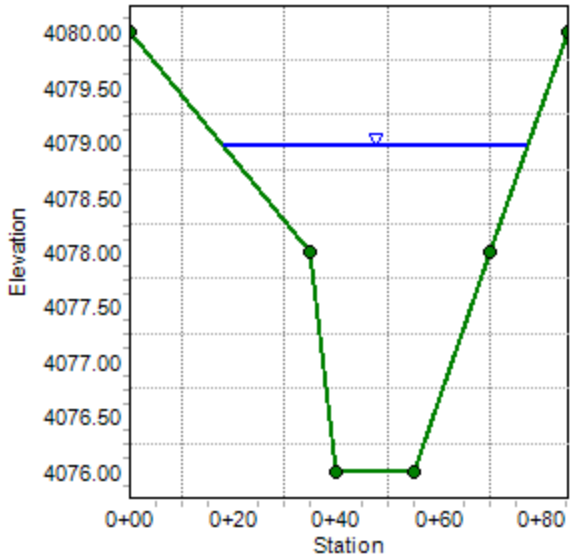
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00530 | ft/ft |
| Normal Depth | 2.97 | ft |
| Discharge | 338.00 | ft³/s |

## Cross Section Image



# Rating Table for Proposed East Channel Cross Section 9

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00530 | ft/ft |
| Discharge | 338.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4080.00 |
| 0+35 | 4078.00 |
| 0+40 | 4076.00 |
| 0+55 | 4076.00 |
| 0+70 | 4078.00 |
| 0+85 | 4080.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4080.00) | (0+35, 4078.00) | 0.045 |
| (0+35, 4078.00) | (0+40, 4076.00) | 0.045 |
| (0+40, 4076.00) | (0+55, 4076.00) | 0.030 |
| (0+55, 4076.00) | (0+70, 4078.00) | 0.045 |
| (0+70, 4078.00) | (0+85, 4080.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4076.00 | | 0.00 | | |
| 10.00 | 4076.38 | 1.56 | 6.40 | 18.89 | 18.79 |
| 20.00 | 4076.58 | 1.94 | 10.33 | 20.93 | 20.78 |
| 30.00 | 4076.74 | 2.18 | 13.78 | 22.56 | 22.37 |

# Rating Table for Proposed East Channel Cross Section 9

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 40.00 | 4076.87 | 2.36 | 16.94 | 23.97 | 23.74 |
| 50.00 | 4077.00 | 2.51 | 19.92 | 25.23 | 24.97 |
| 60.00 | 4077.11 | 2.64 | 22.77 | 26.37 | 26.08 |
| 70.00 | 4077.21 | 2.75 | 25.50 | 27.42 | 27.11 |
| 80.00 | 4077.31 | 2.84 | 28.15 | 28.41 | 28.07 |
| 90.00 | 4077.40 | 2.93 | 30.71 | 29.33 | 28.97 |
| 100.00 | 4077.48 | 3.01 | 33.22 | 30.21 | 29.82 |
| 110.00 | 4077.56 | 3.08 | 35.67 | 31.04 | 30.63 |
| 120.00 | 4077.64 | 3.15 | 38.07 | 31.83 | 31.41 |
| 130.00 | 4077.71 | 3.22 | 40.42 | 32.59 | 32.15 |
| 140.00 | 4077.79 | 3.28 | 42.73 | 33.32 | 32.86 |
| 150.00 | 4077.85 | 3.33 | 45.00 | 34.02 | 33.54 |
| 160.00 | 4077.92 | 3.39 | 47.23 | 34.70 | 34.20 |
| 170.00 | 4077.98 | 3.44 | 49.44 | 35.35 | 34.84 |
| 180.00 | 4078.07 | 3.43 | 52.50 | 37.27 | 36.74 |
| 190.00 | 4078.15 | 3.41 | 55.71 | 39.40 | 38.86 |
| 200.00 | 4078.23 | 3.40 | 58.78 | 41.33 | 40.79 |
| 210.00 | 4078.30 | 3.40 | 61.76 | 43.13 | 42.58 |
| 220.00 | 4078.37 | 3.40 | 64.65 | 44.80 | 44.24 |
| 230.00 | 4078.43 | 3.41 | 67.48 | 46.38 | 45.82 |
| 240.00 | 4078.49 | 3.42 | 70.26 | 47.87 | 47.31 |
| 250.00 | 4078.55 | 3.43 | 72.98 | 49.29 | 48.72 |
| 260.00 | 4078.60 | 3.44 | 75.66 | 50.65 | 50.08 |
| 270.00 | 4078.66 | 3.45 | 78.30 | 51.96 | 51.38 |
| 280.00 | 4078.71 | 3.46 | 80.92 | 53.22 | 52.64 |
| 290.00 | 4078.75 | 3.47 | 83.47 | 54.43 | 53.84 |
| 300.00 | 4078.80 | 3.49 | 86.02 | 55.60 | 55.01 |
| 310.00 | 4078.85 | 3.50 | 88.53 | 56.74 | 56.14 |
| 320.00 | 4078.89 | 3.52 | 91.02 | 57.84 | 57.24 |
| 330.00 | 4078.93 | 3.53 | 93.49 | 58.91 | 58.30 |
| 340.00 | 4078.97 | 3.54 | 95.93 | 59.95 | 59.34 |

Job No. 035-230142

# Computation

| | | |
|---|---|---|
| Project: Rincon Drainage Master Plan | Computed: MTH | Date: 10-16-2015 |
| Subject: Proposed East Channel Basin | Checked: DAP | Date: 1-27-16 |
| Task: Drainage Basin Volume Calculations | Sheet: 1 of 1 | |

## VOLUME EXCAVATED

Conic Section Formula:

$$V_{1\text{-}2} = ( ( E_1 - E_2 ) / 3 ) * ( A_1 + A_2 + ( A_1 * A_2 )^{1/2} )$$

| | |
|---|---|
| $V_{1\text{-}2}$ | Storage Volume in cubic feet. |
| $A_1$ | Top surface area in square feet. |
| $A_2$ | Bottom surface area in square feet. |
| $E_1$ | Top elevation in feet. |
| $E_2$ | Bottom elevation in feet. |

| *RETENTION BASIN* | *ELEVATION* | *SURFACE AREA* | *VOLUME PROVIDED* | | *Excavation:* |
|---|---|---|---|---|---|
| | *(ft)* | *($ft^2$)* | *($ft^3$)* | *(Ac-ft)* | *($yd^3$)* |
| ***BASIN*** | 4,080 | 63,475 | 115,115 | 2.64 | |
| ***6:1 Side Slopes*** | 4,078 | 51,836 | 92,775 | 2.13 | |
| | 4,076 | 41,145 | | | |
| | | *Subtotal:* | 207,890 | 4.77 | **7,699** |

**** 4075 to 4076 will be used for sediment deposition***

# Worksheet for Proposed Downstream West Channel

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00500 | ft/ft |
| Left Side Slope | 4.00 | ft/ft (H:V) |
| Right Side Slope | 4.00 | ft/ft (H:V) |
| Bottom Width | 20.00 | ft |
| Discharge | 618.00 | $ft^3/s$ |

## Results

| | | |
|---|---|---|
| Normal Depth | 3.42 | ft |
| Flow Area | 115.18 | $ft^2$ |
| Wetted Perimeter | 48.20 | ft |
| Hydraulic Radius | 2.39 | ft |
| Top Width | 47.36 | ft |
| Critical Depth | 2.59 | ft |
| Critical Slope | 0.01464 | ft/ft |
| Velocity | 5.37 | ft/s |
| Velocity Head | 0.45 | ft |
| Specific Energy | 3.87 | ft |
| Froude Number | 0.61 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.42 | ft |
| Critical Depth | 2.59 | ft |
| Channel Slope | 0.00500 | ft/ft |

# Worksheet for Proposed Downstream West Channel

## GVF Output Data

| | | |
|---|---|---|
| Critical Slope | 0.01464 | ft/ft |

# Rating Table for Proposed Downstream West Channel

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00500 | ft/ft |
| Left Side Slope | 4.00 | ft/ft (H:V) |
| Right Side Slope | 4.00 | ft/ft (H:V) |
| Bottom Width | 20.00 | ft |
| Discharge | 618.00 | ft³/s |

| Discharge (ft³/s) | Normal Depth (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 400.00 | 2.73 | 4.74 | 84.36 | 42.50 | 41.83 |
| 420.00 | 2.80 | 4.81 | 87.35 | 43.09 | 42.40 |
| 440.00 | 2.87 | 4.87 | 90.29 | 43.66 | 42.95 |
| 460.00 | 2.94 | 4.94 | 93.20 | 44.21 | 43.49 |
| 480.00 | 3.00 | 5.00 | 96.08 | 44.75 | 44.01 |
| 500.00 | 3.07 | 5.05 | 98.93 | 45.28 | 44.53 |
| 520.00 | 3.13 | 5.11 | 101.74 | 45.80 | 45.03 |
| 540.00 | 3.19 | 5.17 | 104.53 | 46.31 | 45.53 |
| 560.00 | 3.25 | 5.22 | 107.30 | 46.81 | 46.01 |
| 580.00 | 3.31 | 5.27 | 110.04 | 47.30 | 46.48 |
| 600.00 | 3.37 | 5.32 | 112.75 | 47.78 | 46.95 |
| 620.00 | 3.43 | 5.37 | 115.44 | 48.25 | 47.40 |
| 640.00 | 3.48 | 5.42 | 118.12 | 48.71 | 47.85 |
| 660.00 | 3.54 | 5.47 | 120.76 | 49.16 | 48.29 |
| 680.00 | 3.59 | 5.51 | 123.39 | 49.61 | 48.73 |
| 700.00 | 3.64 | 5.56 | 125.99 | 50.05 | 49.15 |

# Cross Section for Proposed Downstream West Channel

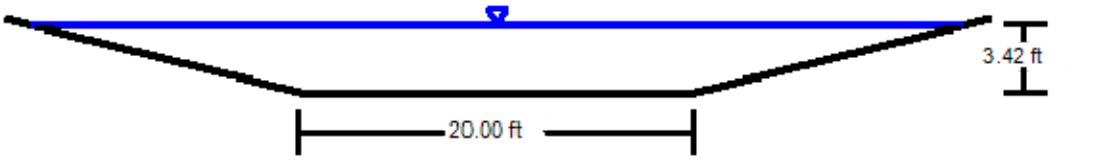
## Project Description

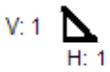
| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.035 | |
| Channel Slope | 0.00500 | ft/ft |
| Normal Depth | 3.42 | ft |
| Left Side Slope | 4.00 | ft/ft (H:V) |
| Right Side Slope | 4.00 | ft/ft (H:V) |
| Bottom Width | 20.00 | ft |
| Discharge | 618.00 | ft³/s |

## Cross Section Image



| | | | |
|---|---|---|---|
| Project: | Rincon Drainage Master Plan | Computed: | MTH |
| Subject: | Catch Basin Calculations | Checked: | DAP |
| Task: | Capcity of Drop Inlets for I-25 Roadside Ditches | | |
| Job #: | 035-230142 | | |

| Catch Basin Number (CB-#) | Contributing Drainage Area (RN-#) | Clogging Factor (Cg/Cc) | Weir Coeff. | 25 YEAR | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Total Flow Q (cfs) | Pond Depth d $(ft)^2$ | Perimete P (ft) | Capacity Qig[1] (cfs) | # Grates |
| **CB-1** | RN4 | 0.50 | 1.66 | 10.0 | 0.75 | 16.00 | **8.6** | single |
| **CB-1** | RN5 | 0.50 | 1.66 | 6.0 | 0.75 | 16.00 | **8.6** | single |
| **COMBINED** | n/a | 0.50 | 1.66 | 16.0 | 0.75 | 32.00 | **17.3** | double |

**For Design:**

For catch basin, use NMDOT 623-17 (4' x 4' Shoulder Drop Inlet)
For grate, use NMDOT 623-17 (4' x 4' Shoulder Drop Inlet)

**Notes:**

[1] Qig = Flow intercepted by grated inlet portion:

**$Qig = Cw\ P\ (d^{1.5})\ Cg$** (Weir Flow Equation - Equation 5-9 of NMDOT Drainage Manual Volume II)

Where: Qig = Amount of street flow intercepted by grate, cfs.
Cw = Weir Coefficient.
P = Perimeter of grate (for single)
Cg = Clogging factor = 0.5 for grate. (Added to NMDOT equation to account for clogging)

| | | | |
|---|---|---|---|
| Computed: | DGH | Date: | 05.25.214 |
| Checked: | SDK | Date: | 06.06.2014 |

## HEC-HMS Route Hydraulic Parameters

| | Profile | | | | | Cross Section Characteristics | | | | Manning's Roughness Coefficient | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Route ID | High Elevation (ft) [a] | Low Elevation (ft) [a] | Length (ft) [b] | Length [HMS(ft)] [c] | Slope (ft/ft) | Geometry Type | Total Width (ft) | Left Bank [STA (ft)] [d] | Right Bank [STA (ft)] [d] | Manning's "n" (Left Overbank) [d] | Manning's "n" (Main Channel) [d] | Manning's "n" (Right Overbank) [d] |
| F1R3 | 4093 | 4087 | 415 | 1420 | 0.013 | Irregular Channel | 105 | 42 | 62 | 0.070 | 0.030 | 0.070 |
| F2R3 | 4094 | 4087 | 392 | 1434 | 0.018 | Irregular Channel | 105 | 42 | 62 | 0.070 | 0.030 | 0.070 |
| F3R4 | 4088 | 4084 | 447 | 765 | 0.009 | Irregular Channel | 26 | 8 | 18 | 0.045 | 0.045 | 0.016 |
| F4R4 | 4092 | 4082 | 234 | 284 | 0.043 | Irregular Channel | 26 | 5 | 14 | 0.070 | 0.030 | 0.070 |
| F5R1 | 4096 | 4082 | 491 | 491 | 0.029 | Irregular Channel | 35 | 10 | 21 | 0.070 | 0.045 | 0.070 |
| F6R1 | 4098 | 4082 | 419 | 419 | 0.038 | Irregular Channel | 88 | 42 | 61 | 0.070 | 0.045 | 0.070 |
| F7R1 | 4096 | 4082 | 302 | 302 | 0.046 | Irregular Channel | 88 | 42 | 61 | 0.070 | 0.045 | 0.070 |
| F8R1 | 4094 | 4082 | 345 | 345 | 0.035 | Irregular Channel | 97 | 59 | 84 | 0.025 | 0.045 | 0.025 |
| F9F10 | 4047 | 4039 | 283 | 452 | 0.028 | Irregular Channel | 19 | 0 | 19 | 0.070 | 0.030 | 0.070 |
| R10R11 | 4061 | 4059 | 298 | 1144 | 0.008 | Irregular Channel | 53 | 23 | 34 | 0.070 | 0.030 | 0.070 |
| R11R16 | 4054 | 4050 | 435 | 855 | 0.009 | Irregular Channel | 63 | 31 | 37 | 0.070 | 0.030 | 0.070 |
| R12R16 | 4064 | 4056 | 84 | 87 | 0.093 | Irregular Channel | 21 | 6 | 14 | 0.070 | 0.050 | 0.070 |
| R13R16 | 4062 | 4049 | 298 | 298 | 0.044 | Irregular Channel | 43 | 20 | 32 | 0.070 | 0.070 | 0.070 |
| R14R17 | 4052 | 4046 | 367 | 663 | 0.015 | Irregular Channel | 51 | 27 | 36 | 0.070 | 0.030 | 0.070 |
| R15R18 | 4064 | 4042 | 810 | 846 | 0.027 | Irregular Channel | 173 | 25 | 60 | 0.070 | 0.030 | 0.070 |
| R16R17 | 4048 | 4046 | 348 | 633 | 0.007 | Irregular Channel | 100 | 35 | 47 | 0.070 | 0.030 | 0.070 |
| R19R20 | 4042 | 4040 | 430 | 816 | 0.005 | Roadway (Typical, Gravel) | 42 | 0 | 40 | 0.025 | 0.025 | 0.025 |
| R1R2 | 4082 | 4076 | 340 | 340 | 0.018 | Irregular Channel | 52 | 14 | 25 | 0.070 | 0.045 | 0.070 |
| R20R21 | 4041 | 4040 | 450 | 987 | 0.002 | Irregular Channel | 50 | 0 | 50 | 0.060 | 0.060 | 0.060 |
| R3R10 | 4075 | 4069 | 431 | 546 | 0.014 | Irregular Channel | 38 | 17 | 31 | 0.070 | 0.030 | 0.070 |
| R4R7 | 4078 | 4073 | 198 | 603 | 0.028 | Irregular Channel | 26 | 11 | 15 | 0.030 | 0.045 | 0.030 |
| R5R7 | 4074 | 4070 | 318 | 318 | 0.011 | Irregular Channel | 55 | 0 | 55 | 0.030 | 0.030 | 0.030 |
| R6R8 | 4072 | 4070 | 360 | 360 | 0.006 | Roadway (Typical, Asphalt) | 32 | 0 | 32 | 0.016 | 0.016 | 0.016 |
| R3R7R10B | 4072 | 4066 | 187 | 187 | 0.032 | Irregular Channel | 28 | 5 | 15 | 0.070 | 0.030 | 0.070 |
| R8R9 | 4070 | 4069 | 306 | 306 | 0.003 | Roadway (Typical, Asphalt) | 22 | 0 | 22 | 0.016 | 0.016 | 0.016 |
| R9R10 | 4069 | 4068 | 482 | 482 | 0.001 | Roadway (Typical, Asphalt) | 32 | 0 | 32 | 0.016 | 0.016 | 0.016 |
| R7R10A | 4076 | 4068 | 672 | 672 | 0.012 | Irregular Channel | 89 | 0 | 52 | 0.030 | 0.030 | 0.030 |
| R7R10B | 4073 | 4068 | 323 | 323 | 0.015 | Irregular Channel | 101 | 0 | 52 | 0.045 | 0.030 | 0.045 |
| R14R17_R16R17 | 4044 | 4042 | 329 | 329 | 0.006 | Irregular Channel | 121 | 8 | 62 | 0.070 | 0.030 | 0.070 |
| F3R4_F4R4 | 4081 | 4080 | 532 | 532 | 0.002 | Irregular Channel | 30 | 8 | 18 | 0.016 | 0.016 | 0.016 |

Notes

a - Elevation data derived from 2-foot contour GIS data provided by Dona Ana County.

b - This value represents the distance between elevation points utilized in the derivation of the average slope for each route.

c - This value represents the total distance of the reach. This value is the input for the length parameter within the HEC-HMS model.

d - Bank stations and associated roughness coefficients estimated through review of available aerial imagery and site photos. Roughness values derived from "Manning's n for Channels (Chow, 1959).

## Route ID: *F1R3*

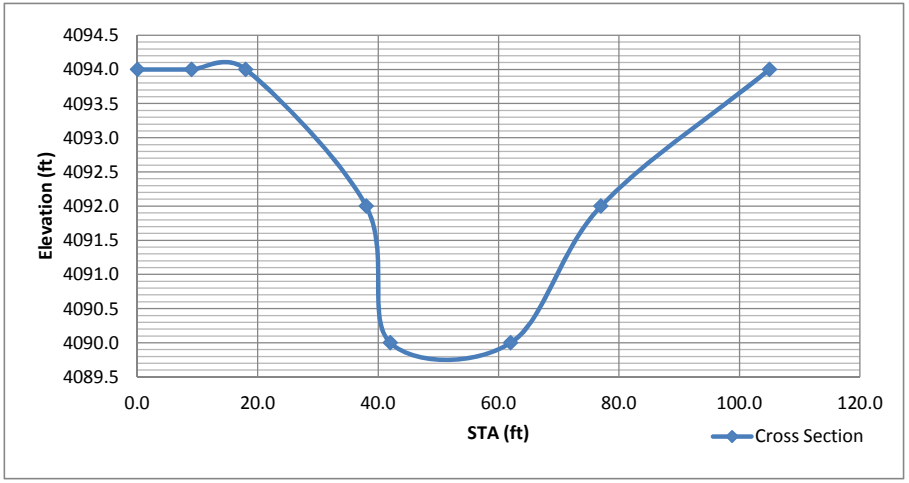
**Profile**

| | |
|---|---|
| High Elevation (ft) | 4093 |
| Low Elevation (ft) | 4087 |
| Length (ft) | 415 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel |
|---|---|
| Total Width (ft) | 105 |
| Left Bank (STA) | 42.0 |
| Right Bank (STA) | 62.0 |
| Left Overbank Manning's "n" | 0.070 |
| Main Channel Manning's "n" | 0.030 |
| Right Overbank Manning's "n" | 0.070 |

| STA (ft) | Elevation (ft) |
|---|---|
| 0.0 | 4094.0 |
| 9.0 | 4094.0 |
| 18.0 | 4094.0 |
| 38.0 | 4092.0 |
| 42.0 | 4090.0 |
| 62.0 | 4090.0 |
| 77.0 | 4092.0 |
| 105.0 | 4094.0 |



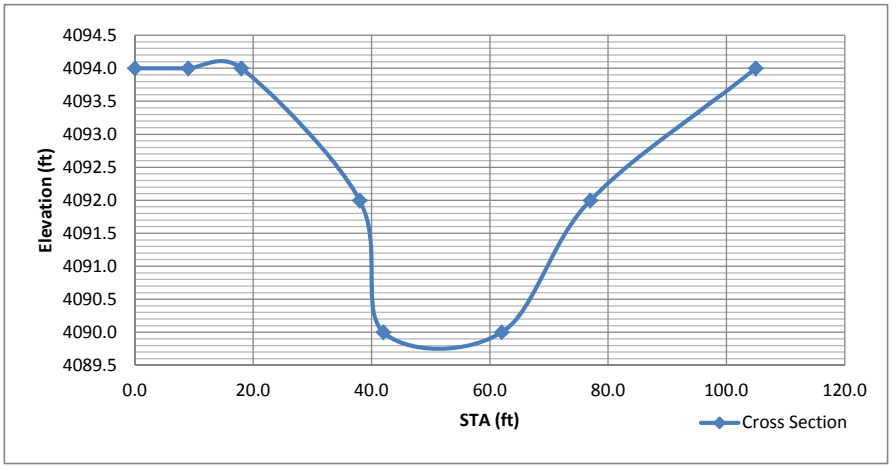
## Route ID: *F2R3*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4094 |
| Low Elevation (ft) | 4087 |
| Length (ft) | 392 |
| Slope (%) | 0.02 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 105 | 0.0 | 4094.0 |
| Left Bank (STA) | 42.0 | 9.0 | 4094.0 |
| Right Bank (STA) | 62.0 | 18.0 | 4094.0 |
| Left Overbank Manning's "n" | 0.070 | 38.0 | 4092.0 |
| Main Channel Manning's "n" | 0.030 | 42.0 | 4090.0 |
| Right Overbank Manning's "n" | 0.070 | 62.0 | 4090.0 |
| | | 77.0 | 4092.0 |
| | | 105.0 | 4094.0 |



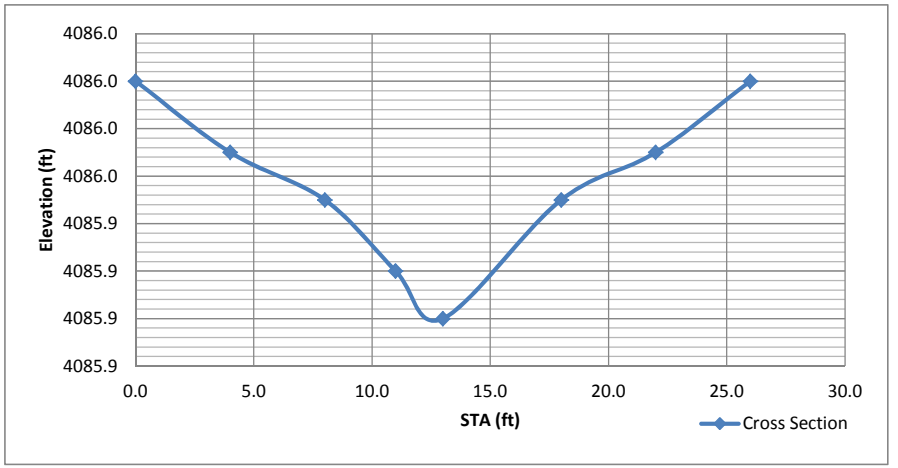
## Route ID: *F3R4*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4088 |
| Low Elevation (ft) | 4084 |
| Length (ft) | 447 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 26 | 0.0 | 4086.0 |
| Left Bank (STA) | 8.0 | 4.0 | 4086.0 |
| Right Bank (STA) | 18.0 | 8.0 | 4086.0 |
| Left Overbank Manning's "n" | 0.045 | 11.0 | 4085.9 |
| Main Channel Manning's "n" | 0.045 | 13.0 | 4085.9 |
| Right Overbank Manning's "n" | 0.016 | 18.0 | 4086.0 |
| | | 22.0 | 4086.0 |
| | | 26.0 | 4086.0 |



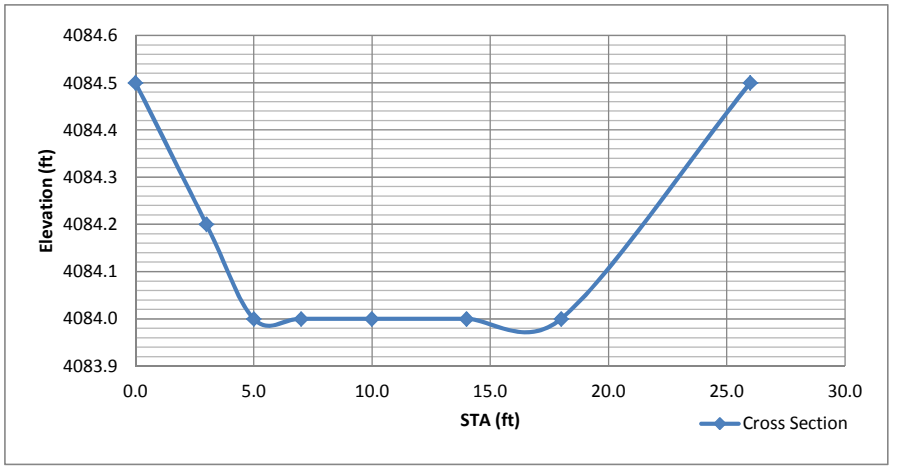
## Route ID: *F4R4*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4092 |
| Low Elevation (ft) | 4082 |
| Length (ft) | 234 |
| Slope (%) | 0.04 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 26 | 0.0 | 4084.5 |
| Left Bank (STA) | 5.0 | 3.0 | 4084.2 |
| Right Bank (STA) | 14.0 | 5.0 | 4084.0 |
| Left Overbank Manning's "n" | 0.070 | 7.0 | 4084.0 |
| Main Channel Manning's "n" | 0.030 | 10.0 | 4084.0 |
| Right Overbank Manning's "n" | 0.070 | 14.0 | 4084.0 |
| | | 18.0 | 4084.0 |
| | | 26.0 | 4084.5 |



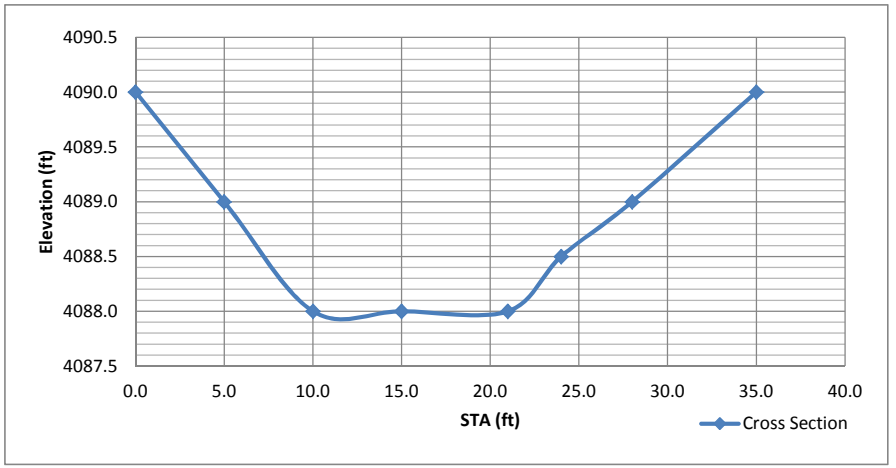
## Route ID: *F5R1*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4096 |
| Low Elevation (ft) | 4082 |
| Length (ft) | 491 |
| Slope (%) | 0.03 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 35 | 0.0 | 4090.0 |
| Left Bank (STA) | 10.0 | 5.0 | 4089.0 |
| Right Bank (STA) | 21.0 | 10.0 | 4088.0 |
| Left Overbank Manning's "n" | 0.070 | 15.0 | 4088.0 |
| Main Channel Manning's "n" | 0.045 | 21.0 | 4088.0 |
| Right Overbank Manning's "n" | 0.070 | 24.0 | 4088.5 |
| | | 28.0 | 4089.0 |
| | | 35.0 | 4090.0 |



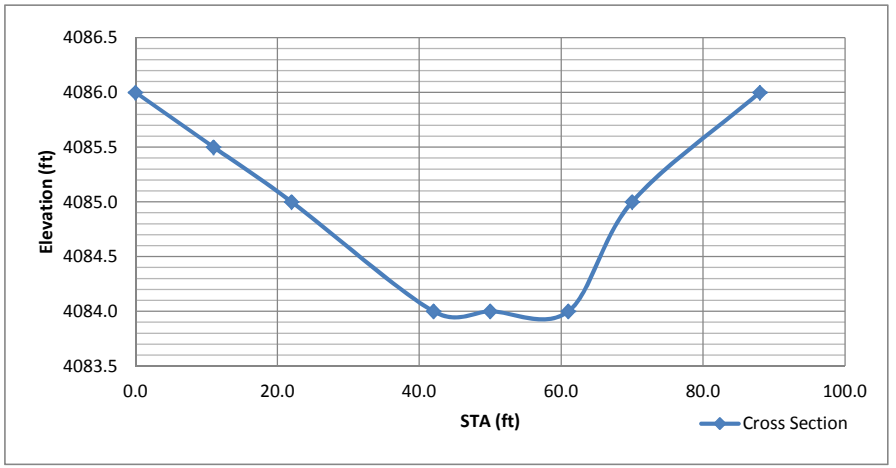
## Route ID: *F6R1*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4098 |
| Low Elevation (ft) | 4082 |
| Length (ft) | 419 |
| Slope (%) | 0.04 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 88 | 0.0 | 4086.0 |
| Left Bank (STA) | 42.0 | 11.0 | 4085.5 |
| Right Bank (STA) | 61.0 | 22.0 | 4085.0 |
| Left Overbank Manning's "n" | 0.070 | 42.0 | 4084.0 |
| Main Channel Manning's "n" | 0.045 | 50.0 | 4084.0 |
| Right Overbank Manning's "n" | 0.070 | 61.0 | 4084.0 |
| | | 70.0 | 4085.0 |
| | | 88.0 | 4086.0 |



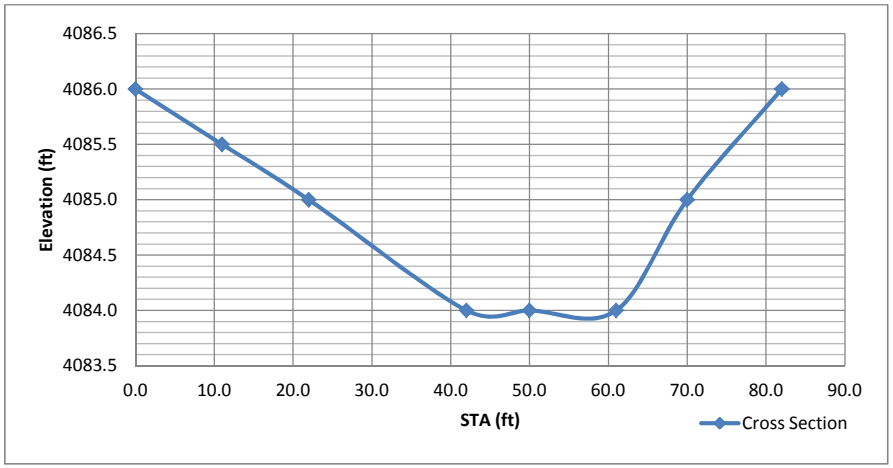
## Route ID: *F7R1*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4096 |
| Low Elevation (ft) | 4082 |
| Length (ft) | 302 |
| Slope (%) | 0.05 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 88 | 0.0 | 4086.0 |
| Left Bank (STA) | 42.0 | 11.0 | 4085.5 |
| Right Bank (STA) | 61.0 | 22.0 | 4085.0 |
| Left Overbank Manning's "n" | 0.070 | 42.0 | 4084.0 |
| Main Channel Manning's "n" | 0.045 | 50.0 | 4084.0 |
| Right Overbank Manning's "n" | 0.070 | 61.0 | 4084.0 |
| | | 70.0 | 4085.0 |
| | | 82.0 | 4086.0 |



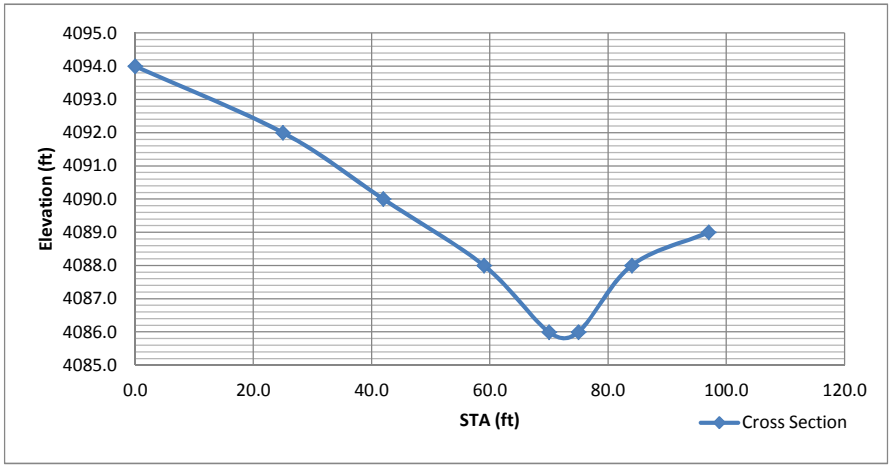
## Route ID: *F8R1*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4094 |
| Low Elevation (ft) | 4082 |
| Length (ft) | 345 |
| Slope (%) | 0.03 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 97 | 0.0 | 4094.0 |
| Left Bank (STA) | 59.0 | 25.0 | 4092.0 |
| Right Bank (STA) | 84.0 | 42.0 | 4090.0 |
| Left Overbank Manning's "n" | 0.025 | 59.0 | 4088.0 |
| Main Channel Manning's "n" | 0.045 | 70.0 | 4086.0 |
| Right Overbank Manning's "n" | 0.025 | 75.0 | 4086.0 |
| | | 84.0 | 4088.0 |
| | | 97.0 | 4089.0 |



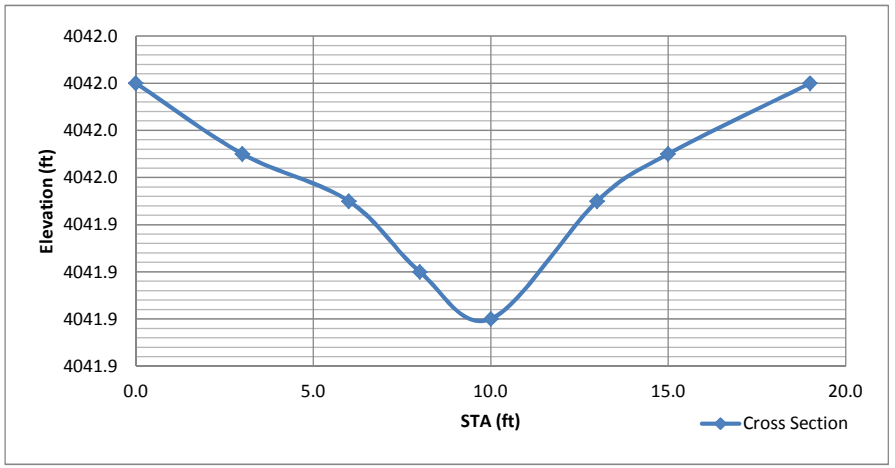
## Route ID: *F9R10*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4047 |
| Low Elevation (ft) | 4039 |
| Length (ft) | 283 |
| Slope (%) | 0.03 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 19 | 0.0 | 4042.0 |
| Left Bank (STA) | 0.0 | 3.0 | 4042.0 |
| Right Bank (STA) | 19.0 | 6.0 | 4042.0 |
| Left Overbank Manning's "n" | 0.070 | 8.0 | 4041.9 |
| Main Channel Manning's "n" | 0.030 | 10.0 | 4041.9 |
| Right Overbank Manning's "n" | 0.070 | 13.0 | 4042.0 |
| | | 15.0 | 4042.0 |
| | | 19.0 | 4042.0 |



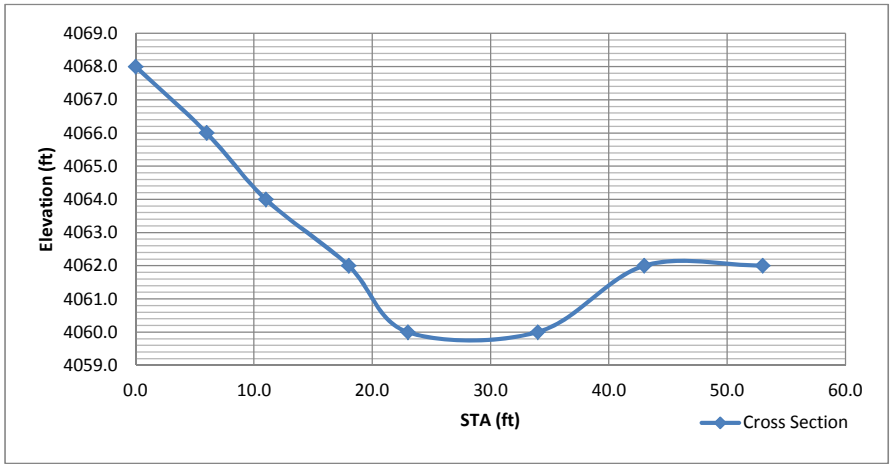
## Route ID: *R10R11*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4061 |
| Low Elevation (ft) | 4059 |
| Length (ft) | 298 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 53 | 0.0 | 4068.0 |
| Left Bank (STA) | 23.0 | 6.0 | 4066.0 |
| Right Bank (STA) | 34.0 | 11.0 | 4064.0 |
| Left Overbank Manning's "n" | 0.070 | 18.0 | 4062.0 |
| Main Channel Manning's "n" | 0.030 | 23.0 | 4060.0 |
| Right Overbank Manning's "n" | 0.070 | 34.0 | 4060.0 |
| | | 43.0 | 4062.0 |
| | | 53.0 | 4062.0 |



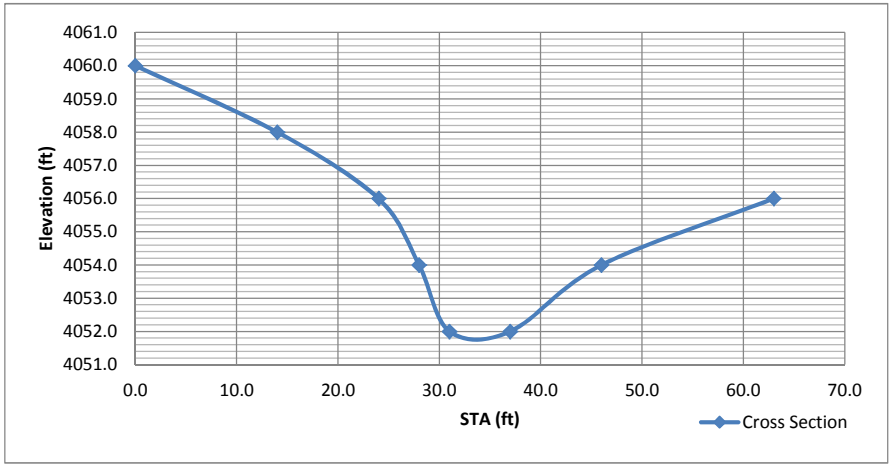
## Route ID: *R11R16*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4054 |
| Low Elevation (ft) | 4050 |
| Length (ft) | 435 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 63 | 0.0 | 4060.0 |
| Left Bank (STA) | 31.0 | 14.0 | 4058.0 |
| Right Bank (STA) | 37.0 | 24.0 | 4056.0 |
| Left Overbank Manning's "n" | 0.070 | 28.0 | 4054.0 |
| Main Channel Manning's "n" | 0.030 | 31.0 | 4052.0 |
| Right Overbank Manning's "n" | 0.070 | 37.0 | 4052.0 |
| | | 46.0 | 4054.0 |
| | | 63.0 | 4056.0 |



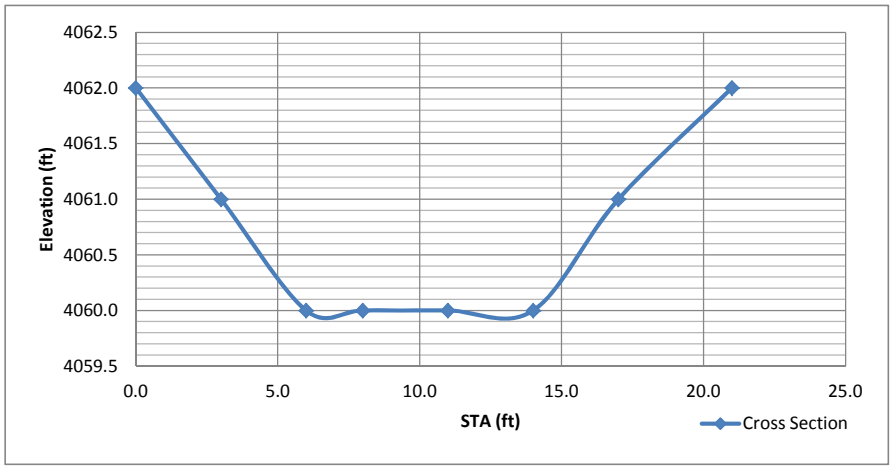
## Route ID: *R12R16*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4064 |
| Low Elevation (ft) | 4056 |
| Length (ft) | 84 |
| Slope (%) | 0.09 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 21 | 0.0 | 4062.0 |
| Left Bank (STA) | 6.0 | 3.0 | 4061.0 |
| Right Bank (STA) | 14.0 | 6.0 | 4060.0 |
| Left Overbank Manning's "n" | 0.070 | 8.0 | 4060.0 |
| Main Channel Manning's "n" | 0.050 | 11.0 | 4060.0 |
| Right Overbank Manning's "n" | 0.070 | 14.0 | 4060.0 |
| | | 17.0 | 4061.0 |
| | | 21.0 | 4062.0 |



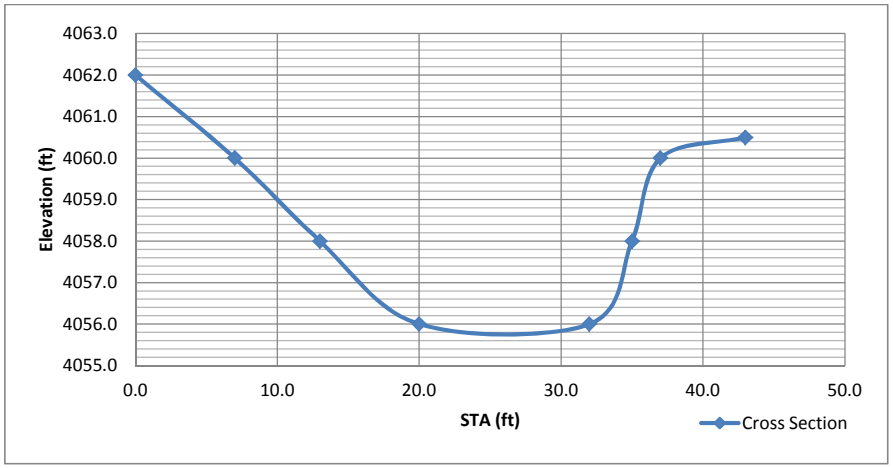
## Route ID: *R13R16*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4062 |
| Low Elevation (ft) | 4049 |
| Length (ft) | 298 |
| Slope (%) | 0.04 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 43 | 0.0 | 4062.0 |
| Left Bank (STA) | 20.0 | 7.0 | 4060.0 |
| Right Bank (STA) | 32.0 | 13.0 | 4058.0 |
| Left Overbank Manning's "n" | 0.070 | 20.0 | 4056.0 |
| Main Channel Manning's "n" | 0.070 | 32.0 | 4056.0 |
| Right Overbank Manning's "n" | 0.070 | 35.0 | 4058.0 |
| | | 37.0 | 4060.0 |
| | | 43.0 | 4060.5 |



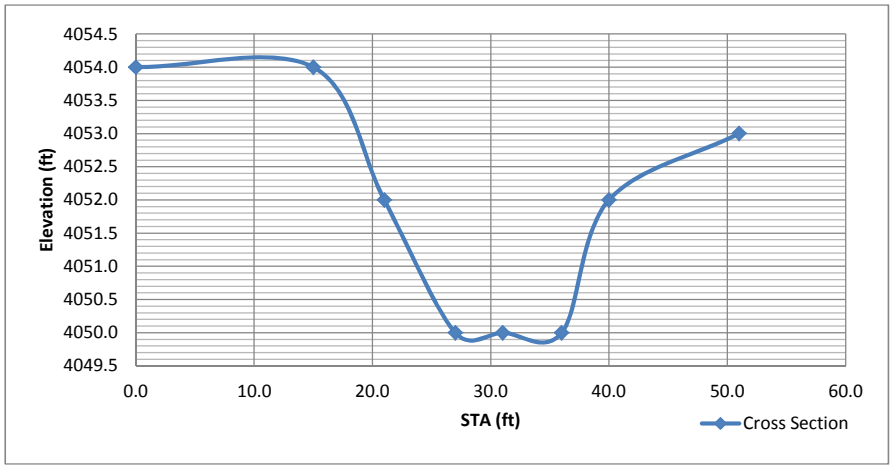
## Route ID: *R14R17*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4052 |
| Low Elevation (ft) | 4046 |
| Length (ft) | 367 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 51 | 0.0 | 4054.0 |
| Left Bank (STA) | 27.0 | 15.0 | 4054.0 |
| Right Bank (STA) | 36.0 | 21.0 | 4052.0 |
| Left Overbank Manning's "n" | 0.070 | 27.0 | 4050.0 |
| Main Channel Manning's "n" | 0.030 | 31.0 | 4050.0 |
| Right Overbank Manning's "n" | 0.070 | 36.0 | 4050.0 |
| | | 40.0 | 4052.0 |
| | | 51.0 | 4053.0 |



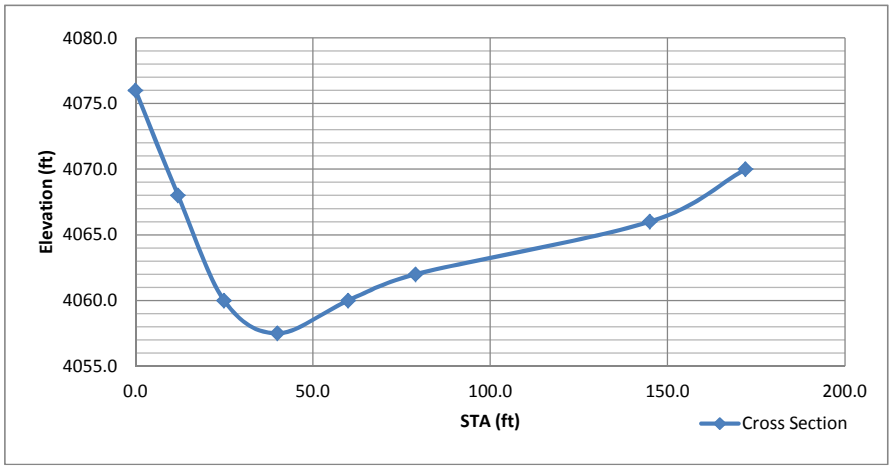
## Route ID: *R15R18*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4064 |
| Low Elevation (ft) | 4042 |
| Length (ft) | 810 |
| Slope (%) | 0.03 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 173 | 0.0 | 4076.0 |
| Left Bank (STA) | 25.0 | 12.0 | 4068.0 |
| Right Bank (STA) | 60.0 | 25.0 | 4060.0 |
| Left Overbank Manning's "n" | 0.070 | 40.0 | 4057.5 |
| Main Channel Manning's "n" | 0.030 | 60.0 | 4060.0 |
| Right Overbank Manning's "n" | 0.070 | 79.0 | 4062.0 |
| | | 145.0 | 4066.0 |
| | | 172.0 | 4070.0 |



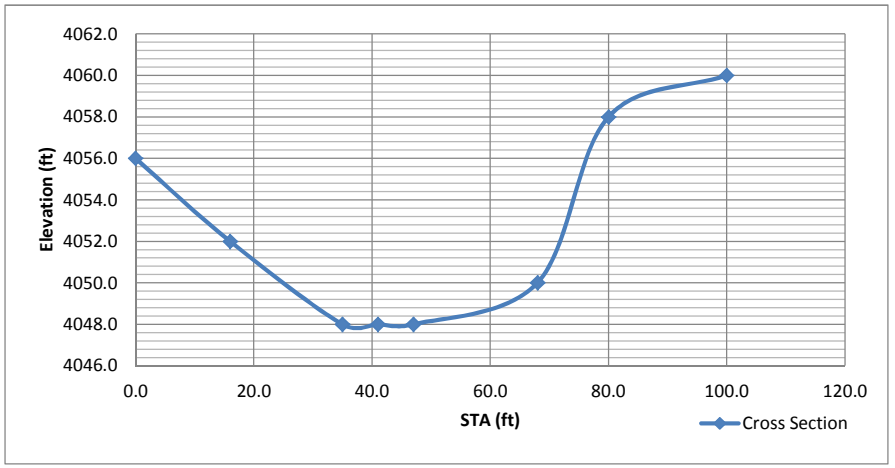
## Route ID: *R16R17*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4048 |
| Low Elevation (ft) | 4046 |
| Length (ft) | 348 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 100 | 0.0 | 4056.0 |
| Left Bank (STA) | 35.0 | 16.0 | 4052.0 |
| Right Bank (STA) | 47.0 | 35.0 | 4048.0 |
| Left Overbank Manning's "n" | 0.070 | 41.0 | 4048.0 |
| Main Channel Manning's "n" | 0.030 | 47.0 | 4048.0 |
| Right Overbank Manning's "n" | 0.070 | 68.0 | 4050.0 |
| | | 80.0 | 4058.0 |
| | | 100.0 | 4060.0 |



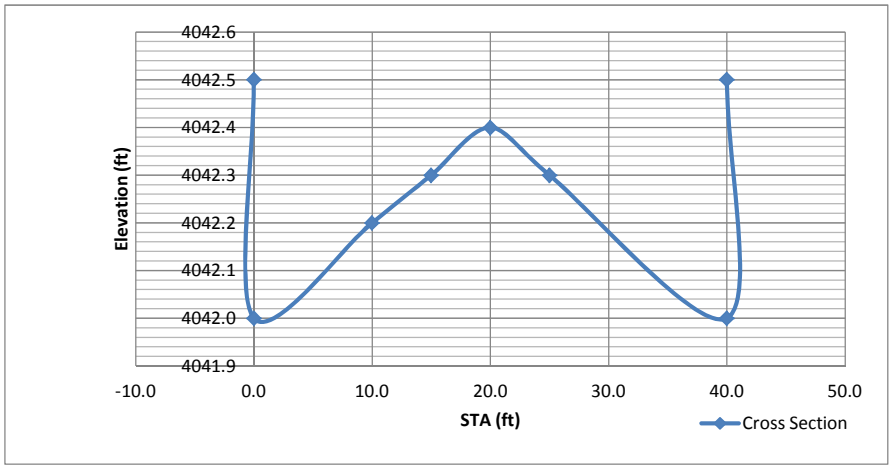
## Route ID: *R19R20*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4042 |
| Low Elevation (ft) | 4040 |
| Length (ft) | 430 |
| Slope (%) | 0.00 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 42 | 0.0 | 4042.5 |
| Left Bank (STA) | 0.0 | 0.0 | 4042.0 |
| Right Bank (STA) | 40.0 | 10.0 | 4042.2 |
| Left Overbank Manning's "n" | 0.025 | 15.0 | 4042.3 |
| Main Channel Manning's "n" | 0.025 | 20.0 | 4042.4 |
| Right Overbank Manning's "n" | 0.025 | 25.0 | 4042.3 |
| | | 40.0 | 4042.0 |
| | | 40.0 | 4042.5 |



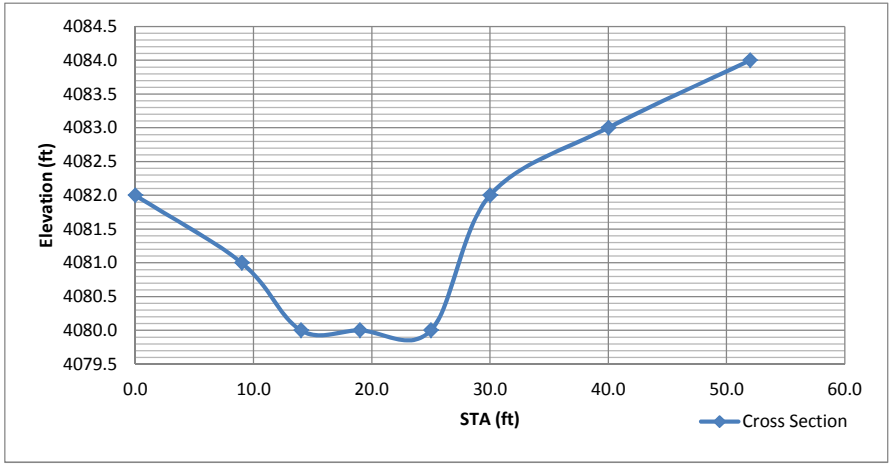
## Route ID: *R1R2*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4082 |
| Low Elevation (ft) | 4076 |
| Length (ft) | 340 |
| Slope (%) | 0.02 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 52 | 0.0 | 4082.0 |
| Left Bank (STA) | 14.0 | 9.0 | 4081.0 |
| Right Bank (STA) | 25.0 | 14.0 | 4080.0 |
| Left Overbank Manning's "n" | 0.070 | 19.0 | 4080.0 |
| Main Channel Manning's "n" | 0.045 | 25.0 | 4080.0 |
| Right Overbank Manning's "n" | 0.070 | 30.0 | 4082.0 |
| | | 40.0 | 4083.0 |
| | | 52.0 | 4084.0 |



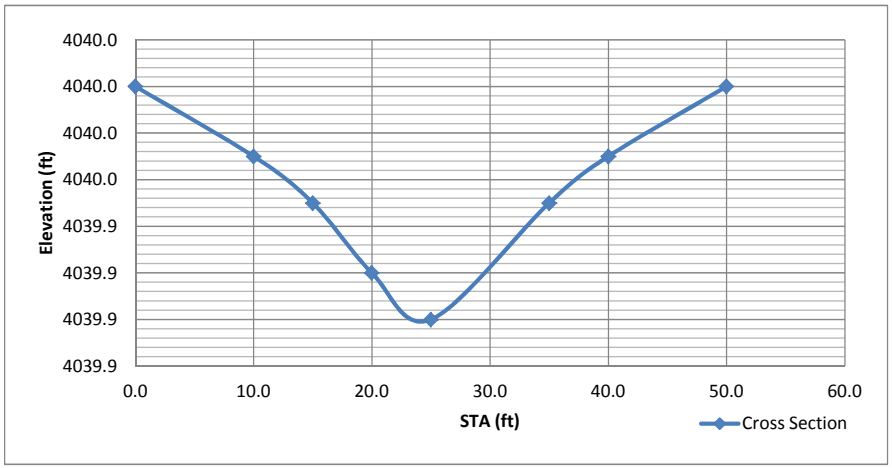
## Route ID: *R20R21*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4041 |
| Low Elevation (ft) | 4040 |
| Length (ft) | 450 |
| Slope (%) | 0.00 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 50 | 0.0 | 4040.0 |
| Left Bank (STA) | 0.0 | 10.0 | 4040.0 |
| Right Bank (STA) | 50.0 | 15.0 | 4040.0 |
| Left Overbank Manning's "n" | 0.060 | 20.0 | 4039.9 |
| Main Channel Manning's "n" | 0.060 | 25.0 | 4039.9 |
| Right Overbank Manning's "n" | 0.060 | 35.0 | 4040.0 |
| | | 40.0 | 4040.0 |
| | | 50.0 | 4040.0 |



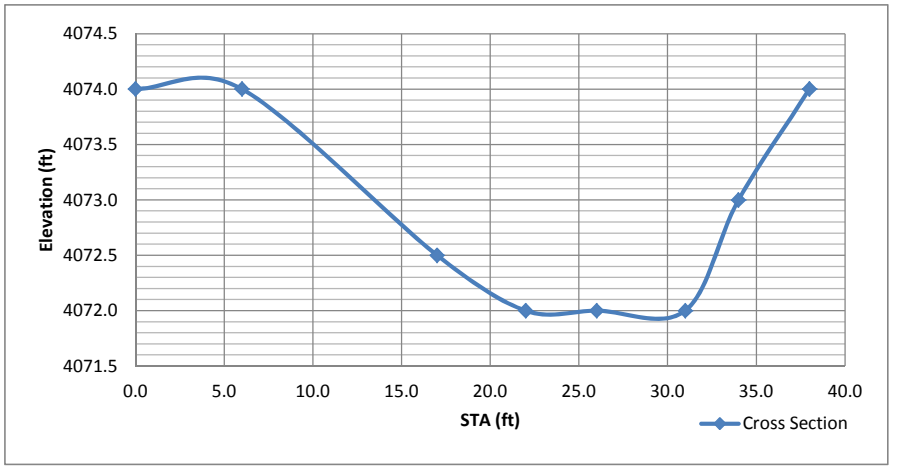
## Route ID: *R3R10*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4075 |
| Low Elevation (ft) | 4069 |
| Length (ft) | 431 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 38 | 0.0 | 4074.0 |
| Left Bank (STA) | 17.0 | 6.0 | 4074.0 |
| Right Bank (STA) | 31.0 | 17.0 | 4072.5 |
| Left Overbank Manning's "n" | 0.070 | 22.0 | 4072.0 |
| Main Channel Manning's "n" | 0.030 | 26.0 | 4072.0 |
| Right Overbank Manning's "n" | 0.070 | 31.0 | 4072.0 |
| | | 34.0 | 4073.0 |
| | | 38.0 | 4074.0 |



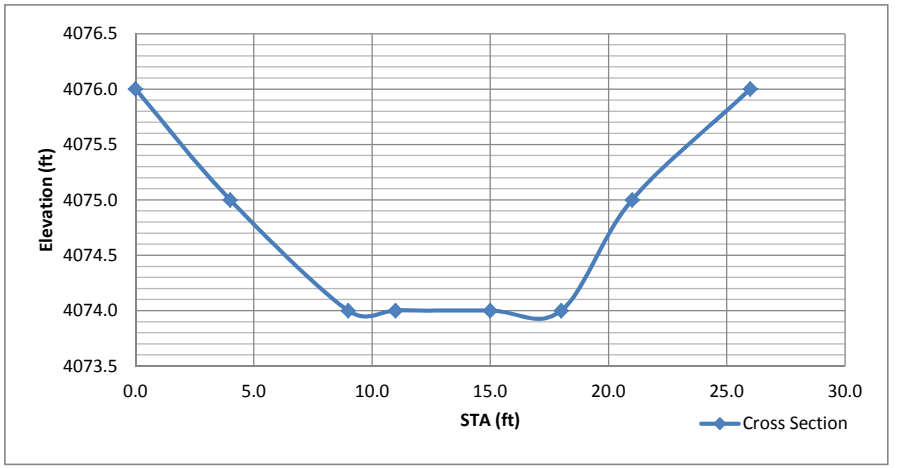
## Route ID: *R4R7*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4078 |
| Low Elevation (ft) | 4073 |
| Length (ft) | 198 |
| Slope (%) | 0.03 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 26 | 0.0 | 4076.0 |
| Left Bank (STA) | 11.0 | 4.0 | 4075.0 |
| Right Bank (STA) | 15.0 | 9.0 | 4074.0 |
| Left Overbank Manning's "n" | 0.030 | 11.0 | 4074.0 |
| Main Channel Manning's "n" | 0.045 | 15.0 | 4074.0 |
| Right Overbank Manning's "n" | 0.030 | 18.0 | 4074.0 |
| | | 21.0 | 4075.0 |
| | | 26.0 | 4076.0 |



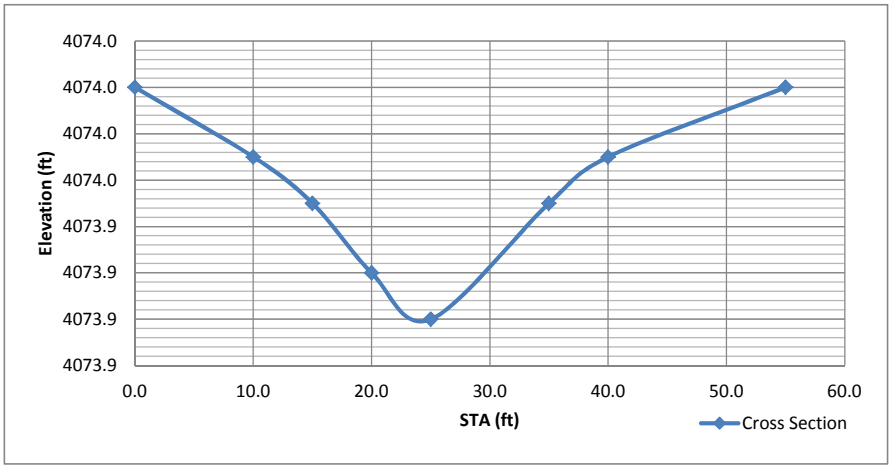
## Route ID: *R5R7*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4074 |
| Low Elevation (ft) | 4070 |
| Length (ft) | 318 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 55 | 0.0 | 4074.0 |
| Left Bank (STA) | 0.0 | 10.0 | 4074.0 |
| Right Bank (STA) | 55.0 | 15.0 | 4074.0 |
| Left Overbank Manning's "n" | 0.030 | 20.0 | 4073.9 |
| Main Channel Manning's "n" | 0.030 | 25.0 | 4073.9 |
| Right Overbank Manning's "n" | 0.030 | 35.0 | 4074.0 |
| | | 40.0 | 4074.0 |
| | | 55.0 | 4074.0 |



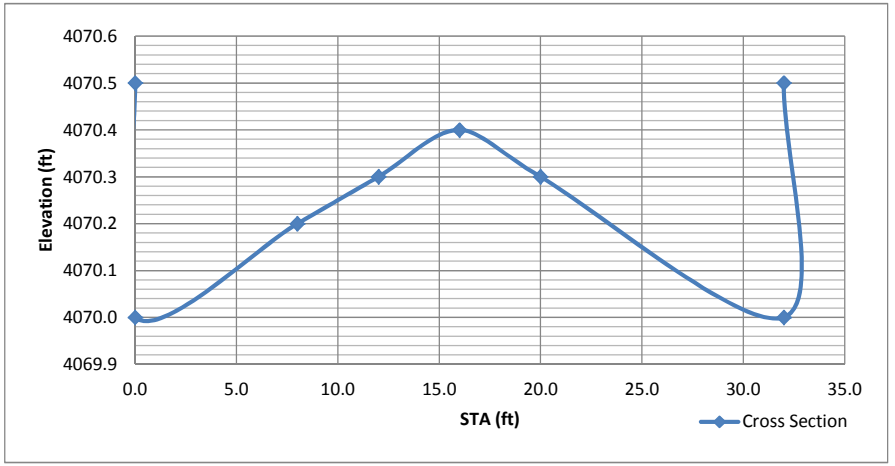
## Route ID: *R6R8*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4072 |
| Low Elevation (ft) | 4070 |
| Length (ft) | 360 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 32 | 0.0 | 4070.5 |
| Left Bank (STA) | 0.0 | 0.0 | 4070.0 |
| Right Bank (STA) | 32.0 | 8.0 | 4070.2 |
| Left Overbank Manning's "n" | 0.016 | 12.0 | 4070.3 |
| Main Channel Manning's "n" | 0.016 | 16.0 | 4070.4 |
| Right Overbank Manning's "n" | 0.016 | 20.0 | 4070.3 |
| | | 32.0 | 4070.0 |
| | | 32.0 | 4070.5 |



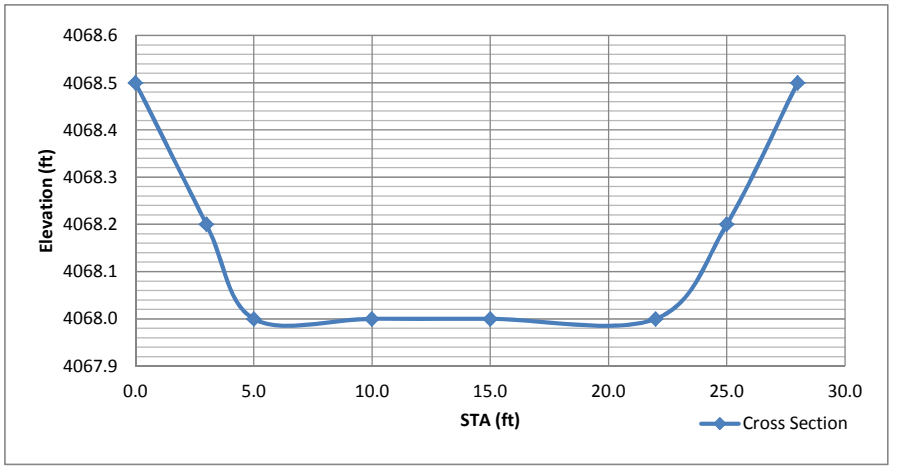
## Route ID: *R3R7R10B*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4072 |
| Low Elevation (ft) | 4066 |
| Length (ft) | 187 |
| Slope (%) | 0.03 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 28 | 0.0 | 4068.5 |
| Left Bank (STA) | 5.0 | 3.0 | 4068.2 |
| Right Bank (STA) | 15.0 | 5.0 | 4068.0 |
| Left Overbank Manning's "n" | 0.070 | 10.0 | 4068.0 |
| Main Channel Manning's "n" | 0.030 | 15.0 | 4068.0 |
| Right Overbank Manning's "n" | 0.070 | 22.0 | 4068.0 |
| | | 25.0 | 4068.2 |
| | | 28.0 | 4068.5 |



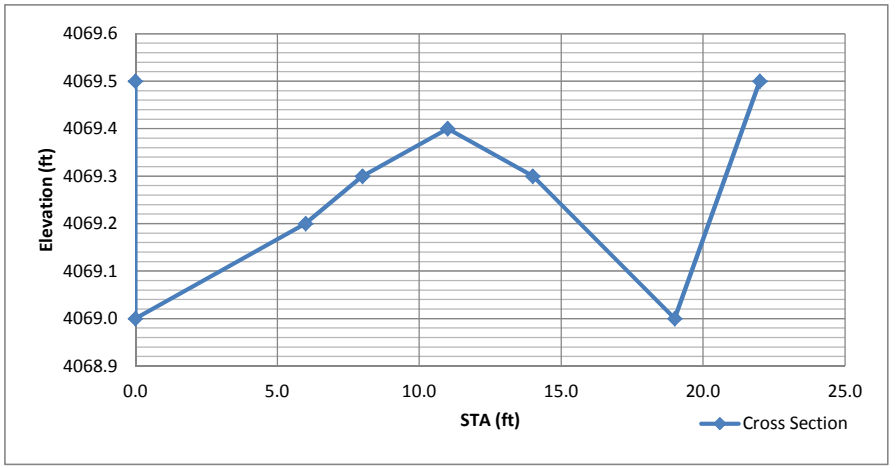
## Route ID: *R8R9*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4070 |
| Low Elevation (ft) | 4069 |
| Length (ft) | 306 |
| Slope (%) | 0.00 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 22 | 0.0 | 4069.5 |
| Left Bank (STA) | 0.0 | 0.0 | 4069.0 |
| Right Bank (STA) | 22.0 | 6.0 | 4069.2 |
| Left Overbank Manning's "n" | 0.016 | 8.0 | 4069.3 |
| Main Channel Manning's "n" | 0.016 | 11.0 | 4069.4 |
| Right Overbank Manning's "n" | 0.016 | 14.0 | 4069.3 |
| | | 19.0 | 4069.0 |
| | | 22.0 | 4069.5 |



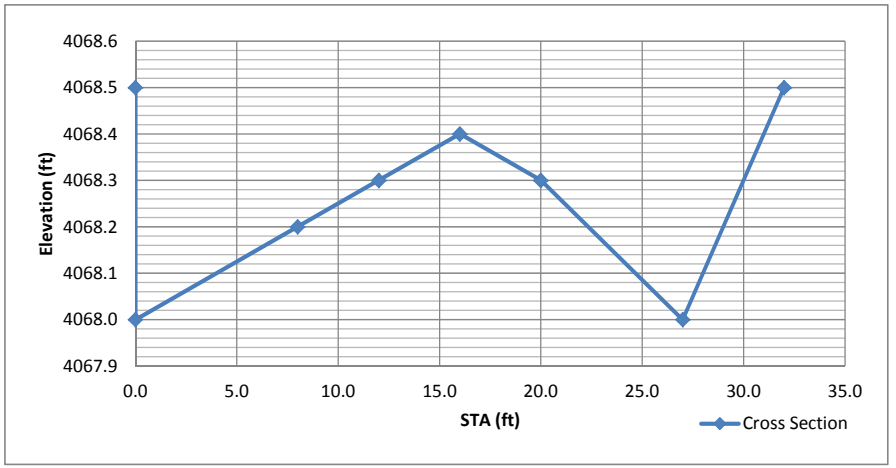
## Route ID: *R9R10*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4069 |
| Low Elevation (ft) | 4068 |
| Length (ft) | 482 |
| Slope (%) | 0.00 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 32 | 0.0 | 4068.5 |
| Left Bank (STA) | 0.0 | 0.0 | 4068.0 |
| Right Bank (STA) | 32.0 | 8.0 | 4068.2 |
| Left Overbank Manning's "n" | 0.016 | 12.0 | 4068.3 |
| Main Channel Manning's "n" | 0.016 | 16.0 | 4068.4 |
| Right Overbank Manning's "n" | 0.016 | 20.0 | 4068.3 |
| | | 27.0 | 4068.0 |
| | | 32.0 | 4068.5 |



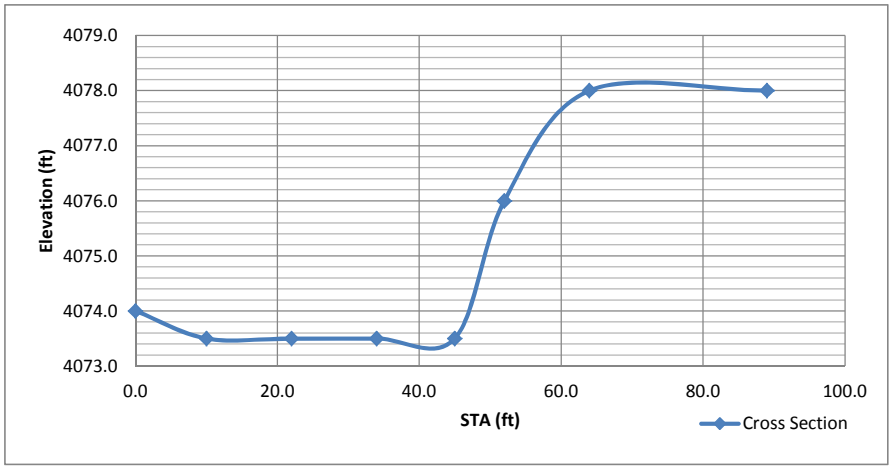
## Route ID: *F7R10A*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4076 |
| Low Elevation (ft) | 4068 |
| Length (ft) | 672 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 89 | 0.0 | 4074.0 |
| Left Bank (STA) | 0.0 | 10.0 | 4073.5 |
| Right Bank (STA) | 52.0 | 22.0 | 4073.5 |
| Left Overbank Manning's "n" | 0.030 | 34.0 | 4073.5 |
| Main Channel Manning's "n" | 0.030 | 45.0 | 4073.5 |
| Right Overbank Manning's "n" | 0.030 | 52.0 | 4076.0 |
| | | 64.0 | 4078.0 |
| | | 89.0 | 4078.0 |



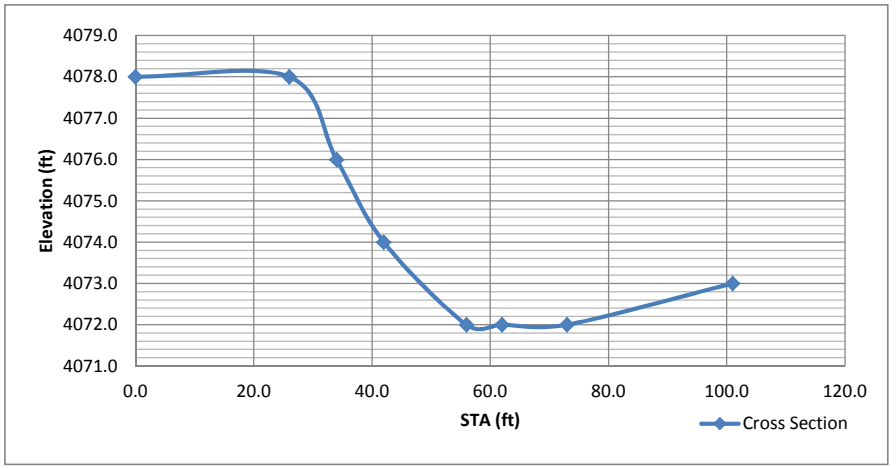
## Route ID: *F7R10A*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4073 |
| Low Elevation (ft) | 4068 |
| Length (ft) | 323 |
| Slope (%) | 0.02 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 101 | 0.0 | 4078.0 |
| Left Bank (STA) | 0.0 | 26.0 | 4078.0 |
| Right Bank (STA) | 52.0 | 34.0 | 4076.0 |
| Left Overbank Manning's "n" | 0.045 | 42.0 | 4074.0 |
| Main Channel Manning's "n" | 0.030 | 56.0 | 4072.0 |
| Right Overbank Manning's "n" | 0.045 | 62.0 | 4072.0 |
| | | 73.0 | 4072.0 |
| | | 101.0 | 4073.0 |



## Route ID: *R14R17_R16R17*

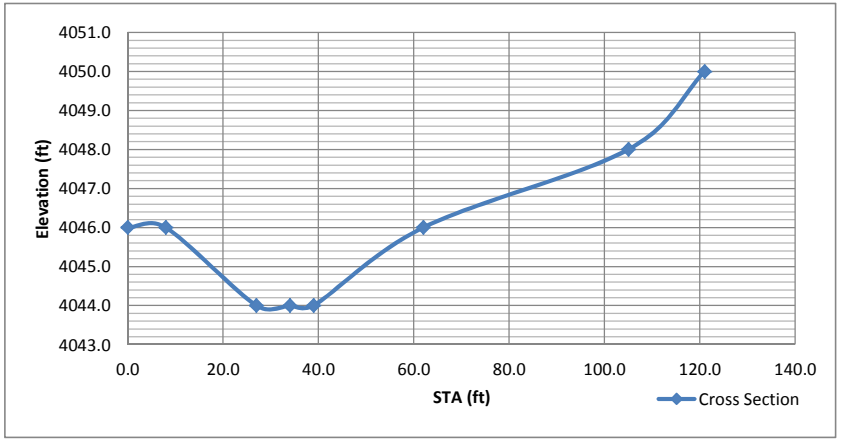
**Profile**

| | |
|---|---|
| High Elevation (ft) | 4044 |
| Low Elevation (ft) | 4042 |
| Length (ft) | 329 |
| Slope (%) | 0.01 |

**Cross Section Geometry**

| Geometry Type | Irregular Channel |
|---|---|
| Total Width (ft) | 121 |
| Left Bank (STA) | 8.0 |
| Right Bank (STA) | 62.0 |
| Left Overbank Manning's "n" | 0.070 |
| Main Channel Manning's "n" | 0.030 |
| Right Overbank Manning's "n" | 0.070 |

| STA (ft) | Elevation (ft) |
|---|---|
| 0.0 | 4046.0 |
| 8.0 | 4046.0 |
| 27.0 | 4044.0 |
| 34.0 | 4044.0 |
| 39.0 | 4044.0 |
| 62.0 | 4046.0 |
| 105.0 | 4048.0 |
| 121.0 | 4050.0 |



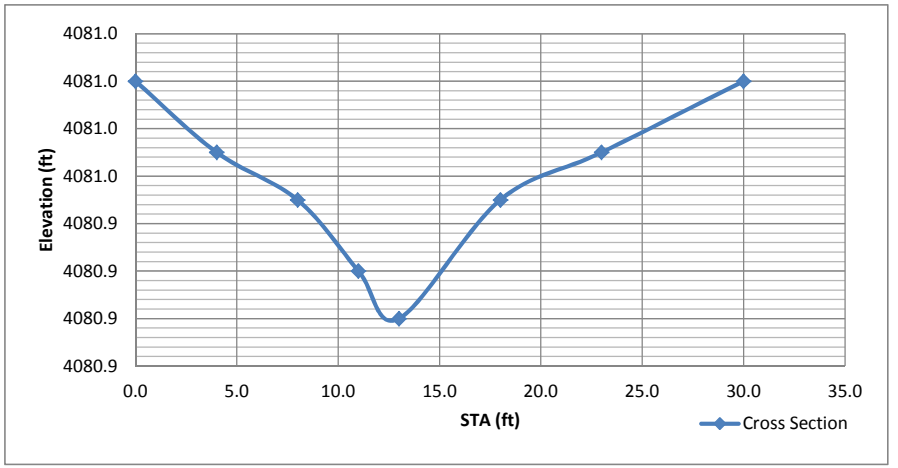
## Route ID: *F3R4_F4R4*

**Profile**

| | |
|---|---|
| High Elevation (ft) | 4081 |
| Low Elevation (ft) | 4080 |
| Length (ft) | 532 |
| Slope (%) | 0.00 |

**Cross Section Geometry**

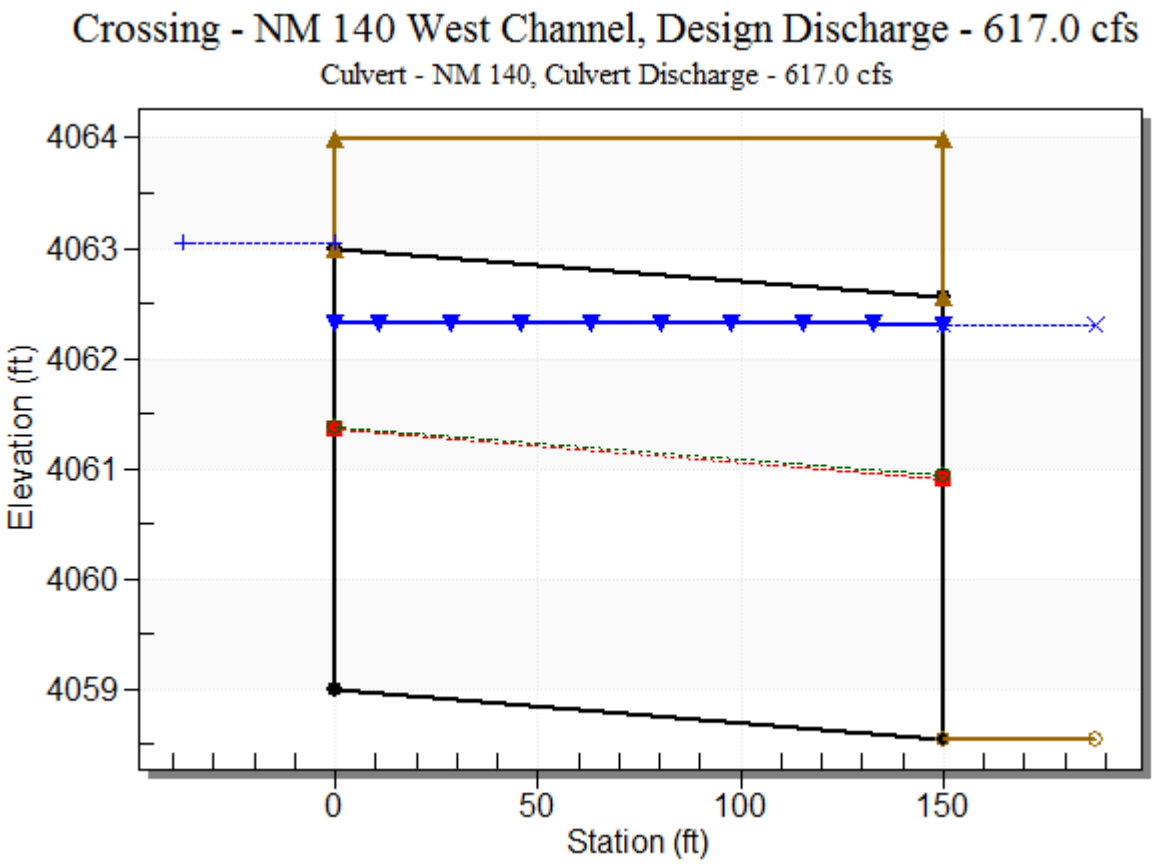
| Geometry Type | Irregular Channel | STA (ft) | Elevation (ft) |
|---|---|---|---|
| Total Width (ft) | 30 | 0.0 | 4081.0 |
| Left Bank (STA) | 8.0 | 4.0 | 4081.0 |
| Right Bank (STA) | 18.0 | 8.0 | 4081.0 |
| Left Overbank Manning's "n" | 0.016 | 11.0 | 4080.9 |
| Main Channel Manning's "n" | 0.016 | 13.0 | 4080.9 |
| Right Overbank Manning's "n" | 0.016 | 18.0 | 4081.0 |
| | | 23.0 | 4081.0 |
| | | 30.0 | 4081.0 |



# HY-8 Culvert Analysis Report

Proposed West Channel
Culvert under NM 140

**Water Surface Profile Plot for Culvert: NM 140**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 617 cfs

Maximum Flow: 800 cfs

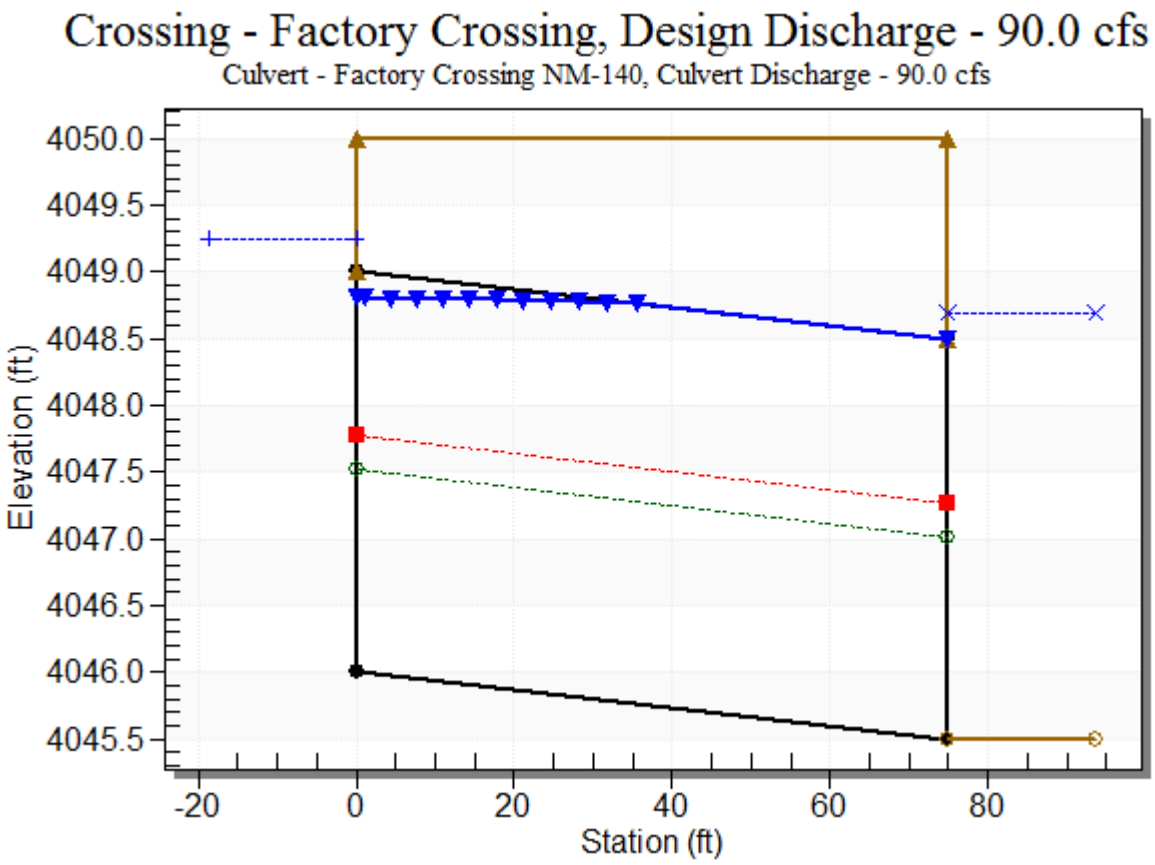
## Table 1 - Summary of Culvert Flows at Crossing: NM 140 West Channel

| Headwater Elevation (ft) | Total Discharge (cfs) | NM 140 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4059.00 | 0.00 | 0.00 | 0.00 | 1 |
| 4060.04 | 80.00 | 80.00 | 0.00 | 1 |
| 4060.70 | 160.00 | 160.00 | 0.00 | 1 |
| 4061.23 | 240.00 | 240.00 | 0.00 | 1 |
| 4061.68 | 320.00 | 320.00 | 0.00 | 1 |
| 4062.09 | 400.00 | 400.00 | 0.00 | 1 |
| 4062.46 | 480.00 | 480.00 | 0.00 | 1 |
| 4062.81 | 560.00 | 560.00 | 0.00 | 1 |
| 4063.04 | 617.00 | 617.00 | 0.00 | 1 |
| 4063.48 | 720.00 | 720.00 | 0.00 | 1 |
| 4063.96 | 800.00 | 800.00 | 0.00 | 1 |
| 4064.00 | 807.92 | 807.92 | 0.00 | Overtopping |

# HY-8 Culvert Analysis Report

Proposed Factory
Crossing NM-140

**Water Surface Profile Plot for Culvert: Factory Crossing NM-140**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 90 cfs

Maximum Flow: 150 cfs

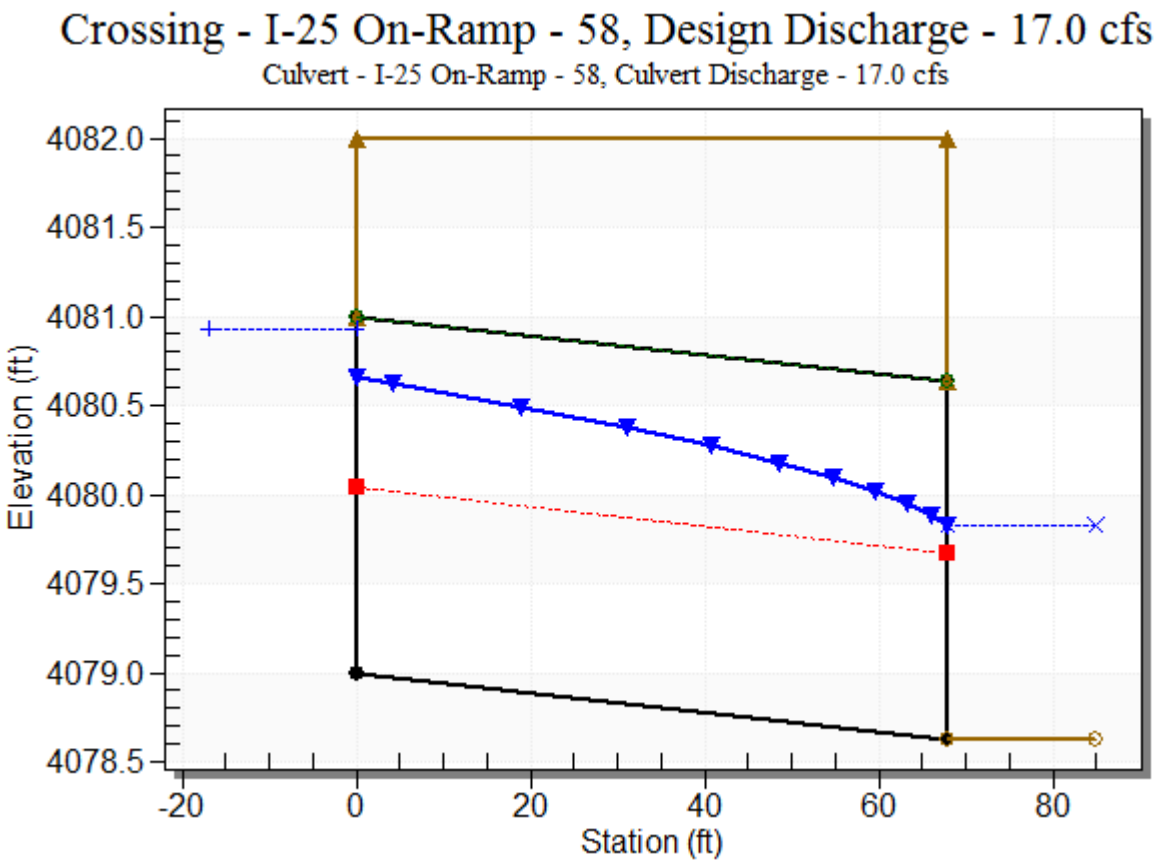
## Table 1 - Summary of Culvert Flows at Crossing: Factory Crossing

| Headwater Elevation (ft) | Total Discharge (cfs) | Factory Crossing NM-140 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4046.00 | 0.00 | 0.00 | 0.00 | 1 |
| 4047.21 | 15.00 | 15.00 | 0.00 | 1 |
| 4047.75 | 30.00 | 30.00 | 0.00 | 1 |
| 4048.17 | 45.00 | 45.00 | 0.00 | 1 |
| 4048.53 | 60.00 | 60.00 | 0.00 | 1 |
| 4048.88 | 75.00 | 75.00 | 0.00 | 1 |
| 4049.25 | 90.00 | 90.00 | 0.00 | 1 |
| 4049.63 | 105.00 | 105.00 | 0.00 | 1 |
| 4050.01 | 120.00 | 118.89 | 0.77 | 16 |
| 4050.12 | 135.00 | 115.65 | 19.15 | 6 |
| 4050.20 | 150.00 | 111.09 | 38.75 | 5 |
| 4050.00 | 119.28 | 119.28 | 0.00 | Overtopping |

# HY-8 Culvert Analysis Report

Proposed I-25 On-Ramp

**Water Surface Profile Plot for Culvert: I-25 On-Ramp - 58**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 17 cfs

Maximum Flow: 21 cfs

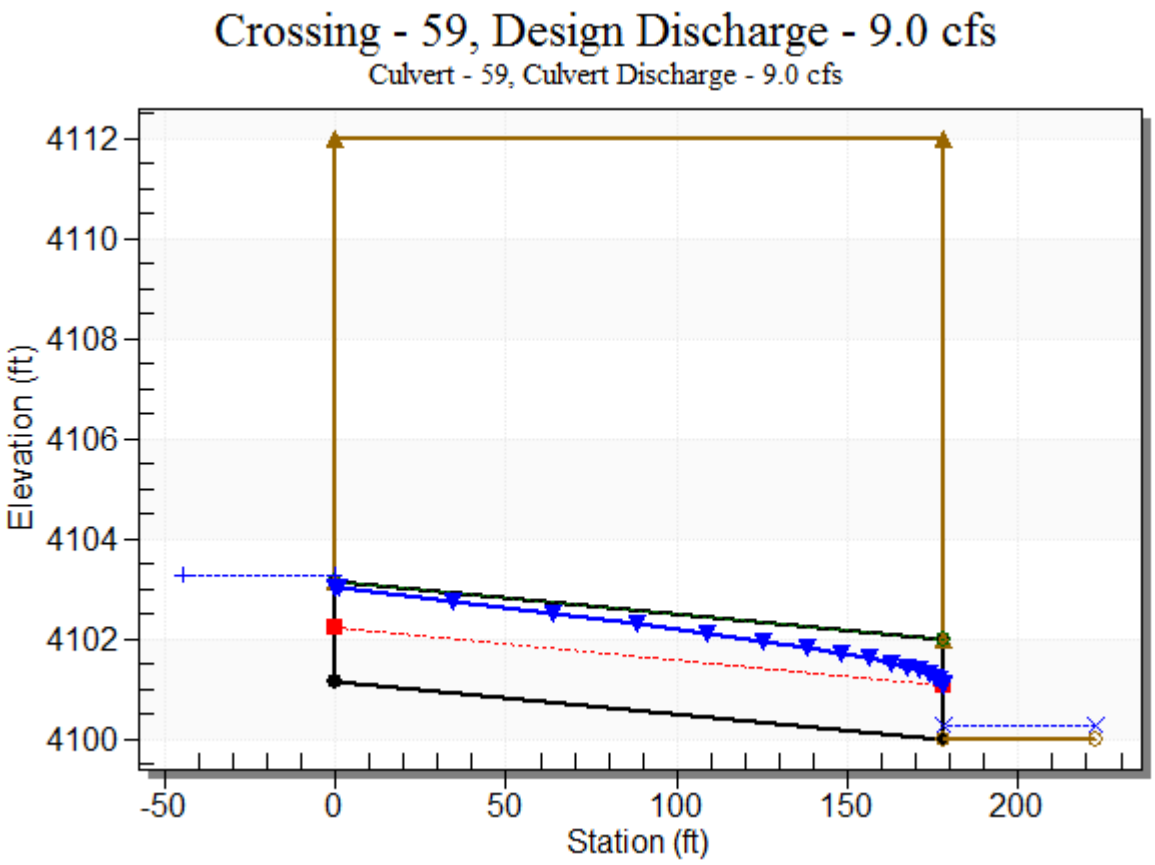
## Table 1 - Summary of Culvert Flows at Crossing: I-25 On-Ramp - 58

| Headwater Elevation (ft) | Total Discharge (cfs) | I-25 On-Ramp - 58 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4079.00 | 0.00 | 0.00 | 0.00 | 1 |
| 4079.60 | 2.10 | 2.10 | 0.00 | 1 |
| 4079.86 | 4.20 | 4.20 | 0.00 | 1 |
| 4080.07 | 6.30 | 6.30 | 0.00 | 1 |
| 4080.25 | 8.40 | 8.40 | 0.00 | 1 |
| 4080.42 | 10.50 | 10.50 | 0.00 | 1 |
| 4080.59 | 12.60 | 12.60 | 0.00 | 1 |
| 4080.75 | 14.70 | 14.70 | 0.00 | 1 |
| 4080.91 | 16.80 | 16.80 | 0.00 | 1 |
| 4080.93 | 17.00 | 17.00 | 0.00 | 1 |
| 4081.31 | 21.00 | 21.00 | 0.00 | 1 |
| 4082.00 | 25.08 | 25.08 | 0.00 | Overtopping |

# HY-8 Culvert Analysis Report

Existing without sediment embedment

**Water Surface Profile Plot for Culvert: 59**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

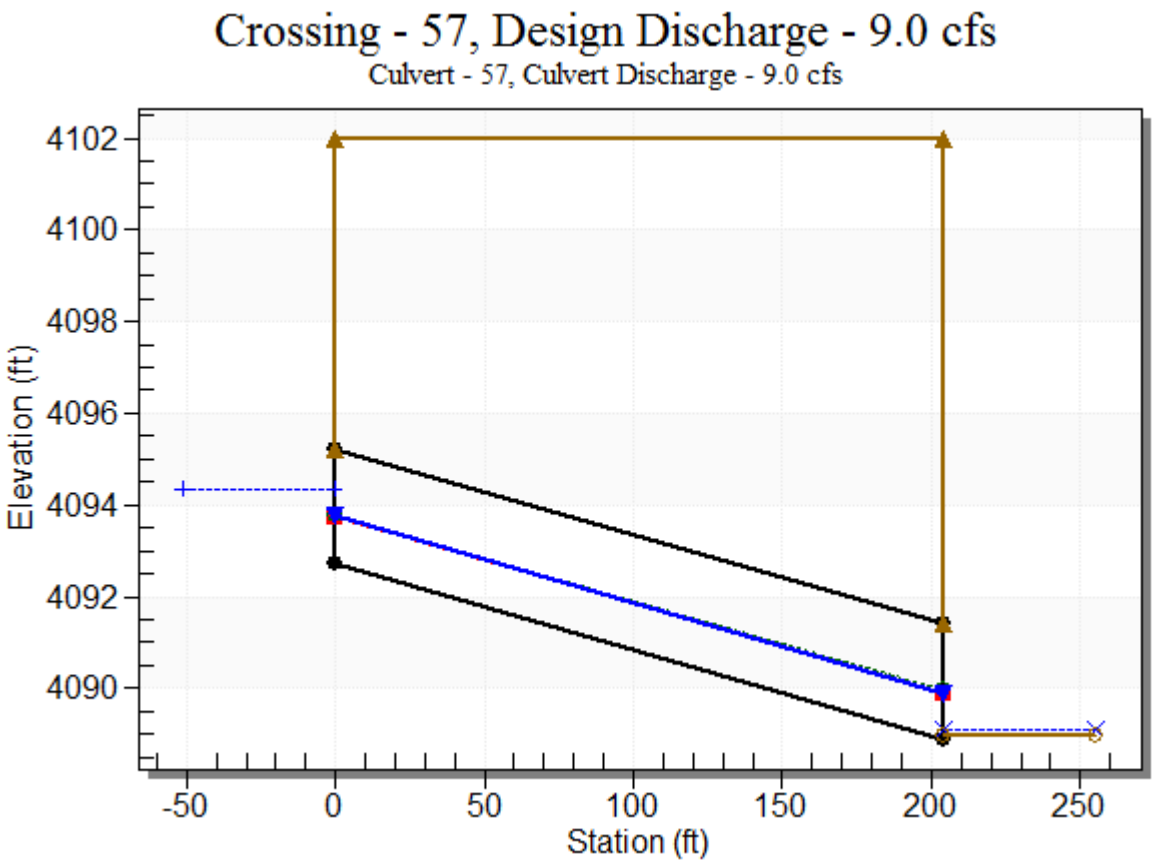
Design Flow: 9 cfs

Maximum Flow: 9 cfs

## Table 1 - Summary of Culvert Flows at Crossing: 59

| Headwater Elevation (ft) | Total Discharge (cfs) | 59 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4101.15 | 0.00 | 0.00 | 0.00 | 1 |
| 4101.68 | 0.90 | 0.90 | 0.00 | 1 |
| 4101.91 | 1.80 | 1.80 | 0.00 | 1 |
| 4102.10 | 2.70 | 2.70 | 0.00 | 1 |
| 4102.27 | 3.60 | 3.60 | 0.00 | 1 |
| 4102.42 | 4.50 | 4.50 | 0.00 | 1 |
| 4102.57 | 5.40 | 5.40 | 0.00 | 1 |
| 4102.72 | 6.30 | 6.30 | 0.00 | 1 |
| 4102.87 | 7.20 | 7.20 | 0.00 | 1 |
| 4103.04 | 8.10 | 8.10 | 0.00 | 1 |
| 4103.25 | 9.00 | 9.00 | 0.00 | 1 |
| 4112.00 | 21.33 | 21.33 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 57**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

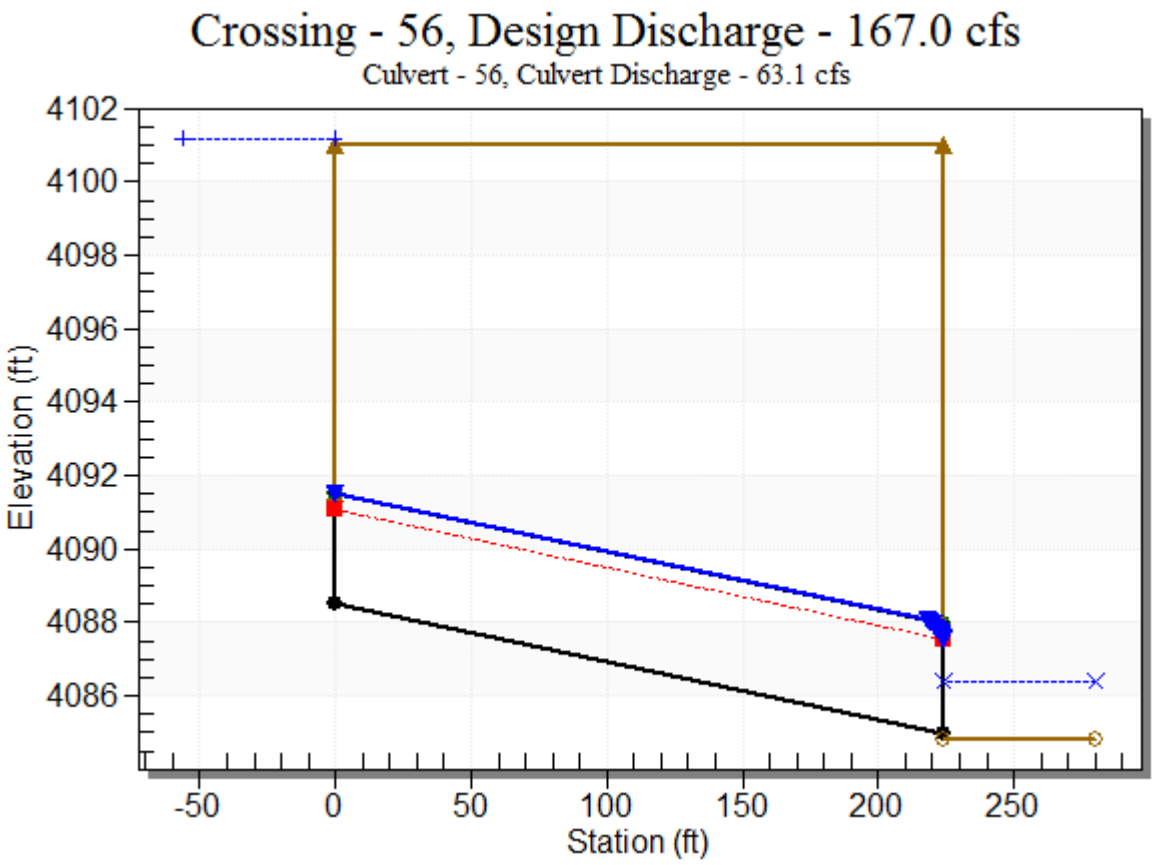
Design Flow: 9 cfs

Maximum Flow: 9 cfs

## Table 2 - Summary of Culvert Flows at Crossing: 57

| Headwater Elevation (ft) | Total Discharge (cfs) | 57 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4092.72 | 0.00 | 0.00 | 0.00 | 1 |
| 4093.20 | 0.90 | 0.90 | 0.00 | 1 |
| 4093.40 | 1.80 | 1.80 | 0.00 | 1 |
| 4093.57 | 2.70 | 2.70 | 0.00 | 1 |
| 4093.70 | 3.60 | 3.60 | 0.00 | 1 |
| 4093.82 | 4.50 | 4.50 | 0.00 | 1 |
| 4093.94 | 5.40 | 5.40 | 0.00 | 1 |
| 4094.04 | 6.30 | 6.30 | 0.00 | 1 |
| 4094.14 | 7.20 | 7.20 | 0.00 | 1 |
| 4094.23 | 8.10 | 8.10 | 0.00 | 1 |
| 4094.32 | 9.00 | 9.00 | 0.00 | 1 |
| 4102.00 | 36.90 | 36.90 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 56**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 167 cfs

Maximum Flow: 300 cfs

## Table 3 - Summary of Culvert Flows at Crossing: 56

| Headwater Elevation (ft) | Total Discharge (cfs) | 56 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4088.50 | 0.00 | 0.00 | 0.00 | 1 |
| 4091.46 | 30.00 | 30.00 | 0.00 | 1 |
| 4099.89 | 60.00 | 60.00 | 0.00 | 1 |
| 4101.08 | 90.00 | 62.80 | 26.56 | 10 |
| 4101.13 | 120.00 | 62.92 | 56.76 | 5 |
| 4101.18 | 150.00 | 63.02 | 86.58 | 4 |
| 4101.20 | 167.00 | 63.07 | 103.19 | 3 |
| 4101.25 | 210.00 | 63.19 | 145.91 | 3 |
| 4101.28 | 240.00 | 63.26 | 176.38 | 3 |
| 4101.31 | 270.00 | 63.33 | 206.51 | 3 |
| 4101.34 | 300.00 | 63.40 | 236.55 | 3 |
| 4101.00 | 62.61 | 62.61 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 55

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

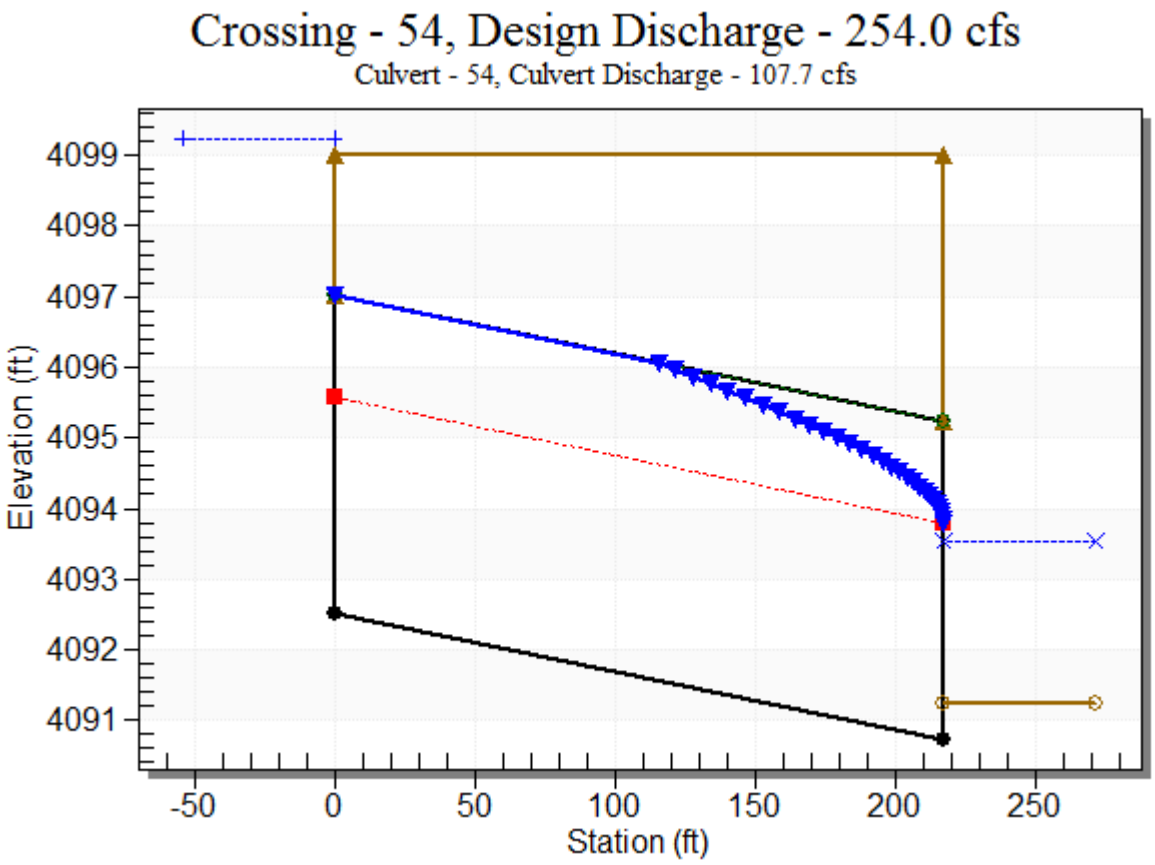
Design Flow: 21 cfs

Maximum Flow: 50 cfs

## Table 4 - Summary of Culvert Flows at Crossing: 55

| Headwater Elevation (ft) | Total Discharge (cfs) | 55 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4092.08 | 0.00 | 0.00 | 0.00 | 1 |
| 4092.97 | 5.00 | 5.00 | 0.00 | 1 |
| 4093.36 | 10.00 | 10.00 | 0.00 | 1 |
| 4093.67 | 15.00 | 15.00 | 0.00 | 1 |
| 4093.94 | 20.00 | 20.00 | 0.00 | 1 |
| 4093.98 | 21.00 | 21.00 | 0.00 | 1 |
| 4096.67 | 30.00 | 30.00 | 0.00 | 1 |
| 4094.85 | 35.00 | 35.00 | 0.00 | 1 |
| 4095.06 | 40.00 | 40.00 | 0.00 | 1 |
| 4095.25 | 45.00 | 45.00 | 0.00 | 1 |
| 4095.44 | 50.00 | 50.00 | 0.00 | 1 |
| 4099.00 | 132.65 | 132.65 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 54**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

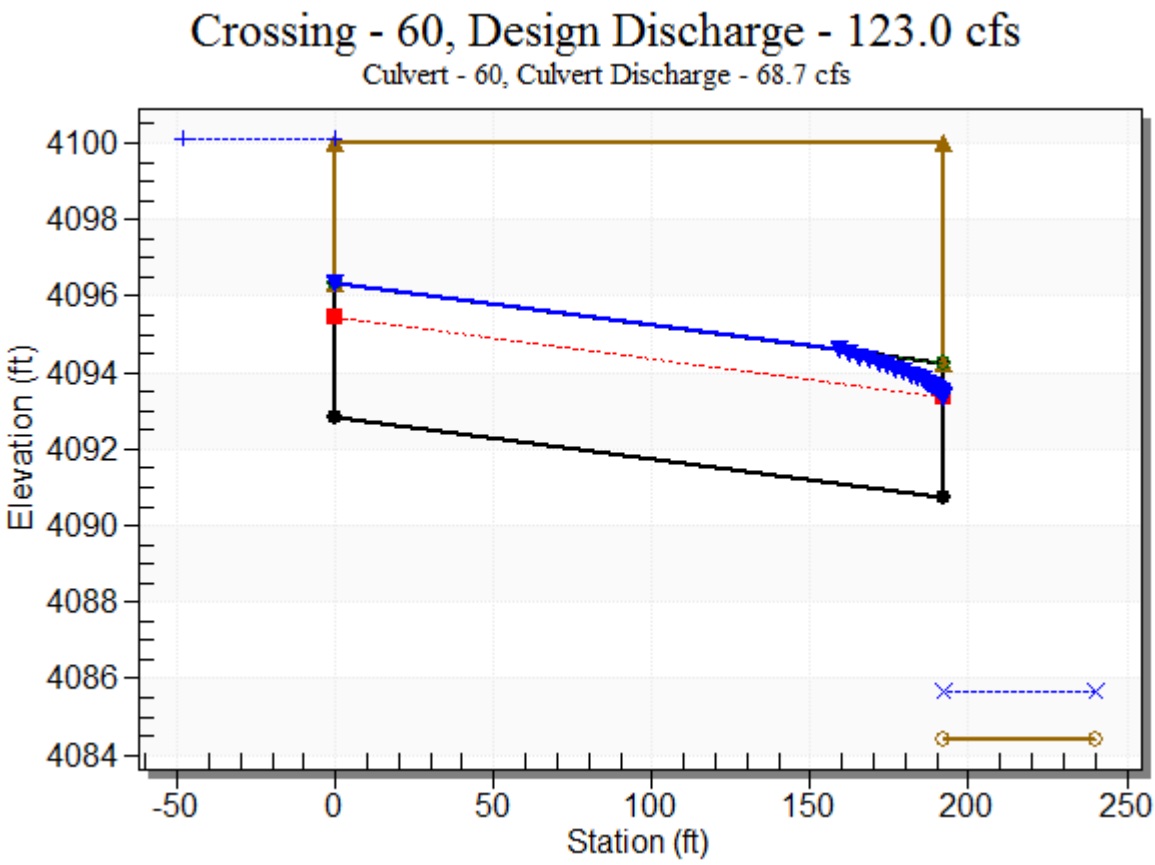
Design Flow: 254 cfs

Maximum Flow: 300 cfs

## Table 5 - Summary of Culvert Flows at Crossing: 54

| Headwater Elevation (ft) | Total Discharge (cfs) | 54 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4092.52 | 0.00 | 0.00 | 0.00 | 1 |
| 4095.02 | 30.00 | 30.00 | 0.00 | 1 |
| 4096.28 | 60.00 | 60.00 | 0.00 | 1 |
| 4097.62 | 90.00 | 90.00 | 0.00 | 1 |
| 4099.05 | 120.00 | 105.85 | 13.47 | 20 |
| 4099.11 | 150.00 | 106.22 | 43.17 | 5 |
| 4099.16 | 180.00 | 106.73 | 72.67 | 4 |
| 4099.20 | 210.00 | 107.17 | 102.56 | 4 |
| 4099.23 | 240.00 | 107.56 | 131.71 | 3 |
| 4099.25 | 254.00 | 107.74 | 145.94 | 3 |
| 4099.30 | 300.00 | 108.20 | 191.46 | 3 |
| 4099.00 | 105.34 | 105.34 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 60**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

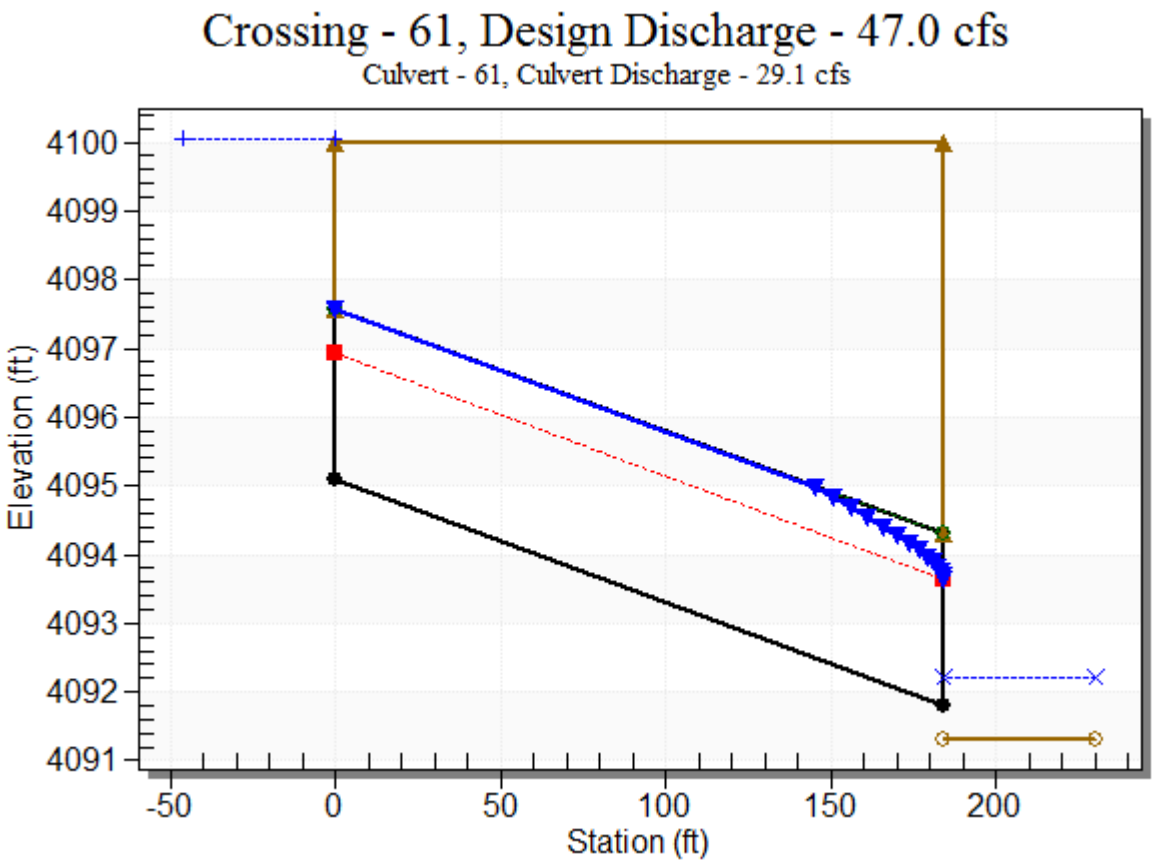
Design Flow: 123 cfs

Maximum Flow: 200 cfs

## Table 6 - Summary of Culvert Flows at Crossing: 60

| Headwater Elevation (ft) | Total Discharge (cfs) | 60 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4092.83 | 0.00 | 0.00 | 0.00 | 1 |
| 4095.01 | 20.00 | 20.00 | 0.00 | 1 |
| 4096.15 | 40.00 | 40.00 | 0.00 | 1 |
| 4098.46 | 60.00 | 60.00 | 0.00 | 1 |
| 4100.05 | 80.00 | 68.20 | 11.39 | 23 |
| 4100.09 | 100.00 | 68.44 | 31.23 | 5 |
| 4100.12 | 120.00 | 68.62 | 51.03 | 4 |
| 4100.13 | 123.00 | 68.65 | 54.11 | 3 |
| 4100.18 | 160.00 | 68.93 | 90.94 | 4 |
| 4100.21 | 180.00 | 69.06 | 110.69 | 3 |
| 4100.23 | 200.00 | 69.18 | 130.69 | 3 |
| 4100.00 | 67.95 | 67.95 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 61**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

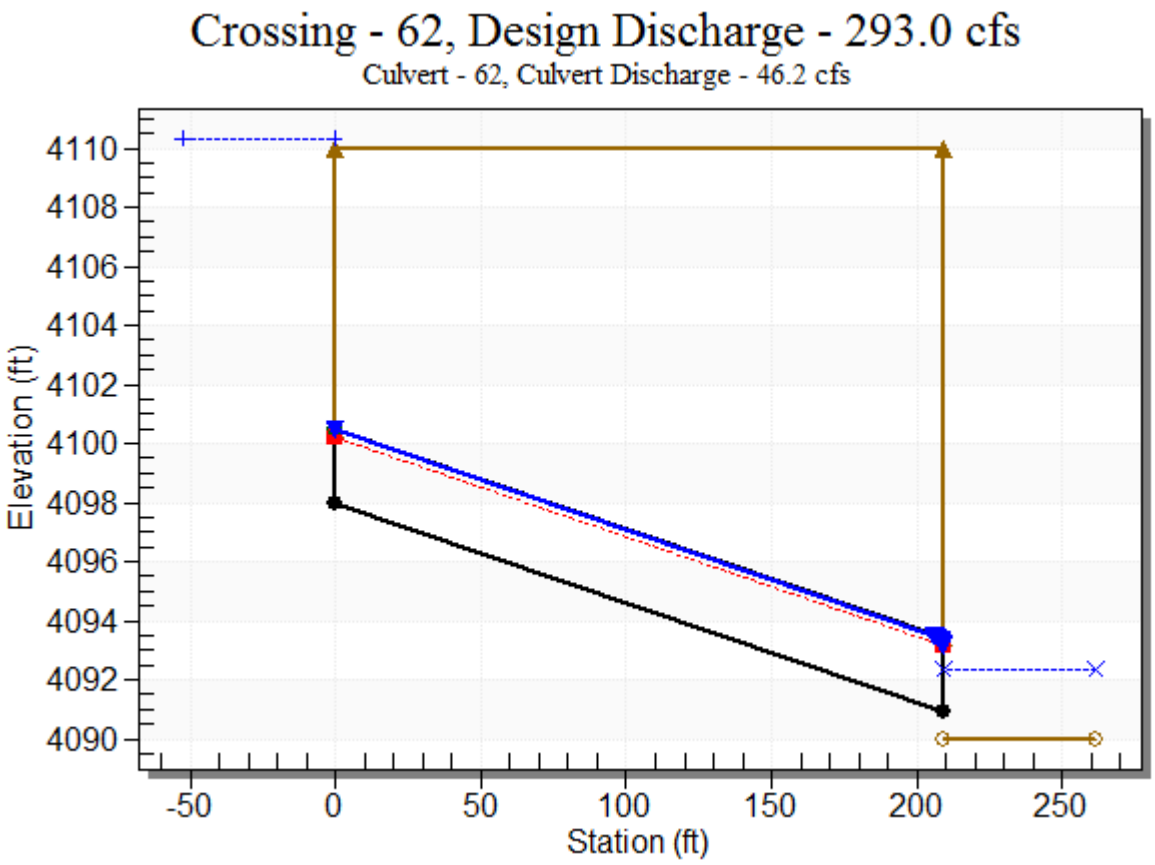
Design Flow: 47 cfs

Maximum Flow: 100 cfs

## Table 7 - Summary of Culvert Flows at Crossing: 61

| Headwater Elevation (ft) | Total Discharge (cfs) | 61 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4095.08 | 0.00 | 0.00 | 0.00 | 1 |
| 4096.77 | 10.00 | 10.00 | 0.00 | 1 |
| 4097.62 | 20.00 | 20.00 | 0.00 | 1 |
| 4100.01 | 30.00 | 28.99 | 0.74 | 91 |
| 4100.04 | 40.00 | 29.08 | 10.75 | 6 |
| 4100.06 | 47.00 | 29.12 | 17.63 | 4 |
| 4100.09 | 60.00 | 29.18 | 30.66 | 4 |
| 4100.11 | 70.00 | 29.22 | 40.48 | 3 |
| 4100.12 | 80.00 | 29.26 | 50.56 | 3 |
| 4100.14 | 90.00 | 29.29 | 60.62 | 3 |
| 4100.15 | 100.00 | 29.32 | 70.02 | 2 |
| 4100.00 | 28.97 | 28.97 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 62**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

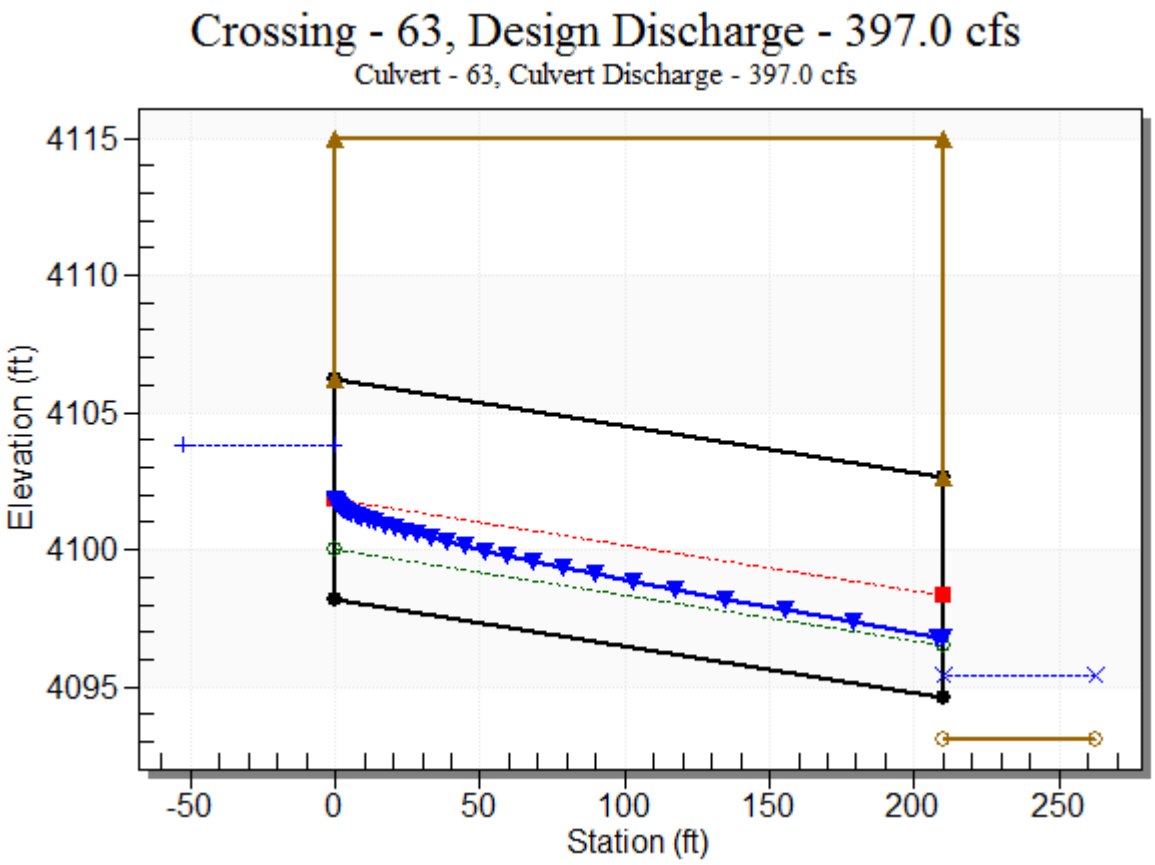
Design Flow: 293 cfs

Maximum Flow: 350 cfs

## Table 8 - Summary of Culvert Flows at Crossing: 62

| Headwater Elevation (ft) | Total Discharge (cfs) | 62 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4097.98 | 0.00 | 0.00 | 0.00 | 1 |
| 4102.67 | 35.00 | 35.00 | 0.00 | 1 |
| 4110.07 | 70.00 | 45.81 | 23.74 | 22 |
| 4110.14 | 105.00 | 45.89 | 58.61 | 5 |
| 4110.18 | 140.00 | 45.96 | 93.46 | 4 |
| 4110.23 | 175.00 | 46.02 | 128.73 | 4 |
| 4110.27 | 210.00 | 46.07 | 163.18 | 3 |
| 4110.30 | 245.00 | 46.12 | 198.43 | 3 |
| 4110.34 | 280.00 | 46.16 | 233.63 | 3 |
| 4110.35 | 293.00 | 46.18 | 245.84 | 2 |
| 4110.40 | 350.00 | 46.25 | 303.69 | 3 |
| 4110.00 | 45.72 | 45.72 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 63**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

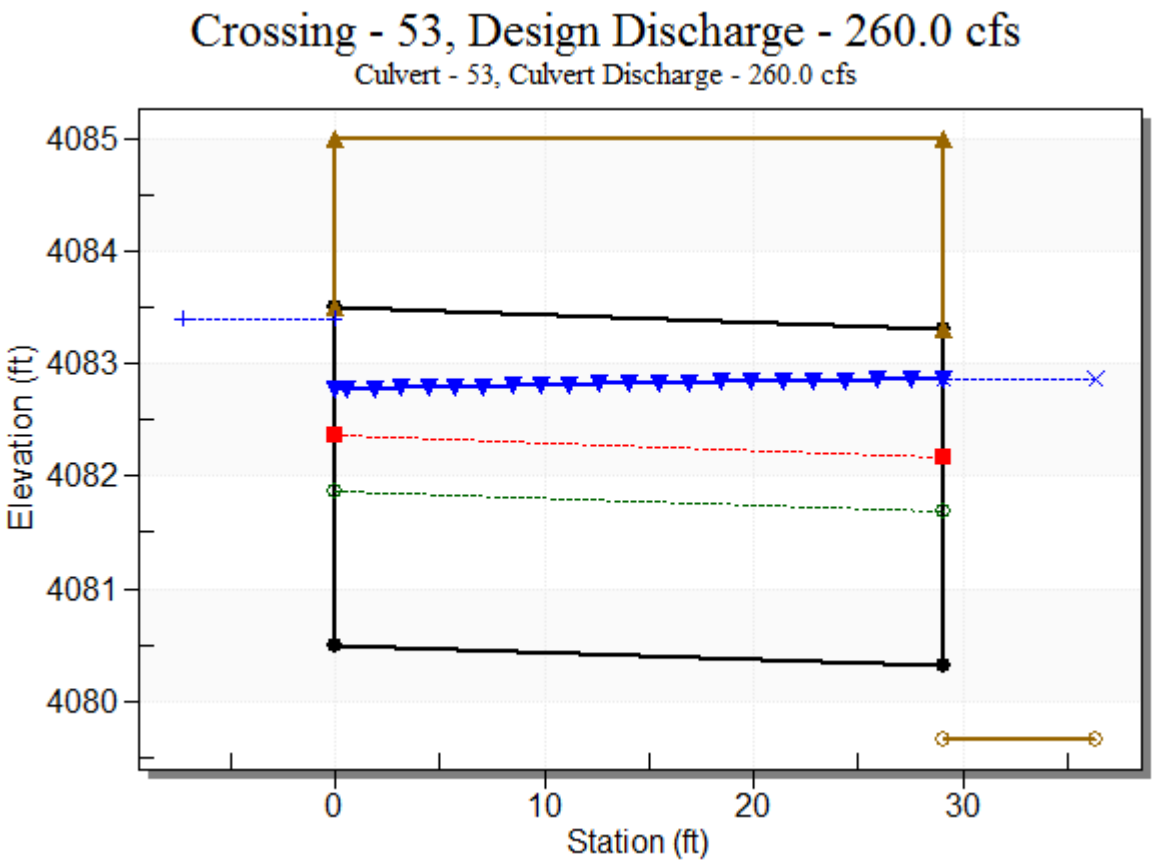
Design Flow: 397 cfs

Maximum Flow: 450 cfs

## Table 9 - Summary of Culvert Flows at Crossing: 63

| Headwater Elevation (ft) | Total Discharge (cfs) | 63 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4098.18 | 0.00 | 0.00 | 0.00 | 1 |
| 4099.50 | 45.00 | 45.00 | 0.00 | 1 |
| 4100.27 | 90.00 | 90.00 | 0.00 | 1 |
| 4100.92 | 135.00 | 135.00 | 0.00 | 1 |
| 4101.50 | 180.00 | 180.00 | 0.00 | 1 |
| 4102.04 | 225.00 | 225.00 | 0.00 | 1 |
| 4102.54 | 270.00 | 270.00 | 0.00 | 1 |
| 4103.02 | 315.00 | 315.00 | 0.00 | 1 |
| 4103.47 | 360.00 | 360.00 | 0.00 | 1 |
| 4103.83 | 397.00 | 397.00 | 0.00 | 1 |
| 4104.32 | 450.00 | 450.00 | 0.00 | 1 |
| 4115.00 | 1590.85 | 1590.85 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 53**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 260 cfs

Maximum Flow: 300 cfs

## Table 10 - Summary of Culvert Flows at Crossing: 53

| Headwater Elevation (ft) | Total Discharge (cfs) | 53 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4080.50 | 0.00 | 0.00 | 0.00 | 1 |
| 4081.19 | 30.00 | 30.00 | 0.00 | 1 |
| 4081.59 | 60.00 | 60.00 | 0.00 | 1 |
| 4081.93 | 90.00 | 90.00 | 0.00 | 1 |
| 4082.23 | 120.00 | 120.00 | 0.00 | 1 |
| 4082.51 | 150.00 | 150.00 | 0.00 | 1 |
| 4082.77 | 180.00 | 180.00 | 0.00 | 1 |
| 4083.01 | 210.00 | 210.00 | 0.00 | 1 |
| 4083.24 | 240.00 | 240.00 | 0.00 | 1 |
| 4083.39 | 260.00 | 260.00 | 0.00 | 1 |
| 4083.81 | 300.00 | 299.29 | 0.00 | 11 |
| 4085.00 | 299.39 | 299.39 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 52

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

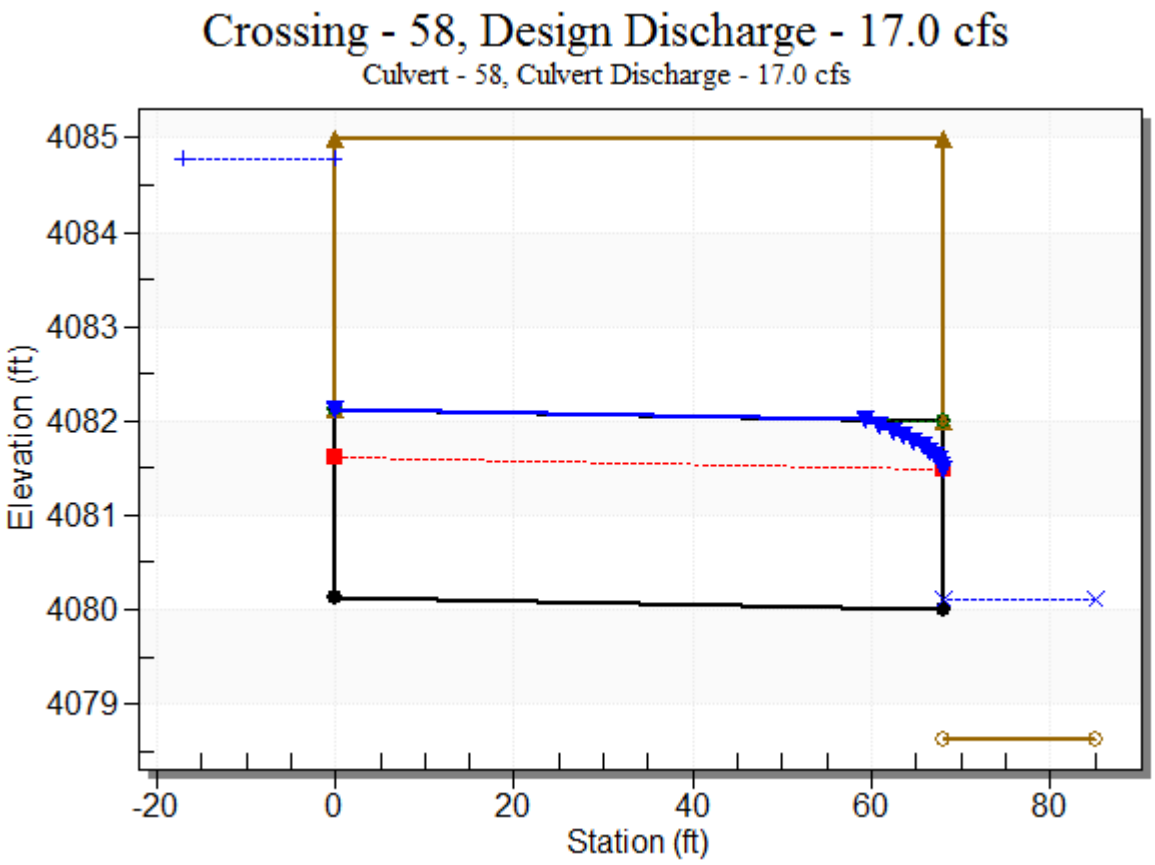
Design Flow: 262 cfs

Maximum Flow: 338 cfs

## Table 11 - Summary of Culvert Flows at Crossing: 52

| Headwater Elevation (ft) | Total Discharge (cfs) | 52 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4076.00 | 0.00 | 0.00 | 0.00 | 1 |
| 4076.77 | 33.80 | 33.80 | 0.00 | 1 |
| 4077.23 | 67.60 | 67.60 | 0.00 | 1 |
| 4077.60 | 101.40 | 101.40 | 0.00 | 1 |
| 4077.91 | 135.20 | 135.20 | 0.00 | 1 |
| 4078.20 | 169.00 | 169.00 | 0.00 | 1 |
| 4078.48 | 202.80 | 202.80 | 0.00 | 1 |
| 4078.75 | 236.60 | 236.60 | 0.00 | 1 |
| 4078.96 | 262.00 | 262.00 | 0.00 | 1 |
| 4079.30 | 304.20 | 304.20 | 0.00 | 1 |
| 4079.58 | 338.00 | 338.00 | 0.00 | 1 |
| 4081.00 | 487.23 | 487.23 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 58**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

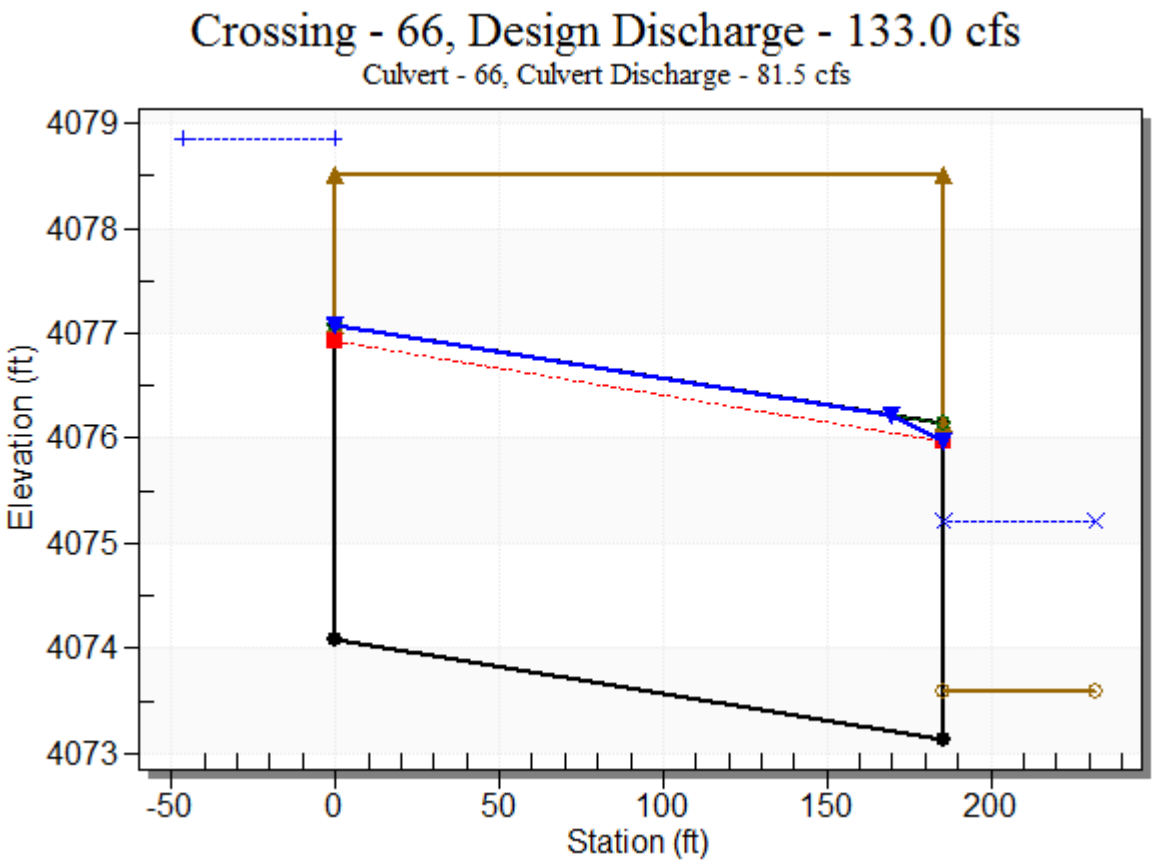
Design Flow: 17 cfs

Maximum Flow: 21 cfs

## Table 12 - Summary of Culvert Flows at Crossing: 58

| Headwater Elevation (ft) | Total Discharge (cfs) | 58 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4080.12 | 0.00 | 0.00 | 0.00 | 1 |
| 4081.07 | 2.10 | 2.10 | 0.00 | 1 |
| 4081.48 | 4.20 | 4.20 | 0.00 | 1 |
| 4081.83 | 6.30 | 6.30 | 0.00 | 1 |
| 4082.18 | 8.40 | 8.40 | 0.00 | 1 |
| 4082.64 | 10.50 | 10.50 | 0.00 | 1 |
| 4083.24 | 12.60 | 12.60 | 0.00 | 1 |
| 4083.94 | 14.70 | 14.70 | 0.00 | 1 |
| 4084.71 | 16.80 | 16.80 | 0.00 | 1 |
| 4084.78 | 17.00 | 17.00 | 0.00 | 1 |
| 4085.04 | 21.00 | 17.70 | 3.17 | 10 |
| 4085.00 | 17.61 | 17.61 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 66**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 133 cfs

Maximum Flow: 200 cfs

## Table 13 - Summary of Culvert Flows at Crossing: 66

| Headwater Elevation (ft) | Total Discharge (cfs) | 66 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4074.08 | 0.00 | 0.00 | 0.00 | 1 |
| 4075.81 | 20.00 | 20.00 | 0.00 | 1 |
| 4076.82 | 40.00 | 40.00 | 0.00 | 1 |
| 4077.71 | 60.00 | 60.00 | 0.00 | 1 |
| 4078.55 | 80.00 | 77.36 | 2.55 | 10 |
| 4078.70 | 100.00 | 79.31 | 20.56 | 7 |
| 4078.80 | 120.00 | 80.68 | 39.13 | 5 |
| 4078.86 | 133.00 | 81.47 | 51.30 | 4 |
| 4078.97 | 160.00 | 82.92 | 76.91 | 4 |
| 4079.03 | 180.00 | 86.49 | 93.20 | 2 |
| 4079.10 | 200.00 | 86.50 | 113.46 | 4 |
| 4078.50 | 76.95 | 76.95 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 70

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

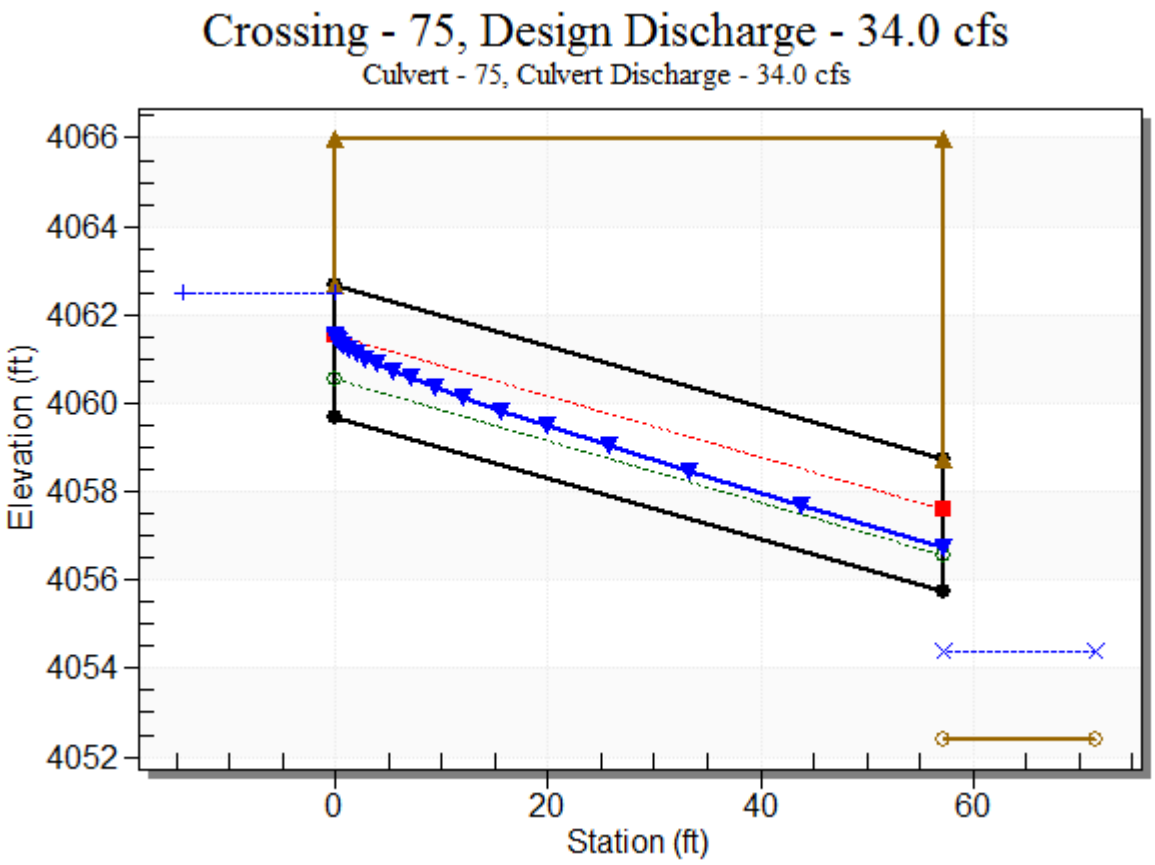
Design Flow: 25 cfs

Maximum Flow: 50 cfs

## Table 14 - Summary of Culvert Flows at Crossing: 70

| Headwater Elevation (ft) | Total Discharge (cfs) | 70 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4060.53 | 0.00 | 0.00 | 0.00 | 1 |
| 4061.43 | 5.00 | 5.00 | 0.00 | 1 |
| 4061.83 | 10.00 | 10.00 | 0.00 | 1 |
| 4062.17 | 15.00 | 15.00 | 0.00 | 1 |
| 4062.49 | 20.00 | 20.00 | 0.00 | 1 |
| 4062.77 | 25.00 | 25.00 | 0.00 | 1 |
| 4063.02 | 30.00 | 30.00 | 0.00 | 1 |
| 4063.27 | 35.00 | 35.00 | 0.00 | 1 |
| 4063.53 | 40.00 | 40.00 | 0.00 | 1 |
| 4063.81 | 45.00 | 45.00 | 0.00 | 1 |
| 4064.10 | 50.00 | 50.00 | 0.00 | 1 |
| 4068.00 | 92.76 | 92.76 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 75**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 34 cfs

Maximum Flow: 50 cfs

## Table 15 - Summary of Culvert Flows at Crossing: 75

| Headwater Elevation (ft) | Total Discharge (cfs) | 75 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4059.67 | 0.00 | 0.00 | 0.00 | 1 |
| 4060.57 | 5.00 | 5.00 | 0.00 | 1 |
| 4060.97 | 10.00 | 10.00 | 0.00 | 1 |
| 4061.33 | 15.00 | 15.00 | 0.00 | 1 |
| 4061.67 | 20.00 | 20.00 | 0.00 | 1 |
| 4061.98 | 25.00 | 25.00 | 0.00 | 1 |
| 4062.27 | 30.00 | 30.00 | 0.00 | 1 |
| 4062.50 | 34.00 | 34.00 | 0.00 | 1 |
| 4062.87 | 40.00 | 40.00 | 0.00 | 1 |
| 4063.20 | 45.00 | 45.00 | 0.00 | 1 |
| 4063.57 | 50.00 | 50.00 | 0.00 | 1 |
| 4066.00 | 74.79 | 74.79 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 76

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

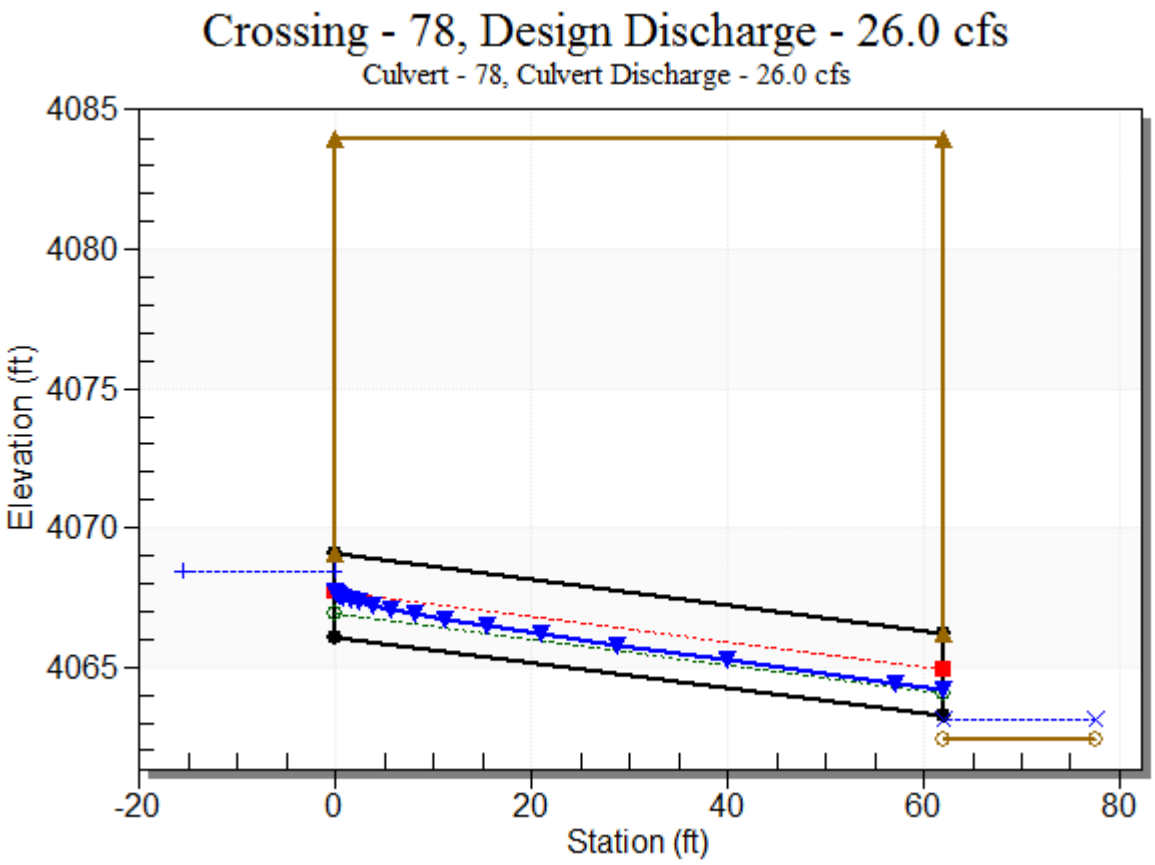
Design Flow: 38 cfs

Maximum Flow: 50 cfs

## Table 16 - Summary of Culvert Flows at Crossing: 76

| Headwater Elevation (ft) | Total Discharge (cfs) | 76 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4061.05 | 0.00 | 0.00 | 0.00 | 1 |
| 4061.93 | 5.00 | 5.00 | 0.00 | 1 |
| 4062.31 | 10.00 | 10.00 | 0.00 | 1 |
| 4062.60 | 15.00 | 15.00 | 0.00 | 1 |
| 4062.88 | 20.00 | 20.00 | 0.00 | 1 |
| 4063.17 | 25.00 | 25.00 | 0.00 | 1 |
| 4063.44 | 30.00 | 30.00 | 0.00 | 1 |
| 4063.68 | 35.00 | 35.00 | 0.00 | 1 |
| 4063.82 | 38.00 | 38.00 | 0.00 | 1 |
| 4064.15 | 45.00 | 45.00 | 0.00 | 1 |
| 4064.38 | 50.00 | 50.00 | 0.00 | 1 |
| 4072.00 | 142.18 | 142.18 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 78**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 26 cfs

Maximum Flow: 50 cfs

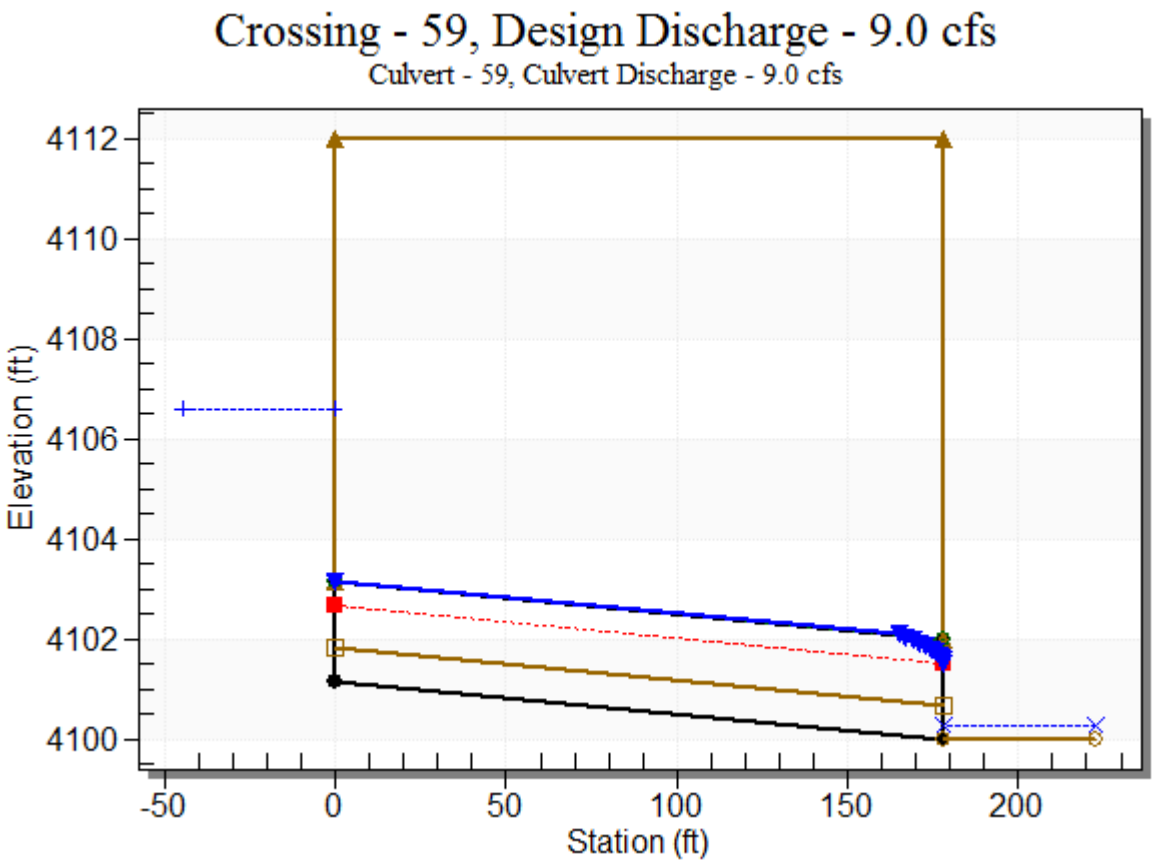
## Table 17 - Summary of Culvert Flows at Crossing: 78

| Headwater Elevation (ft) | Total Discharge (cfs) | 78 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4066.06 | 0.00 | 0.00 | 0.00 | 1 |
| 4066.98 | 5.00 | 5.00 | 0.00 | 1 |
| 4067.39 | 10.00 | 10.00 | 0.00 | 1 |
| 4067.75 | 15.00 | 15.00 | 0.00 | 1 |
| 4068.09 | 20.00 | 20.00 | 0.00 | 1 |
| 4068.40 | 25.00 | 25.00 | 0.00 | 1 |
| 4068.46 | 26.00 | 26.00 | 0.00 | 1 |
| 4068.99 | 35.00 | 35.00 | 0.00 | 1 |
| 4069.29 | 40.00 | 40.00 | 0.00 | 1 |
| 4069.63 | 45.00 | 45.00 | 0.00 | 1 |
| 4069.99 | 50.00 | 50.00 | 0.00 | 1 |
| 4084.00 | 139.49 | 139.49 | 0.00 | Overtopping |

# HY-8 Culvert Analysis Report

Existing with sediment embedment

**Water Surface Profile Plot for Culvert: 59**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

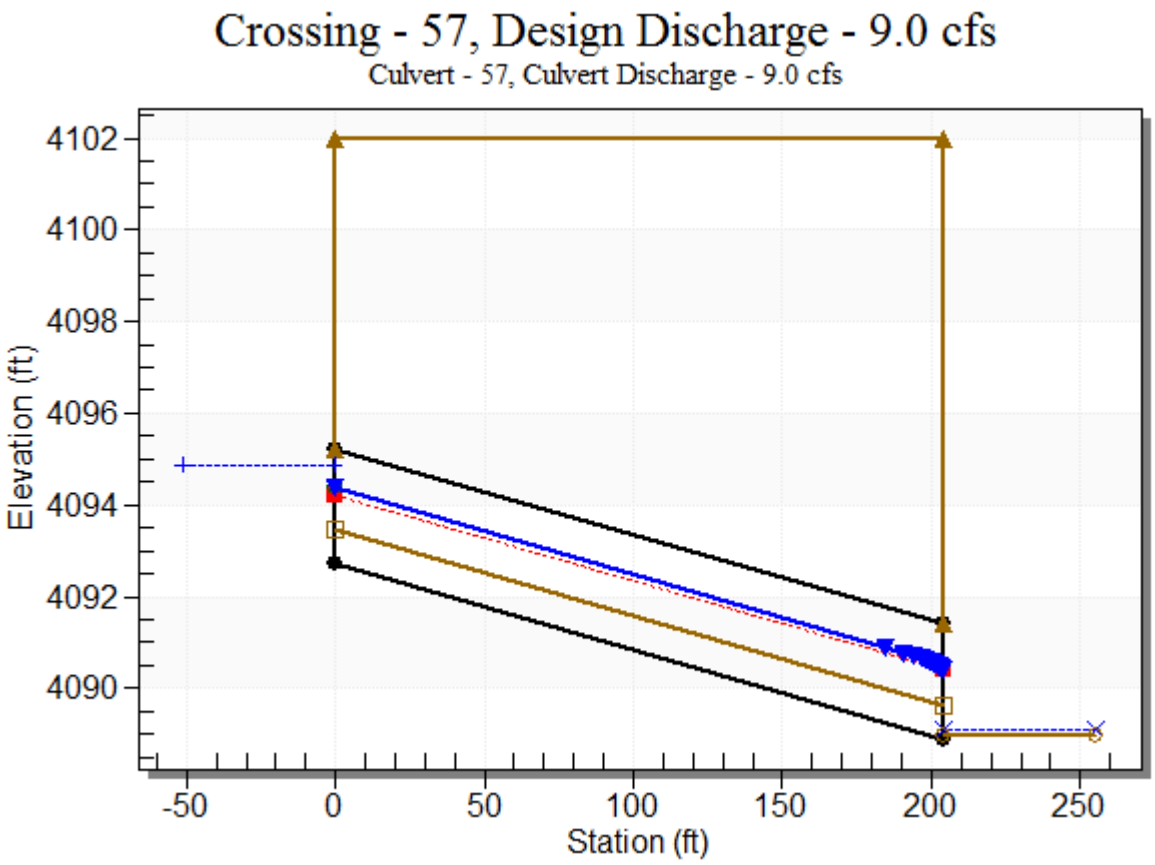
Design Flow: 9 cfs

Maximum Flow: 9 cfs

## Table 1 - Summary of Culvert Flows at Crossing: 59

| Headwater Elevation (ft) | Total Discharge (cfs) | 59 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4101.82 | 0.00 | 0.00 | 0.00 | 1 |
| 4102.21 | 0.90 | 0.90 | 0.00 | 1 |
| 4102.43 | 1.80 | 1.80 | 0.00 | 1 |
| 4102.63 | 2.70 | 2.70 | 0.00 | 1 |
| 4102.84 | 3.60 | 3.60 | 0.00 | 1 |
| 4103.06 | 4.50 | 4.50 | 0.00 | 1 |
| 4103.47 | 5.40 | 5.40 | 0.00 | 1 |
| 4104.07 | 6.30 | 6.30 | 0.00 | 1 |
| 4104.81 | 7.20 | 7.20 | 0.00 | 1 |
| 4105.65 | 8.10 | 8.10 | 0.00 | 1 |
| 4106.60 | 9.00 | 9.00 | 0.00 | 1 |
| 4112.00 | 13.03 | 13.03 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 57**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

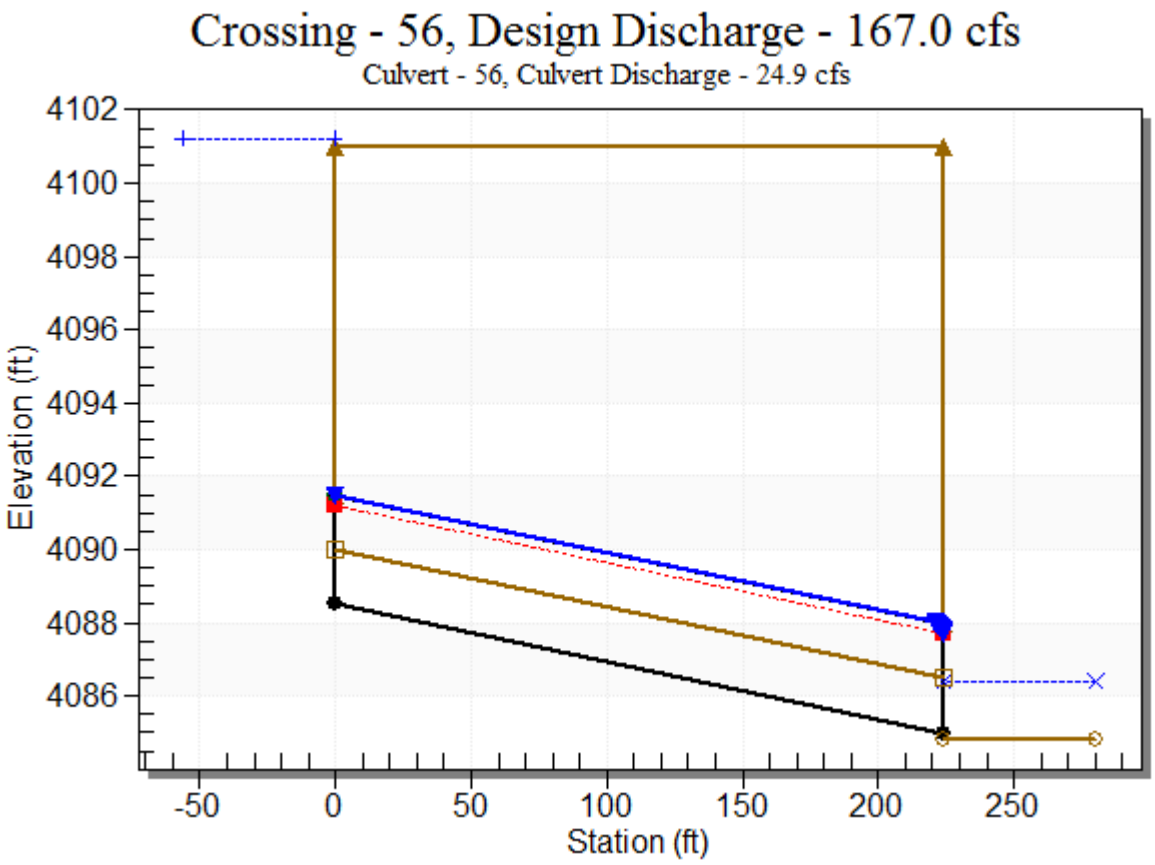
Design Flow: 9 cfs

Maximum Flow: 9 cfs

## Table 2 - Summary of Culvert Flows at Crossing: 57

| Headwater Elevation (ft) | Total Discharge (cfs) | 57 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4093.45 | 0.00 | 0.00 | 0.00 | 1 |
| 4093.76 | 0.90 | 0.90 | 0.00 | 1 |
| 4093.94 | 1.80 | 1.80 | 0.00 | 1 |
| 4094.09 | 2.70 | 2.70 | 0.00 | 1 |
| 4094.22 | 3.60 | 3.60 | 0.00 | 1 |
| 4094.34 | 4.50 | 4.50 | 0.00 | 1 |
| 4094.45 | 5.40 | 5.40 | 0.00 | 1 |
| 4094.56 | 6.30 | 6.30 | 0.00 | 1 |
| 4094.66 | 7.20 | 7.20 | 0.00 | 1 |
| 4094.76 | 8.10 | 8.10 | 0.00 | 1 |
| 4094.85 | 9.00 | 9.00 | 0.00 | 1 |
| 4102.00 | 24.96 | 24.96 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 56**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

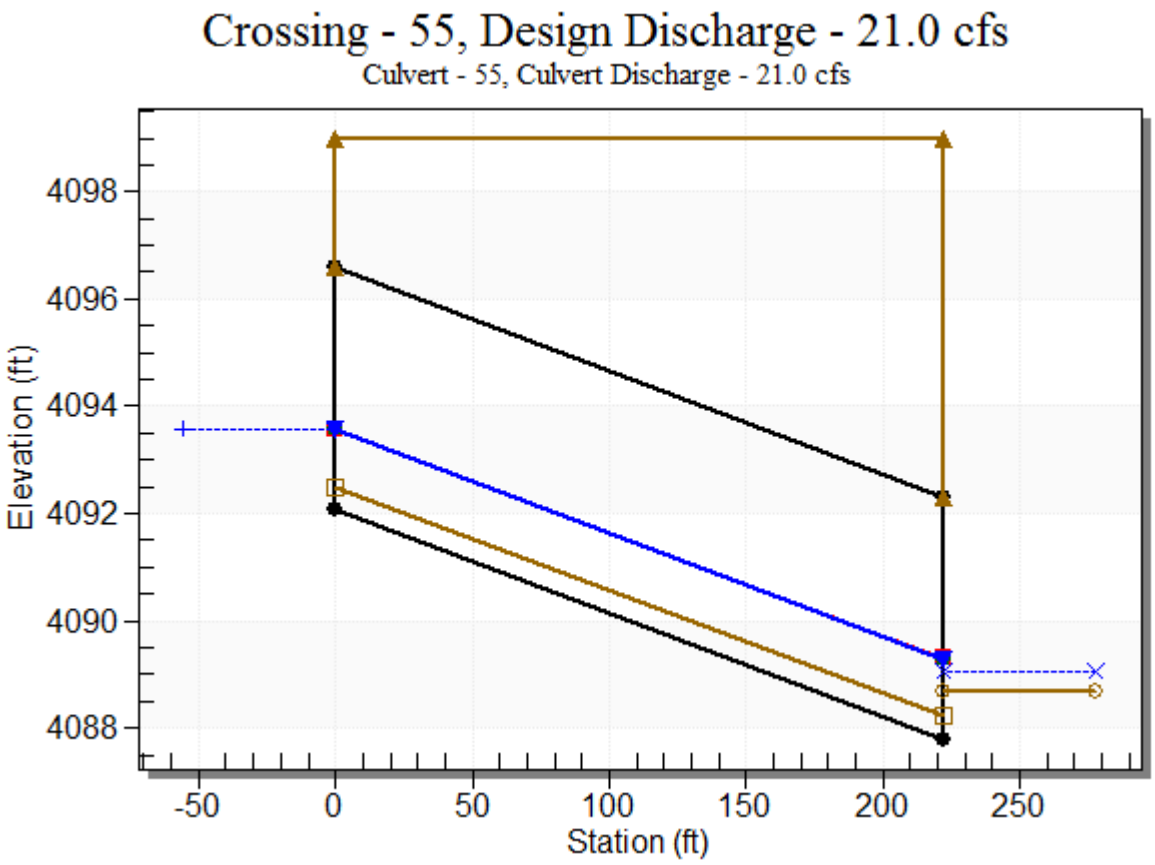
Design Flow: 167 cfs

Maximum Flow: 300 cfs

## Table 3 - Summary of Culvert Flows at Crossing: 56

| Headwater Elevation (ft) | Total Discharge (cfs) | 56 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4090.00 | 0.00 | 0.00 | 0.00 | 1 |
| 4101.03 | 30.00 | 24.69 | 5.09 | 21 |
| 4101.10 | 60.00 | 24.76 | 34.83 | 6 |
| 4101.14 | 90.00 | 24.80 | 64.42 | 4 |
| 4101.19 | 120.00 | 24.85 | 94.82 | 4 |
| 4101.22 | 150.00 | 24.88 | 124.24 | 3 |
| 4101.24 | 167.00 | 24.89 | 141.67 | 3 |
| 4101.29 | 210.00 | 24.94 | 184.67 | 3 |
| 4101.32 | 240.00 | 24.96 | 214.91 | 3 |
| 4101.35 | 270.00 | 24.99 | 244.97 | 3 |
| 4101.37 | 300.00 | 25.02 | 274.48 | 2 |
| 4101.00 | 24.67 | 24.67 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 55**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 21 cfs

Maximum Flow: 50 cfs

## Table 4 - Summary of Culvert Flows at Crossing: 55

| Headwater Elevation (ft) | Total Discharge (cfs) | 55 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4092.50 | 0.00 | 0.00 | 0.00 | 1 |
| 4092.98 | 5.00 | 5.00 | 0.00 | 1 |
| 4093.18 | 10.00 | 10.00 | 0.00 | 1 |
| 4093.37 | 15.00 | 15.00 | 0.00 | 1 |
| 4093.55 | 20.00 | 20.00 | 0.00 | 1 |
| 4093.58 | 21.00 | 21.00 | 0.00 | 1 |
| 4093.88 | 30.00 | 30.00 | 0.00 | 1 |
| 4094.03 | 35.00 | 35.00 | 0.00 | 1 |
| 4095.36 | 40.00 | 40.00 | 0.00 | 1 |
| 4095.57 | 45.00 | 45.00 | 0.00 | 1 |
| 4095.76 | 50.00 | 50.00 | 0.00 | 1 |
| 4099.00 | 123.32 | 123.32 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 54

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

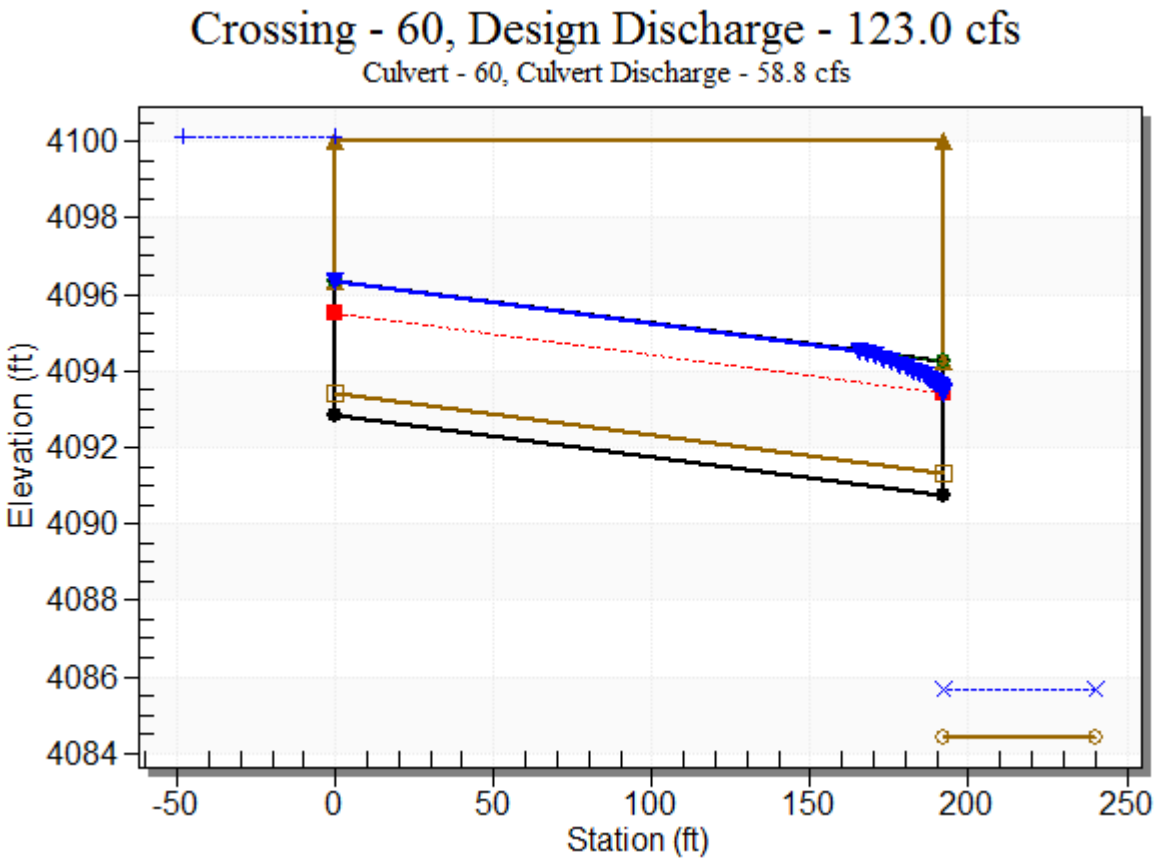
Design Flow: 254 cfs

Maximum Flow: 300 cfs

## Table 5 - Summary of Culvert Flows at Crossing: 54

| Headwater Elevation (ft) | Total Discharge (cfs) | 54 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4093.44 | 0.00 | 0.00 | 0.00 | 1 |
| 4095.62 | 30.00 | 30.00 | 0.00 | 1 |
| 4097.01 | 60.00 | 60.00 | 0.00 | 1 |
| 4099.03 | 90.00 | 84.53 | 4.72 | 8 |
| 4099.10 | 120.00 | 85.24 | 34.35 | 6 |
| 4099.14 | 150.00 | 85.71 | 63.53 | 4 |
| 4099.18 | 180.00 | 86.09 | 93.57 | 4 |
| 4099.22 | 210.00 | 86.41 | 122.70 | 3 |
| 4099.25 | 240.00 | 86.72 | 152.72 | 3 |
| 4099.27 | 254.00 | 86.86 | 166.93 | 3 |
| 4099.32 | 300.00 | 87.26 | 212.55 | 3 |
| 4099.00 | 84.27 | 84.27 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 60**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

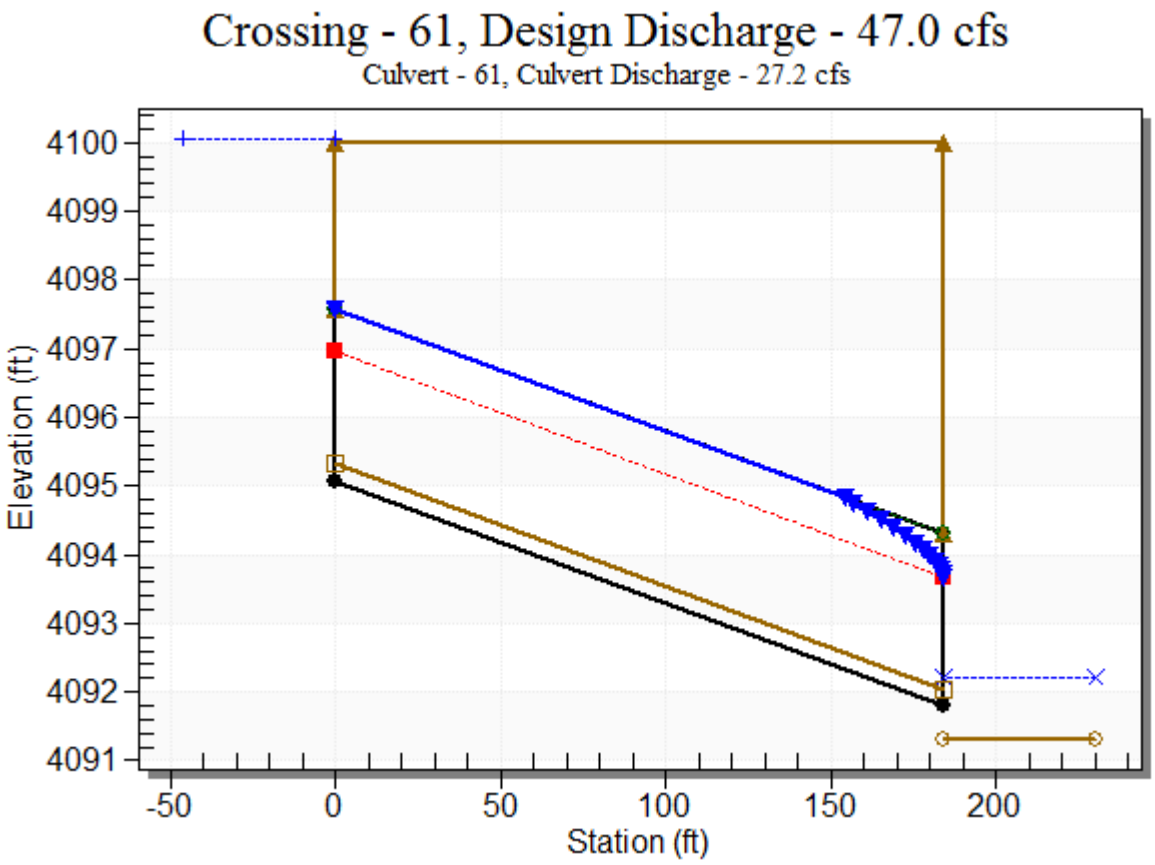
Design Flow: 123 cfs

Maximum Flow: 200 cfs

## Table 6 - Summary of Culvert Flows at Crossing: 60

| Headwater Elevation (ft) | Total Discharge (cfs) | 60 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4093.39 | 0.00 | 0.00 | 0.00 | 1 |
| 4095.38 | 20.00 | 20.00 | 0.00 | 1 |
| 4096.73 | 40.00 | 40.00 | 0.00 | 1 |
| 4100.01 | 60.00 | 58.19 | 1.30 | 63 |
| 4100.07 | 80.00 | 58.46 | 21.17 | 6 |
| 4100.11 | 100.00 | 58.63 | 40.79 | 4 |
| 4100.14 | 120.00 | 58.78 | 60.99 | 4 |
| 4100.14 | 123.00 | 58.79 | 63.37 | 2 |
| 4100.19 | 160.00 | 59.02 | 100.24 | 3 |
| 4100.22 | 180.00 | 59.13 | 120.64 | 3 |
| 4100.24 | 200.00 | 59.23 | 140.67 | 3 |
| 4100.00 | 58.14 | 58.14 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 61**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

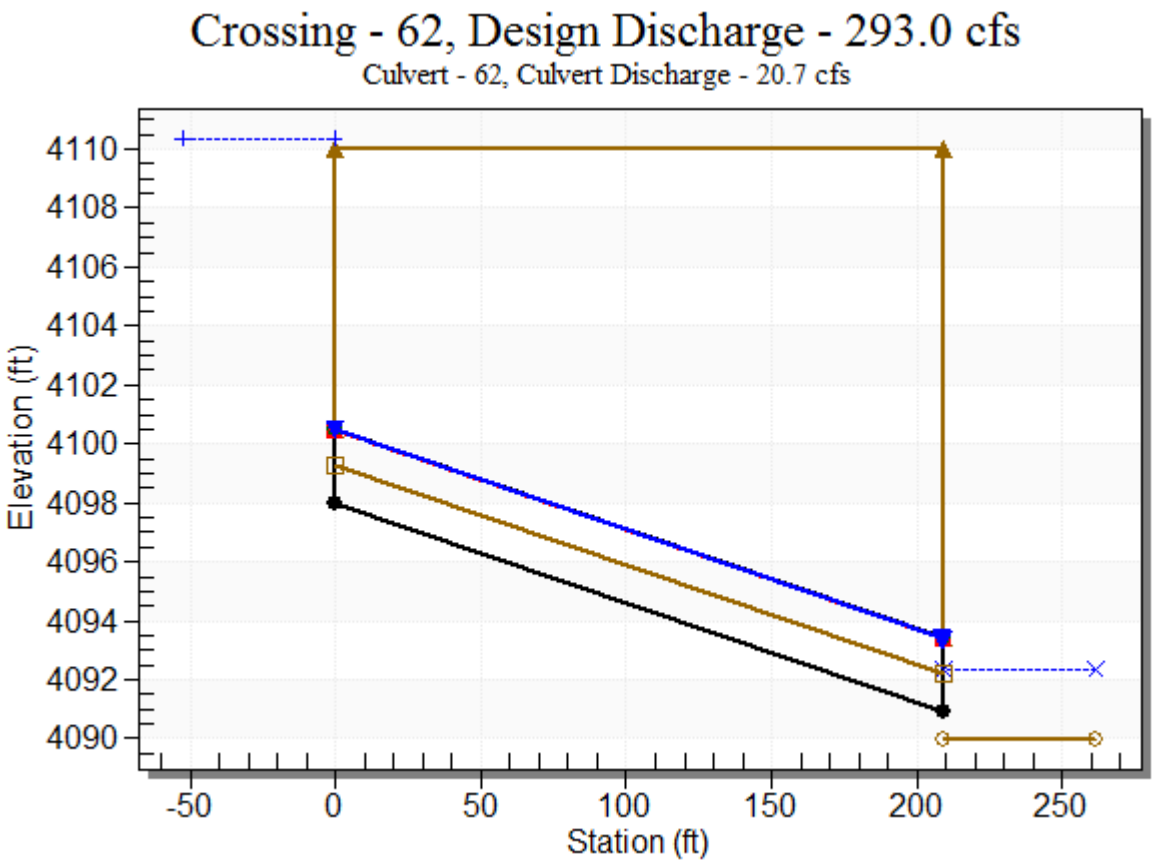
Design Flow: 47 cfs

Maximum Flow: 100 cfs

## Table 7 - Summary of Culvert Flows at Crossing: 61

| Headwater Elevation (ft) | Total Discharge (cfs) | 61 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4095.32 | 0.00 | 0.00 | 0.00 | 1 |
| 4096.93 | 10.00 | 10.00 | 0.00 | 1 |
| 4097.84 | 20.00 | 20.00 | 0.00 | 1 |
| 4100.02 | 30.00 | 27.13 | 2.60 | 28 |
| 4100.05 | 40.00 | 27.20 | 12.51 | 5 |
| 4100.07 | 47.00 | 27.24 | 19.54 | 4 |
| 4100.09 | 60.00 | 27.30 | 32.57 | 4 |
| 4100.11 | 70.00 | 27.34 | 42.40 | 3 |
| 4100.13 | 80.00 | 27.37 | 52.47 | 3 |
| 4100.14 | 90.00 | 27.41 | 62.52 | 3 |
| 4100.15 | 100.00 | 27.44 | 71.97 | 2 |
| 4100.00 | 27.09 | 27.09 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 62**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 293 cfs

Maximum Flow: 350 cfs

## Table 8 - Summary of Culvert Flows at Crossing: 62

| Headwater Elevation (ft) | Total Discharge (cfs) | 62 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4099.29 | 0.00 | 0.00 | 0.00 | 1 |
| 4110.05 | 35.00 | 20.49 | 14.26 | 32 |
| 4110.12 | 70.00 | 20.54 | 49.20 | 6 |
| 4110.17 | 105.00 | 20.57 | 83.70 | 4 |
| 4110.22 | 140.00 | 20.59 | 119.08 | 4 |
| 4110.26 | 175.00 | 20.62 | 153.49 | 3 |
| 4110.29 | 210.00 | 20.64 | 188.81 | 3 |
| 4110.33 | 245.00 | 20.66 | 224.07 | 3 |
| 4110.36 | 280.00 | 20.68 | 259.20 | 3 |
| 4110.37 | 293.00 | 20.69 | 271.61 | 2 |
| 4110.42 | 350.00 | 20.72 | 328.41 | 2 |
| 4110.00 | 20.46 | 20.46 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 63

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

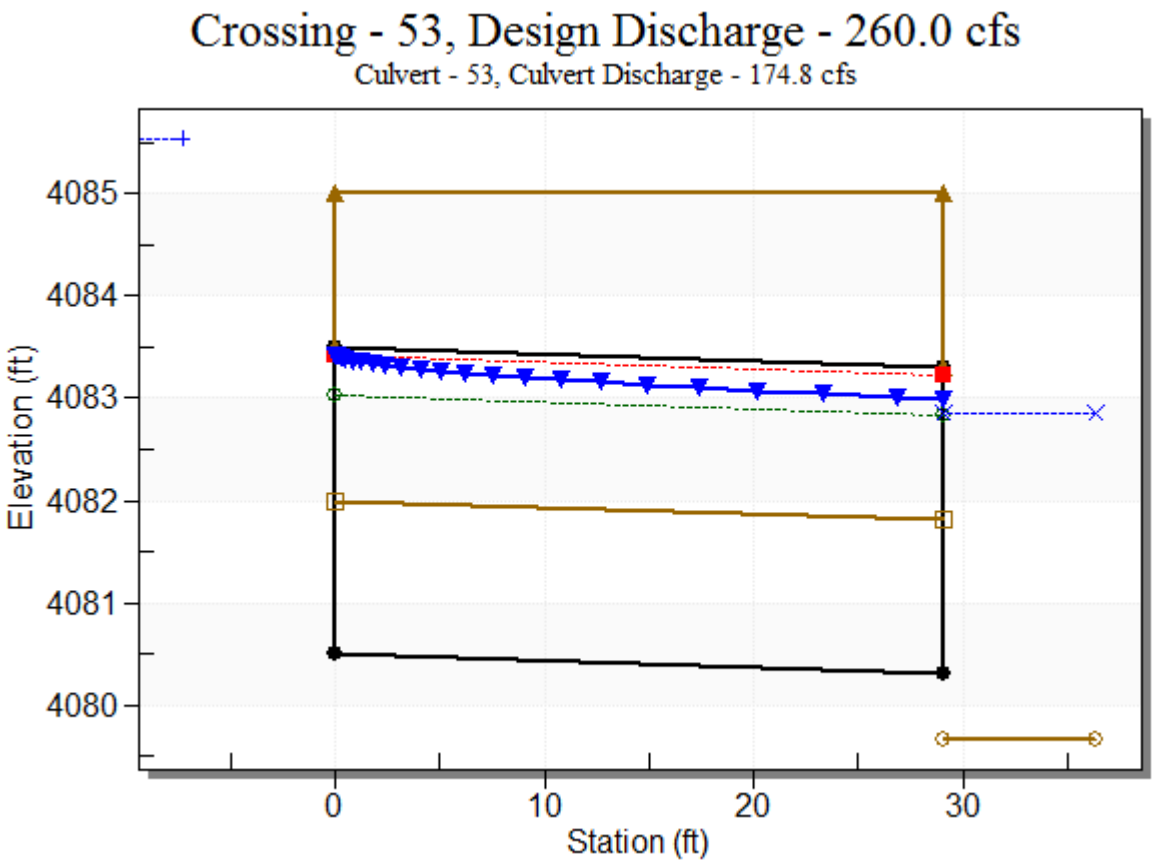
Design Flow: 397 cfs

Maximum Flow: 450 cfs

## Table 9 - Summary of Culvert Flows at Crossing: 63

| Headwater Elevation (ft) | Total Discharge (cfs) | 63 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4099.29 | 0.00 | 0.00 | 0.00 | 1 |
| 4101.57 | 45.00 | 45.00 | 0.00 | 1 |
| 4102.85 | 90.00 | 90.00 | 0.00 | 1 |
| 4103.41 | 135.00 | 135.00 | 0.00 | 1 |
| 4102.93 | 180.00 | 180.00 | 0.00 | 1 |
| 4103.46 | 225.00 | 225.00 | 0.00 | 1 |
| 4103.99 | 270.00 | 270.00 | 0.00 | 1 |
| 4104.52 | 315.00 | 315.00 | 0.00 | 1 |
| 4105.03 | 360.00 | 360.00 | 0.00 | 1 |
| 4105.45 | 397.00 | 397.00 | 0.00 | 1 |
| 4106.05 | 450.00 | 450.00 | 0.00 | 1 |
| 4115.00 | 928.94 | 928.94 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 53**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

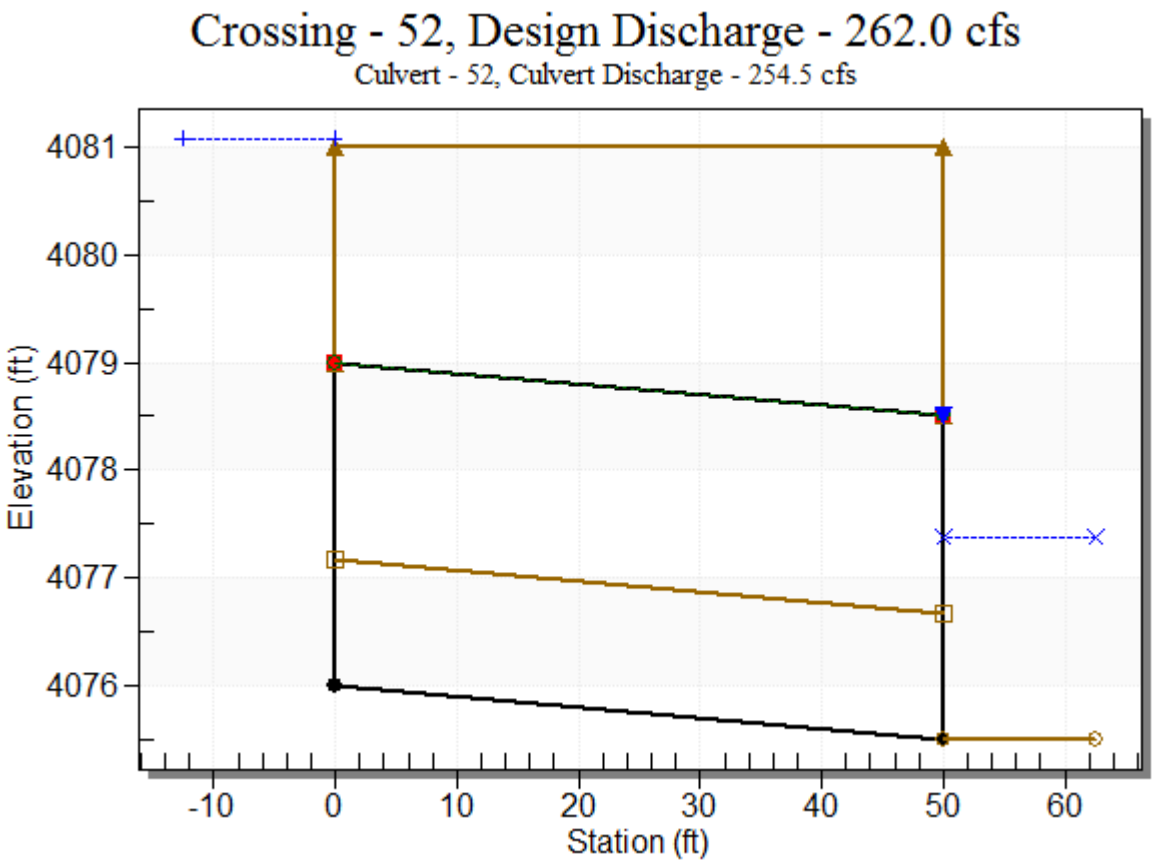
Design Flow: 260 cfs

Maximum Flow: 300 cfs

## Table 10 - Summary of Culvert Flows at Crossing: 53

| Headwater Elevation (ft) | Total Discharge (cfs) | 53 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4082.00 | 0.00 | 0.00 | 0.00 | 1 |
| 4082.74 | 30.00 | 30.00 | 0.00 | 1 |
| 4083.16 | 60.00 | 60.00 | 0.00 | 1 |
| 4083.56 | 90.00 | 90.00 | 0.00 | 1 |
| 4084.18 | 120.00 | 120.00 | 0.00 | 1 |
| 4084.86 | 150.00 | 150.00 | 0.00 | 1 |
| 4085.19 | 180.00 | 162.03 | 17.76 | 7 |
| 4085.34 | 210.00 | 167.48 | 42.28 | 5 |
| 4085.47 | 240.00 | 172.05 | 67.87 | 5 |
| 4085.54 | 260.00 | 174.81 | 85.05 | 4 |
| 4085.68 | 300.00 | 179.90 | 119.99 | 4 |
| 4085.00 | 154.98 | 154.98 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 52**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

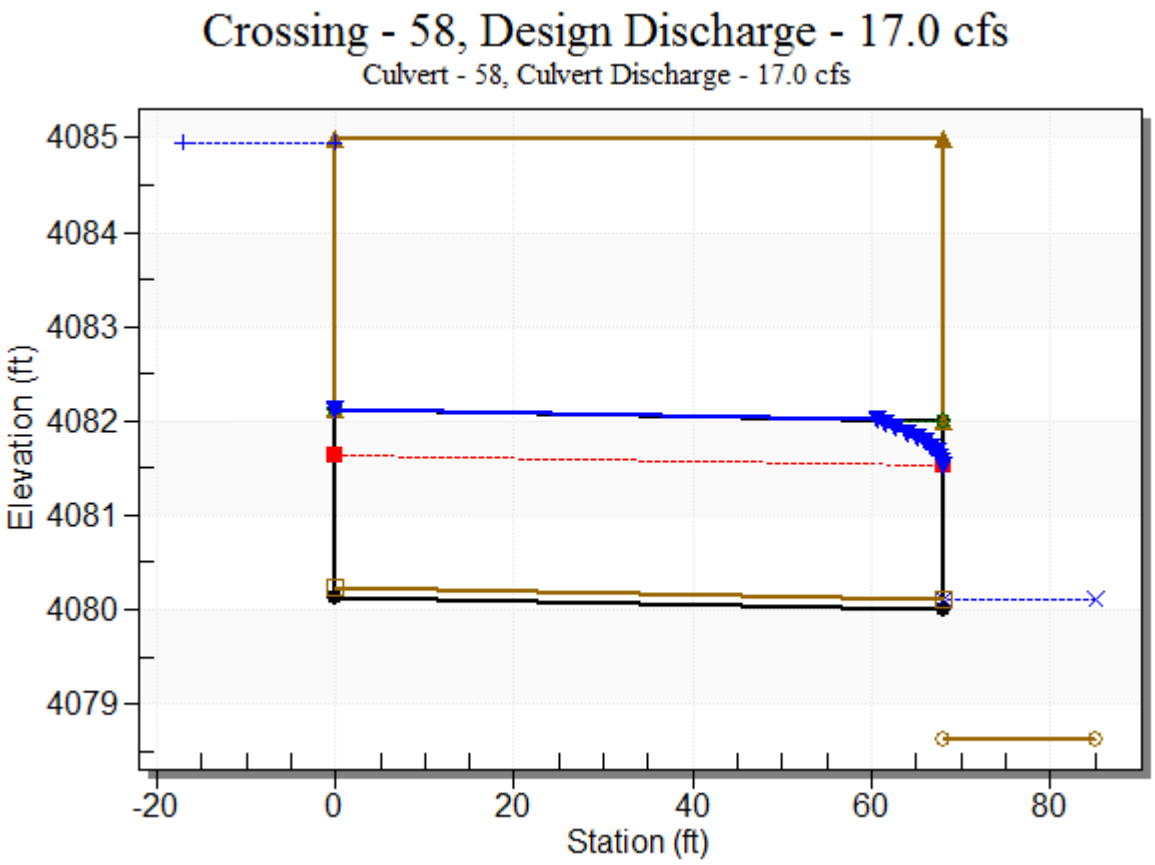
Design Flow: 262 cfs

Maximum Flow: 338 cfs

## Table 11 - Summary of Culvert Flows at Crossing: 52

| Headwater Elevation (ft) | Total Discharge (cfs) | 52 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4077.17 | 0.00 | 0.00 | 0.00 | 1 |
| 4077.99 | 33.80 | 33.80 | 0.00 | 1 |
| 4078.47 | 67.60 | 67.60 | 0.00 | 1 |
| 4078.88 | 101.40 | 101.40 | 0.00 | 1 |
| 4079.25 | 135.20 | 135.20 | 0.00 | 1 |
| 4079.58 | 169.00 | 169.00 | 0.00 | 1 |
| 4080.07 | 202.80 | 202.80 | 0.00 | 1 |
| 4080.71 | 236.60 | 236.60 | 0.00 | 1 |
| 4081.09 | 262.00 | 254.49 | 7.31 | 11 |
| 4081.27 | 304.20 | 262.55 | 41.41 | 6 |
| 4081.38 | 338.00 | 267.51 | 70.37 | 5 |
| 4081.00 | 250.70 | 250.70 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 58**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

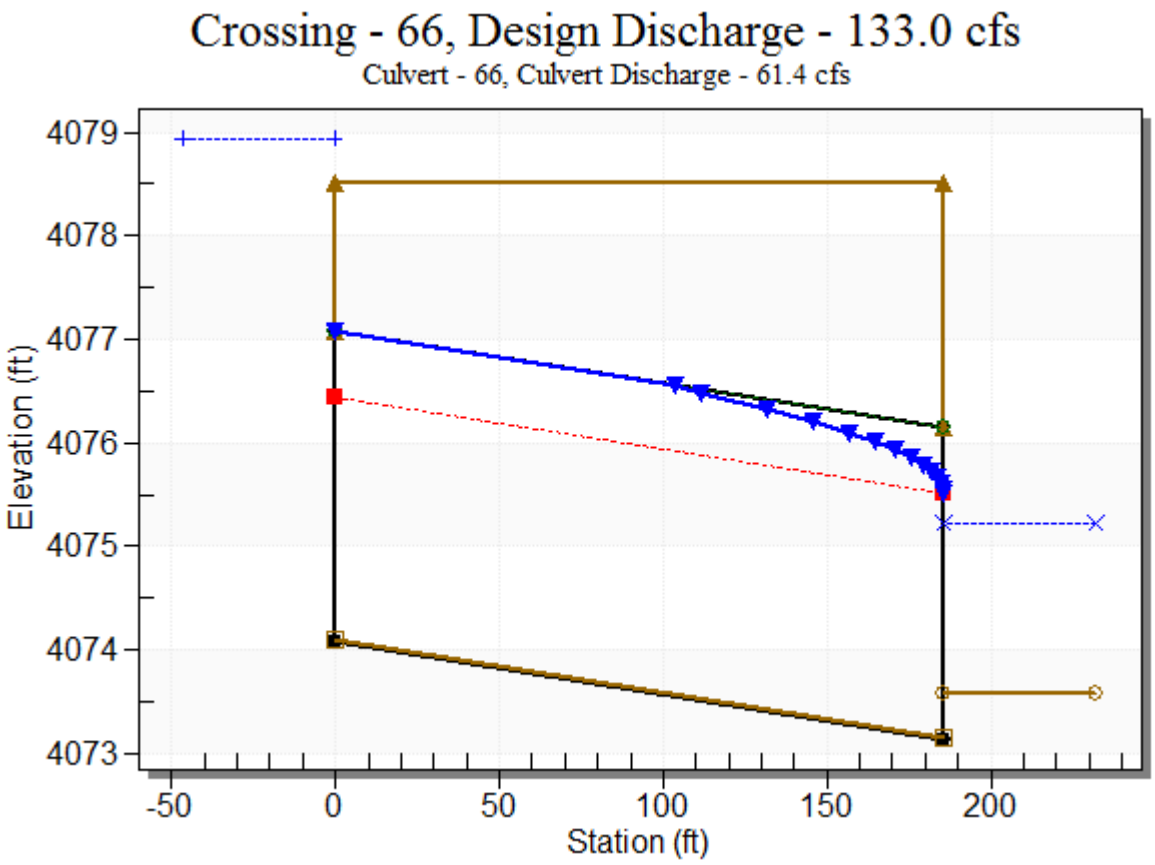
Design Flow: 17 cfs

Maximum Flow: 21 cfs

## Table 12 - Summary of Culvert Flows at Crossing: 58

| Headwater Elevation (ft) | Total Discharge (cfs) | 58 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4080.23 | 0.00 | 0.00 | 0.00 | 1 |
| 4081.13 | 2.10 | 2.10 | 0.00 | 1 |
| 4081.54 | 4.20 | 4.20 | 0.00 | 1 |
| 4081.90 | 6.30 | 6.30 | 0.00 | 1 |
| 4082.27 | 8.40 | 8.40 | 0.00 | 1 |
| 4082.80 | 10.50 | 10.50 | 0.00 | 1 |
| 4083.39 | 12.60 | 12.60 | 0.00 | 1 |
| 4084.09 | 14.70 | 14.70 | 0.00 | 1 |
| 4084.87 | 16.80 | 16.80 | 0.00 | 1 |
| 4084.95 | 17.00 | 17.00 | 0.00 | 1 |
| 4085.04 | 21.00 | 17.18 | 3.66 | 6 |
| 4085.00 | 17.13 | 17.13 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 66**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

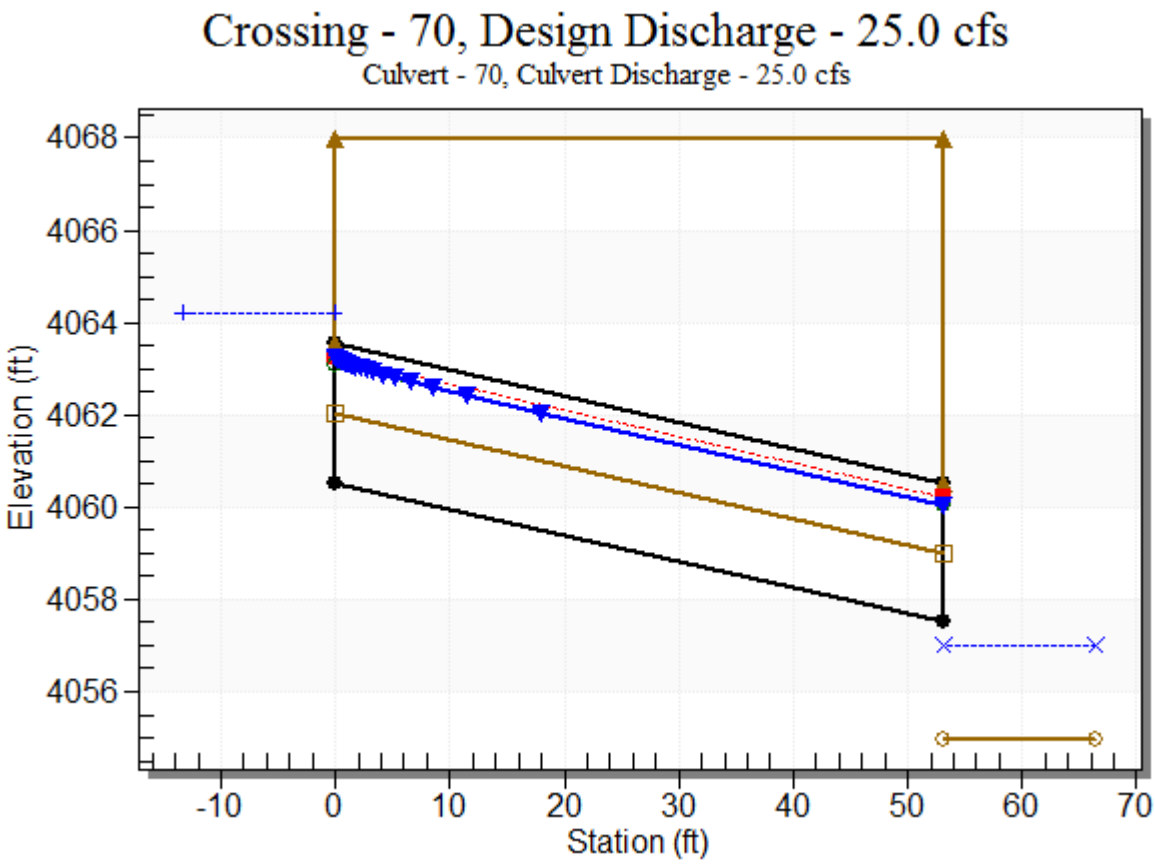
Design Flow: 133 cfs

Maximum Flow: 200 cfs

## Table 13 - Summary of Culvert Flows at Crossing: 66

| Headwater Elevation (ft) | Total Discharge (cfs) | 66 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4074.10 | 0.00 | 0.00 | 0.00 | 1 |
| 4076.15 | 20.00 | 20.00 | 0.00 | 1 |
| 4077.31 | 40.00 | 40.00 | 0.00 | 1 |
| 4078.55 | 60.00 | 57.34 | 2.49 | 20 |
| 4078.70 | 80.00 | 58.89 | 20.98 | 7 |
| 4078.80 | 100.00 | 59.96 | 39.85 | 5 |
| 4078.89 | 120.00 | 60.85 | 58.88 | 4 |
| 4078.94 | 133.00 | 61.39 | 71.50 | 4 |
| 4079.04 | 160.00 | 62.40 | 97.53 | 4 |
| 4079.11 | 180.00 | 63.08 | 116.69 | 3 |
| 4079.17 | 200.00 | 63.72 | 136.15 | 3 |
| 4078.50 | 56.84 | 56.84 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 70**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 25 cfs

Maximum Flow: 50 cfs

## Table 14 - Summary of Culvert Flows at Crossing: 70

| Headwater Elevation (ft) | Total Discharge (cfs) | 70 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4062.03 | 0.00 | 0.00 | 0.00 | 1 |
| 4062.62 | 5.00 | 5.00 | 0.00 | 1 |
| 4062.97 | 10.00 | 10.00 | 0.00 | 1 |
| 4063.28 | 15.00 | 15.00 | 0.00 | 1 |
| 4063.67 | 20.00 | 20.00 | 0.00 | 1 |
| 4064.20 | 25.00 | 25.00 | 0.00 | 1 |
| 4064.87 | 30.00 | 30.00 | 0.00 | 1 |
| 4066.58 | 35.00 | 35.00 | 0.00 | 1 |
| 4068.01 | 40.00 | 38.97 | 0.75 | 59 |
| 4068.03 | 45.00 | 39.03 | 5.79 | 5 |
| 4068.04 | 50.00 | 39.06 | 10.44 | 3 |
| 4068.00 | 38.95 | 38.95 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 75

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

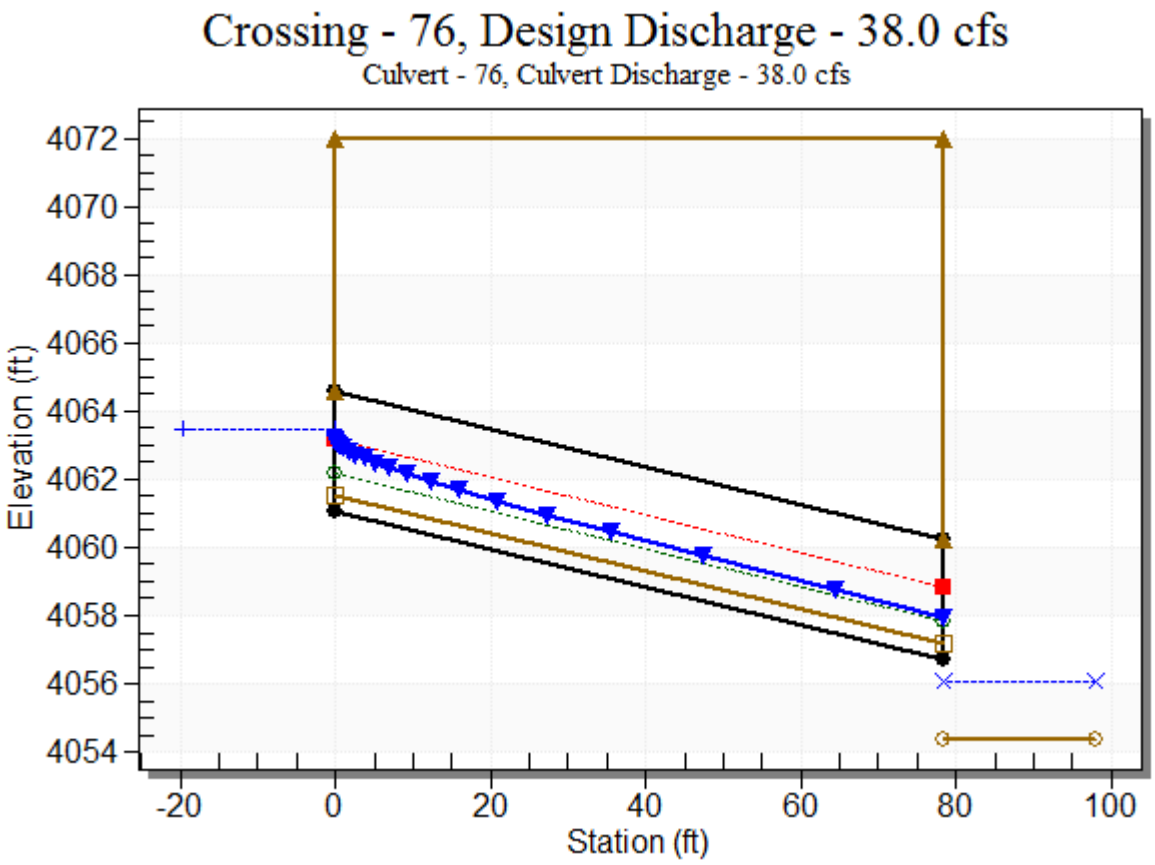
Design Flow: 34 cfs

Maximum Flow: 50 cfs

## Table 15 - Summary of Culvert Flows at Crossing: 75

| Headwater Elevation (ft) | Total Discharge (cfs) | 75 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4059.86 | 0.00 | 0.00 | 0.00 | 1 |
| 4060.37 | 5.00 | 5.00 | 0.00 | 1 |
| 4060.73 | 10.00 | 10.00 | 0.00 | 1 |
| 4061.03 | 15.00 | 15.00 | 0.00 | 1 |
| 4061.29 | 20.00 | 20.00 | 0.00 | 1 |
| 4061.51 | 25.00 | 25.00 | 0.00 | 1 |
| 4061.71 | 30.00 | 30.00 | 0.00 | 1 |
| 4061.86 | 34.00 | 34.00 | 0.00 | 1 |
| 4062.09 | 40.00 | 40.00 | 0.00 | 1 |
| 4062.28 | 45.00 | 45.00 | 0.00 | 1 |
| 4062.49 | 50.00 | 50.00 | 0.00 | 1 |
| 4066.00 | 103.89 | 103.89 | 0.00 | Overtopping |

**Water Surface Profile Plot for Culvert: 76**




**Crossing Discharge Data**

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 38 cfs

Maximum Flow: 50 cfs

## Table 16 - Summary of Culvert Flows at Crossing: 76

| Headwater Elevation (ft) | Total Discharge (cfs) | 76 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4061.50 | 0.00 | 0.00 | 0.00 | 1 |
| 4061.97 | 5.00 | 5.00 | 0.00 | 1 |
| 4062.29 | 10.00 | 10.00 | 0.00 | 1 |
| 4062.56 | 15.00 | 15.00 | 0.00 | 1 |
| 4062.80 | 20.00 | 20.00 | 0.00 | 1 |
| 4063.01 | 25.00 | 25.00 | 0.00 | 1 |
| 4063.20 | 30.00 | 30.00 | 0.00 | 1 |
| 4063.38 | 35.00 | 35.00 | 0.00 | 1 |
| 4063.48 | 38.00 | 38.00 | 0.00 | 1 |
| 4063.70 | 45.00 | 45.00 | 0.00 | 1 |
| 4063.85 | 50.00 | 50.00 | 0.00 | 1 |
| 4072.00 | 182.10 | 182.10 | 0.00 | Overtopping |

## Water Surface Profile Plot for Culvert: 78

## Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 26 cfs

Maximum Flow: 50 cfs

## Table 17 - Summary of Culvert Flows at Crossing: 78

| Headwater Elevation (ft) | Total Discharge (cfs) | 78 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|---|---|---|---|---|
| 4066.55 | 0.00 | 0.00 | 0.00 | 1 |
| 4067.10 | 5.00 | 5.00 | 0.00 | 1 |
| 4067.47 | 10.00 | 10.00 | 0.00 | 1 |
| 4067.76 | 15.00 | 15.00 | 0.00 | 1 |
| 4068.00 | 20.00 | 20.00 | 0.00 | 1 |
| 4068.22 | 25.00 | 25.00 | 0.00 | 1 |
| 4068.26 | 26.00 | 26.00 | 0.00 | 1 |
| 4068.62 | 35.00 | 35.00 | 0.00 | 1 |
| 4068.83 | 40.00 | 40.00 | 0.00 | 1 |
| 4069.06 | 45.00 | 45.00 | 0.00 | 1 |
| 4069.30 | 50.00 | 50.00 | 0.00 | 1 |
| 4084.00 | 141.93 | 141.93 | 0.00 | Overtopping |

# Worksheet for Existing STA 11+05

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01140 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4082.00 |
| 0+00 | 4078.00 |
| 0+19 | 4078.00 |
| 0+39 | 4076.00 |
| 0+84 | 4076.00 |
| 1+21 | 4078.00 |
| 2+43 | 4080.00 |
| 2+71 | 4082.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4082.00) | (0+00, 4078.00) | 0.045 |
| (0+00, 4078.00) | (0+19, 4078.00) | 0.045 |
| (0+19, 4078.00) | (0+39, 4076.00) | 0.045 |
| (0+39, 4076.00) | (0+84, 4076.00) | 0.030 |
| (0+84, 4076.00) | (1+21, 4078.00) | 0.045 |
| (1+21, 4078.00) | (2+43, 4080.00) | 0.045 |
| (2+43, 4080.00) | (2+71, 4082.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

# Worksheet for Existing STA 11+05

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 1.96 | ft |
| Elevation Range | 4076.00 to 4082.00 ft | | |
| Flow Area | | 142.75 | ft² |
| Wetted Perimeter | | 100.96 | ft |
| Hydraulic Radius | | 1.41 | ft |
| Top Width | | 100.81 | ft |
| Normal Depth | | 1.96 | ft |
| Critical Depth | | 1.68 | ft |
| Critical Slope | | 0.02068 | ft/ft |
| Velocity | | 5.12 | ft/s |
| Velocity Head | | 0.41 | ft |
| Specific Energy | | 2.37 | ft |
| Froude Number | | 0.76 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.96 | ft |
| Critical Depth | 1.68 | ft |
| Channel Slope | 0.01140 | ft/ft |
| Critical Slope | 0.02068 | ft/ft |

# Cross Section for Existing STA 11+05

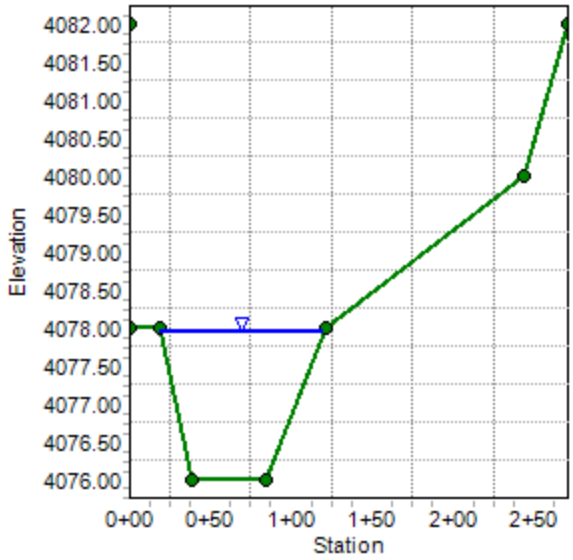
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01140 | ft/ft |
| Normal Depth | 1.96 | ft |
| Discharge | 731.00 | ft³/s |

## Cross Section Image



# Rating Table for Existing STA 11+05

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01140 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4082.00 |
| 0+00 | 4078.00 |
| 0+19 | 4078.00 |
| 0+39 | 4076.00 |
| 0+84 | 4076.00 |
| 1+21 | 4078.00 |
| 2+43 | 4080.00 |
| 2+71 | 4082.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4082.00) | (0+00, 4078.00) | 0.045 |
| (0+00, 4078.00) | (0+19, 4078.00) | 0.045 |
| (0+19, 4078.00) | (0+39, 4076.00) | 0.045 |
| (0+39, 4076.00) | (0+84, 4076.00) | 0.030 |
| (0+84, 4076.00) | (1+21, 4078.00) | 0.045 |
| (1+21, 4078.00) | (2+43, 4080.00) | 0.045 |
| (2+43, 4080.00) | (2+71, 4082.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|

# Rating Table for Existing STA 11+05

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4076.00 | | 0.00 | | |
| 50.00 | 4076.41 | 2.41 | 20.73 | 56.66 | 56.63 |
| 100.00 | 4076.62 | 2.99 | 33.45 | 62.75 | 62.70 |
| 150.00 | 4076.79 | 3.36 | 44.59 | 67.64 | 67.58 |
| 200.00 | 4076.94 | 3.65 | 54.83 | 71.84 | 71.77 |
| 250.00 | 4077.07 | 3.88 | 64.49 | 75.59 | 75.51 |
| 300.00 | 4077.19 | 4.07 | 73.68 | 78.99 | 78.90 |
| 350.00 | 4077.30 | 4.24 | 82.52 | 82.13 | 82.03 |
| 400.00 | 4077.40 | 4.39 | 91.08 | 85.06 | 84.95 |
| 450.00 | 4077.50 | 4.53 | 99.39 | 87.81 | 87.69 |
| 500.00 | 4077.59 | 4.65 | 107.49 | 90.41 | 90.29 |
| 550.00 | 4077.68 | 4.77 | 115.39 | 92.88 | 92.75 |
| 600.00 | 4077.76 | 4.87 | 123.14 | 95.23 | 95.10 |
| 650.00 | 4077.84 | 4.97 | 130.73 | 97.49 | 97.35 |
| 700.00 | 4077.91 | 5.07 | 138.19 | 99.66 | 99.51 |
| 750.00 | 4078.13 | 4.59 | 163.44 | 129.31 | 129.02 |

# Worksheet for Existing STA 7+40

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4078.00 |
| 0+06 | 4076.00 |
| 0+15 | 4074.00 |
| 0+38 | 4072.00 |
| 2+50 | 4072.00 |
| 3+54 | 4074.00 |
| 4+14 | 4076.00 |
| 4+18 | 4078.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4078.00) | (0+06, 4076.00) | 0.045 |
| (0+06, 4076.00) | (0+15, 4074.00) | 0.045 |
| (0+15, 4074.00) | (0+38, 4072.00) | 0.045 |
| (0+38, 4072.00) | (2+50, 4072.00) | 0.030 |
| (2+50, 4072.00) | (3+54, 4074.00) | 0.045 |
| (3+54, 4074.00) | (4+14, 4076.00) | 0.045 |
| (4+14, 4076.00) | (4+18, 4078.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

# Worksheet for Existing STA 7+40

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 0.71 | ft |
| Elevation Range | 4072.00 to 4078.00 ft | | |
| Flow Area | | 165.51 | ft² |
| Wetted Perimeter | | 256.87 | ft |
| Hydraulic Radius | | 0.64 | ft |
| Top Width | | 256.84 | ft |
| Normal Depth | | 0.71 | ft |
| Critical Depth | | 0.69 | ft |
| Critical Slope | | 0.01861 | ft/ft |
| Velocity | | 4.42 | ft/s |
| Velocity Head | | 0.30 | ft |
| Specific Energy | | 1.01 | ft |
| Froude Number | | 0.97 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.71 | ft |
| Critical Depth | 0.69 | ft |
| Channel Slope | 0.01740 | ft/ft |
| Critical Slope | 0.01861 | ft/ft |

# Cross Section for Existing STA 7+40

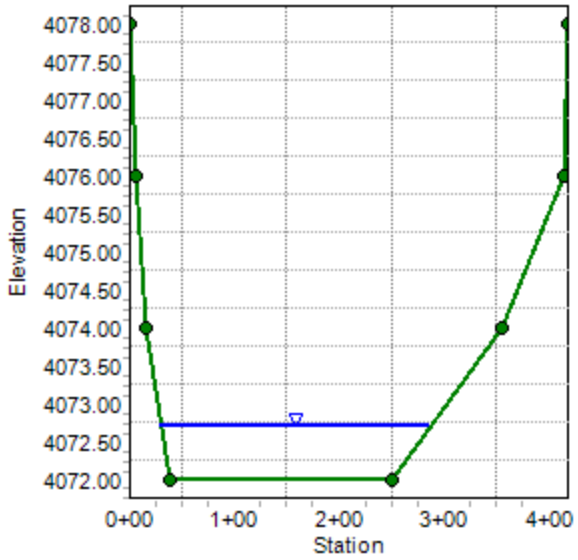
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Normal Depth | 0.71 | ft |
| Discharge | 731.00 | ft³/s |

## Cross Section Image



# Rating Table for Existing STA 7+40

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4078.00 |
| 0+06 | 4076.00 |
| 0+15 | 4074.00 |
| 0+38 | 4072.00 |
| 2+50 | 4072.00 |
| 3+54 | 4074.00 |
| 4+14 | 4076.00 |
| 4+18 | 4078.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4078.00) | (0+06, 4076.00) | 0.045 |
| (0+06, 4076.00) | (0+15, 4074.00) | 0.045 |
| (0+15, 4074.00) | (0+38, 4072.00) | 0.045 |
| (0+38, 4072.00) | (2+50, 4072.00) | 0.030 |
| (2+50, 4072.00) | (3+54, 4074.00) | 0.045 |
| (3+54, 4074.00) | (4+14, 4076.00) | 0.045 |
| (4+14, 4076.00) | (4+18, 4078.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|

# Rating Table for Existing STA 7+40

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4072.00 | | 0.00 | | |
| 50.00 | 4072.14 | 1.68 | 29.80 | 220.75 | 220.74 |
| 100.00 | 4072.21 | 2.18 | 45.90 | 225.34 | 225.33 |
| 150.00 | 4072.27 | 2.53 | 59.19 | 229.06 | 229.04 |
| 200.00 | 4072.32 | 2.82 | 71.02 | 232.32 | 232.30 |
| 250.00 | 4072.37 | 3.05 | 81.94 | 235.29 | 235.27 |
| 300.00 | 4072.41 | 3.26 | 92.13 | 238.02 | 238.00 |
| 350.00 | 4072.45 | 3.44 | 101.83 | 240.60 | 240.58 |
| 400.00 | 4072.49 | 3.60 | 111.10 | 243.04 | 243.01 |
| 450.00 | 4072.52 | 3.75 | 120.01 | 245.35 | 245.33 |
| 500.00 | 4072.56 | 3.89 | 128.62 | 247.57 | 247.54 |
| 550.00 | 4072.59 | 4.01 | 137.02 | 249.72 | 249.69 |
| 600.00 | 4072.63 | 4.14 | 145.05 | 251.76 | 251.73 |
| 650.00 | 4072.66 | 4.25 | 153.01 | 253.76 | 253.72 |
| 700.00 | 4072.69 | 4.35 | 160.78 | 255.70 | 255.66 |
| 750.00 | 4072.72 | 4.45 | 168.39 | 257.58 | 257.54 |

# Worksheet for Existing STA 5+55

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4070.00 |
| 0+19 | 4068.00 |
| 0+37 | 4068.00 |
| 0+54 | 4070.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4070.00) | (0+19, 4068.00) | 0.045 |
| (0+19, 4068.00) | (0+37, 4068.00) | 0.030 |
| (0+37, 4068.00) | (0+54, 4070.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 2.54 | ft |
| Elevation Range | 4068.00 to 4070.00 ft | |
| Flow Area | 101.41 | ft² |
| Wetted Perimeter | 55.31 | ft |
| Hydraulic Radius | 1.83 | ft |
| Top Width | 54.00 | ft |
| Normal Depth | 2.54 | ft |

# Worksheet for Existing STA 5+55

## Results

| | | | |
|---|---|---|---|
| Critical Depth | | 2.45 | ft |
| Critical Slope | | 0.02048 | ft/ft |
| Velocity | | 7.21 | ft/s |
| Velocity Head | | 0.81 | ft |
| Specific Energy | | 3.35 | ft |
| Froude Number | | 0.93 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | | |
|---|---|---|---|
| Downstream Depth | | 0.00 | ft |
| Length | | 0.00 | ft |
| Number Of Steps | | 0 | |

## GVF Output Data

| | | | |
|---|---|---|---|
| Upstream Depth | | 0.00 | ft |
| Profile Description | | | |
| Profile Headloss | | 0.00 | ft |
| Downstream Velocity | | Infinity | ft/s |
| Upstream Velocity | | Infinity | ft/s |
| Normal Depth | | 2.54 | ft |
| Critical Depth | | 2.45 | ft |
| Channel Slope | | 0.01740 | ft/ft |
| Critical Slope | | 0.02048 | ft/ft |

# Cross Section for Existing STA 5+55

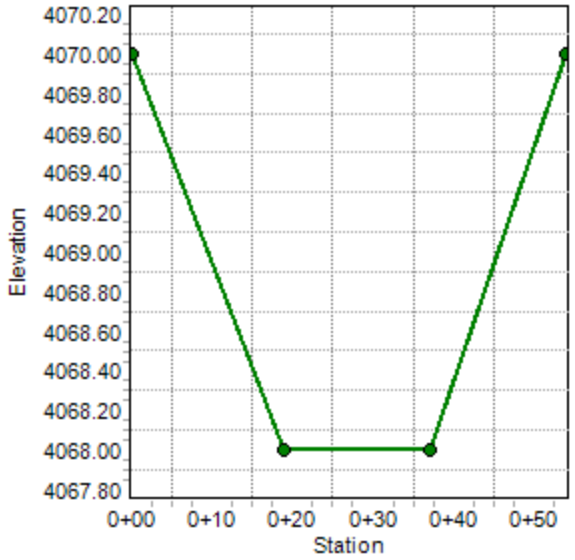
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Normal Depth | 2.54 | ft |
| Discharge | 731.00 | ft³/s |

## Cross Section Image



# Rating Table for Existing STA 5+55

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4070.00 |
| 0+19 | 4068.00 |
| 0+37 | 4068.00 |
| 0+54 | 4070.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4070.00) | (0+19, 4068.00) | 0.045 |
| (0+19, 4068.00) | (0+37, 4068.00) | 0.030 |
| (0+37, 4068.00) | (0+54, 4070.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4068.00 | | 0.00 | | |
| 50.00 | 4068.62 | 3.39 | 14.73 | 29.30 | 29.23 |
| 100.00 | 4068.93 | 4.08 | 24.51 | 34.83 | 34.73 |
| 150.00 | 4069.16 | 4.52 | 33.16 | 39.09 | 38.96 |
| 200.00 | 4069.36 | 4.86 | 41.14 | 42.64 | 42.49 |
| 250.00 | 4069.53 | 5.14 | 48.67 | 45.74 | 45.57 |
| 300.00 | 4069.68 | 5.37 | 55.86 | 48.51 | 48.32 |
| 350.00 | 4069.82 | 5.58 | 62.77 | 51.03 | 50.83 |

# Rating Table for Existing STA 5+55

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 400.00 | 4069.95 | 5.76 | 69.44 | 53.36 | 53.14 |
| 450.00 | 4070.06 | 5.99 | 75.17 | 54.34 | 54.00 |
| 500.00 | 4070.15 | 6.24 | 80.19 | 54.53 | 54.00 |
| 550.00 | 4070.24 | 6.47 | 85.05 | 54.71 | 54.00 |
| 600.00 | 4070.33 | 6.69 | 89.75 | 54.88 | 54.00 |
| 650.00 | 4070.41 | 6.89 | 94.30 | 55.05 | 54.00 |
| 700.00 | 4070.49 | 7.09 | 98.71 | 55.21 | 54.00 |
| 750.00 | 4070.57 | 7.28 | 103.03 | 55.37 | 54.00 |

# Worksheet for Existing STA 2+88

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4072.00 |
| 0+00 | 4068.00 |
| 1+29 | 4066.00 |
| 1+54 | 4066.00 |
| 4+00 | 4068.00 |
| 4+33 | 4070.00 |
| 4+39 | 4072.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4072.00) | (0+00, 4068.00) | 0.045 |
| (0+00, 4068.00) | (1+29, 4066.00) | 0.045 |
| (1+29, 4066.00) | (1+54, 4066.00) | 0.030 |
| (1+54, 4066.00) | (4+00, 4068.00) | 0.045 |
| (4+00, 4068.00) | (4+33, 4070.00) | 0.045 |
| (4+33, 4070.00) | (4+39, 4072.00) | 0.045 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 1.34 | ft |

# Worksheet for Existing STA 2+88

## Results

| | | | |
|---|---|---|---|
| Elevation Range | 4066.00 to 4072.00 ft | | |
| Flow Area | | 201.66 | ft² |
| Wetted Perimeter | | 276.14 | ft |
| Hydraulic Radius | | 0.73 | ft |
| Top Width | | 276.13 | ft |
| Normal Depth | | 1.34 | ft |
| Critical Depth | | 1.18 | ft |
| Critical Slope | | 0.03236 | ft/ft |
| Velocity | | 3.62 | ft/s |
| Velocity Head | | 0.20 | ft |
| Specific Energy | | 1.54 | ft |
| Froude Number | | 0.75 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.34 | ft |
| Critical Depth | 1.18 | ft |
| Channel Slope | 0.01740 | ft/ft |
| Critical Slope | 0.03236 | ft/ft |

# Cross Section for Existing STA 2+88

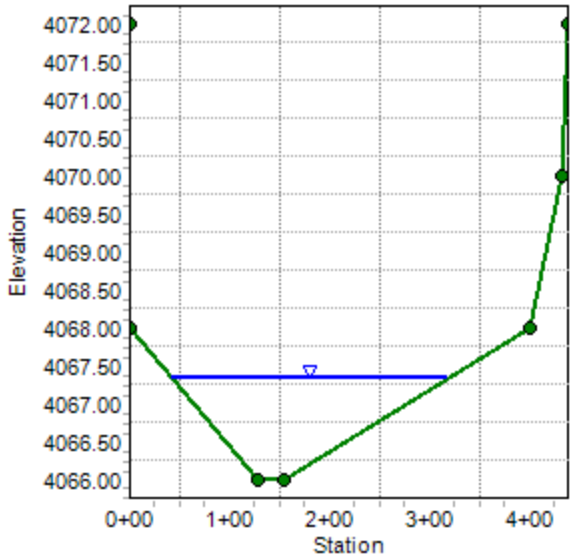
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Normal Depth | 1.34 | ft |
| Discharge | 731.00 | ft³/s |

## Cross Section Image



# Rating Table for Existing STA 2+88

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01740 | ft/ft |
| Discharge | 731.00 | ft³/s |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4072.00 |
| 0+00 | 4068.00 |
| 1+29 | 4066.00 |
| 1+54 | 4066.00 |
| 4+00 | 4068.00 |
| 4+33 | 4070.00 |
| 4+39 | 4072.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4072.00) | (0+00, 4068.00) | 0.045 |
| (0+00, 4068.00) | (1+29, 4066.00) | 0.045 |
| (1+29, 4066.00) | (1+54, 4066.00) | 0.030 |
| (1+54, 4066.00) | (4+00, 4068.00) | 0.045 |
| (4+00, 4068.00) | (4+33, 4070.00) | 0.045 |
| (4+33, 4070.00) | (4+39, 4072.00) | 0.045 |

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00 | 4066.00 | | 0.00 | | |
| 50.00 | 4066.41 | 1.89 | 26.39 | 102.58 | 102.57 |

# Rating Table for Existing STA 2+88

## Input Data

| Discharge (ft³/s) | Water Surface Elevation (ft) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 100.00 | 4066.57 | 2.24 | 44.68 | 131.83 | 131.83 |
| 150.00 | 4066.68 | 2.47 | 60.76 | 153.01 | 153.01 |
| 200.00 | 4066.77 | 2.64 | 75.62 | 170.25 | 170.24 |
| 250.00 | 4066.85 | 2.79 | 89.54 | 184.95 | 184.94 |
| 300.00 | 4066.92 | 2.92 | 102.80 | 197.93 | 197.92 |
| 350.00 | 4066.98 | 3.03 | 115.52 | 209.65 | 209.64 |
| 400.00 | 4067.04 | 3.13 | 127.85 | 220.39 | 220.38 |
| 450.00 | 4067.09 | 3.22 | 139.70 | 230.26 | 230.24 |
| 500.00 | 4067.14 | 3.30 | 151.33 | 239.54 | 239.53 |
| 550.00 | 4067.19 | 3.38 | 162.64 | 248.24 | 248.23 |
| 600.00 | 4067.23 | 3.45 | 173.70 | 256.46 | 256.45 |
| 650.00 | 4067.28 | 3.52 | 184.54 | 264.27 | 264.25 |
| 700.00 | 4067.32 | 3.59 | 195.18 | 271.71 | 271.69 |
| 750.00 | 4067.35 | 3.65 | 205.61 | 278.81 | 278.80 |

# Worksheet for Existing Downstream West Channel

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00800 | ft/ft |
| Normal Depth | 2.00 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4062.00 |
| 0+05 | 4060.00 |
| 0+16 | 4060.00 |
| 0+25 | 4062.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4062.00) | (0+25, 4062.00) | 0.040 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Discharge | 150.12 | $ft^3/s$ |
| Elevation Range | 4060.00 to 4062.00 ft | |
| Flow Area | 36.00 | $ft^2$ |
| Wetted Perimeter | 25.60 | ft |
| Hydraulic Radius | 1.41 | ft |
| Top Width | 25.00 | ft |
| Normal Depth | 2.00 | ft |
| Critical Depth | 1.52 | ft |
| Critical Slope | 0.02292 | ft/ft |

# Worksheet for Existing Downstream West Channel

## Results

| | | | |
|---|---|---|---|
| Velocity | | 4.17 | ft/s |
| Velocity Head | | 0.27 | ft |
| Specific Energy | | 2.27 | ft |
| Froude Number | | 0.61 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.00 | ft |
| Critical Depth | 1.52 | ft |
| Channel Slope | 0.00800 | ft/ft |
| Critical Slope | 0.02292 | ft/ft |

# Rating Table for Existing Downstream West Channel

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00800 | ft/ft |
| Normal Depth | 2.00 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 4062.00 |
| 0+05 | 4060.00 |
| 0+16 | 4060.00 |
| 0+25 | 4062.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 4062.00) | (0+25, 4062.00) | 0.040 |

| Water Surface Elevation (ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 4060.00 | | | | | |
| 4060.25 | 3.72 | 1.25 | 2.97 | 12.83 | 12.75 |
| 4060.50 | 12.16 | 1.91 | 6.38 | 14.65 | 14.50 |
| 4060.75 | 24.69 | 2.42 | 10.22 | 16.48 | 16.25 |
| 4061.00 | 41.25 | 2.84 | 14.50 | 18.30 | 18.00 |
| 4061.25 | 61.92 | 3.22 | 19.22 | 20.13 | 19.75 |
| 4061.50 | 86.84 | 3.56 | 24.38 | 21.95 | 21.50 |
| 4061.75 | 116.18 | 3.88 | 29.97 | 23.78 | 23.25 |
| 4062.00 | 150.12 | 4.17 | 36.00 | 25.60 | 25.00 |

# Cross Section for Existing Downstream West Channel

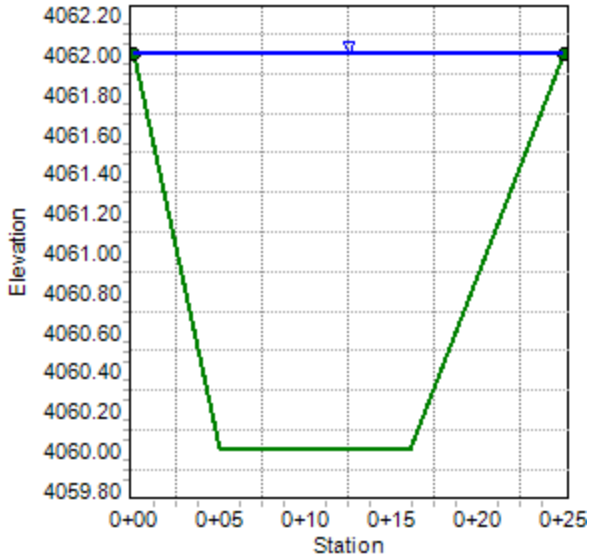
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00800 | ft/ft |
| Normal Depth | 2.00 | ft |
| Discharge | 150.12 | ft³/s |

## Cross Section Image










# APPENDIX D

*Alternatives Analysis*

| Job No. | 10152-10020341 | Calc No. | |
|---|---|---|---|

# Computation

| | | | |
|---|---|---|---|
| Project | Rincon DMP | Computed | DAP |
| Task | Engineering Opinion of Cost | Date | 1/27/2016 |
| Page | Summary Sheet - Soil Management | Reviewed | MAF |
| | | Date | 6/23/2016 |

| Project | Cost | Haul and dispose Soils | Spread Soils on Site |
|---|---|---|---|
| East Channel | $147,642 | $ 413,675.28 | $ 222,726.81 |
| West Channel | $596,193 | $ 716,373.33 | $ 525,283.44 |
| NM-140 Improvements | $11,544 | $ 15,795.18 | $ 11,582.21 |
| I-25 Improvements | $24,296 | $ 18,839.98 | $ 17,718.68 |
| | | | |
| Total | $779,675 | $ 1,164,683.77 | $ 777,311.16 |
| 15% Contigency | $896,626 | $ 1,339,386.33 | $ 893,907.83 |
| 5% Moblization | $38,984 | $ 66,969.32 | $ 44,695.39 |
| Total | $935,610 | $ 1,406,356 | $ 938,603.22 |

$ 470,746 $ 2,994 Cost Difference

Job No. 10152-10020341 | Calc No.

# Computation

| | | | |
|---|---|---|---|
| Project | Rincon DMP | Computed | DAP |
| Task | Engineering Opinion of Cost | Date | 1/27/2016 |
| Page | East Channel Excavaction Costs & Culvert | Reviewed | MAF |
| | | Date | 6/23/2016 |

| UNIT | QUANTITY | UNIT COST | TOTAL | Unit Rate | Total |
|---|---|---|---|---|---|
| CU.YD | 27,278 | $5.00 | $136,391.76 | $ 15.00 | $ 409,175.28 |
| CU.YD. | 150 | $75.00 | $11,250.00 | $ 30.00 | $ 4,500.00 |
| | | TOTAL | $147,641.76 | | $ 413,675.28 |
| | | | | $ (190,948.46) | Savings to spread vs haul & Dispose |
| | | | | $ 222,726.81 | Total |

Comments

Does not include haul off, dispose, or spread on site.

If those elements are required add: $15 for haul and dispose, $3 for speard on site

Dumped in place, no cage. No equipment to place - $30 cy

Job No. 10152-10020341 | Calc No.

# Computation

| | |
|---|---|
| Project | Rincon DMP |
| Task | Engineering Opinion of Cost |
| Page | West Channel + Basin + Infrastructure |

| | |
|---|---|
| Computed | DAP |
| Date | 1/27/2016 |
| Reviewed | MAF |
| Date | 6/23/2016 |

Item Description

| BID ITEM | UNIT | QUANTITY | UNIT COST | TOTAL | cy | Unit Rate | Total | Comments |
|---|---|---|---|---|---|---|---|---|
| DRAINAGE EXCAVATION | CU.YD | 27,299 | $5.00 | $136,492.78 | | $ 15.00 | $ 409,478.33 | Does not include haul off, dispose, or spread on site. If those elements are required add: $15 for haul and dispose, $3 for speard on site |
| TRIPLE RCB 10X4 (Includes Headwall) | EACH | 1 | $250,000.00 | $250,000.00 | | $ 234,270.00 | $ 234,270.00 | Used RCB cost from AZDot = RCB 10x4x3ea = $1538lf (x26lf)(inc Headwalls) + 238cy excavation x $15cy haul and dispose |
| METAL HANDRAIL | L.FT. | 80 | $15.00 | $1,200.00 | | $ 15.00 | $ 1,200.00 | Fine |
| CONCRETE CATCH BASIN (SINGLE 623-17) | EACH | 1 | $4,000.00 | $4,000.00 | | $ 4,000.00 | $ 4,000.00 | Fine |
| RIPRAP (DUMPED) (8") | CU.YD. | 60 | $75.00 | $4,500.00 | | $ 30.00 | $ 1,800.00 | Dumped in place, no cage. No equipment to place - $30 cy |
| 1-ft VERTICAL PROFILE SHIFT | LUMP SUM | 1 | $200,000.00 | $200,000.00 | 75 | $ 875.00 | $ 65,625.00 | Assume: Demo existing, 24' wide x 250' long x 4" thich + 12" compacted soil base + 4" Crusher agg base = 75cy @ $875cy |
| | | | TOTAL | $596,193 | | | $ 716,373.33 | |
| | | | | | | | $ (191,089.89) | Savings to spread vs haul & Dispose |
| | | | | | | | $ 525,283.44 | Total |

| Job No. | 10152-10020341 | Calc No. | |
|---|---|---|---|

# Computation

| | | | |
|---|---|---|---|
| Project | Rincon DMP | Computed | DAP |
| Task | Engineering Opinion of Cost | Date | 1/27/2016 |
| Page | NM-140 Improvements | Reviewed | MAF |
| | | Date | 6/23/2016 |

Item Description

| BID ITEM | UNIT | QUANTITY | UNIT COST | TOTAL | | Unit Rate | Total | Comments |
|---|---|---|---|---|---|---|---|---|
| DRAINAGE EXCAVATION | CU.YD | 602 | $5.00 | $3,009.26 | | $ 15.00 | $ 9,027.78 | Does not include haul off, dispose, or spread on site. If those elements are required add: $15 for haul and dispose, $3 for speard on site |
| REMOVE (PIPE) | L.FT. | 40 | $50.00 | $2,000.00 | | $ 19.31 | $ 772.40 | Demo existing RCP 27"-36" per cost data |
| METAL HANDRAIL | L.FT. | 9 | $15.00 | $135.00 | | $ 15.00 | $ 135.00 | Fine |
| CONCRETE CATCH BASIN (SINGLE 623-17) | EACH | 1 | $4,000.00 | $4,000.00 | | $ 4,000.00 | $ 4,000.00 | Fine |
| HEADWALL | EACH | 1 | $1,500.00 | $1,500.00 | | $ 1,500.00 | $ 1,500.00 | fine |
| RIPRAP (DUMPED) (8") | CU.YD. | 12 | $75.00 | $900.00 | | $ 30.00 | $ 360.00 | Dumped in place, no cage. No equipment to place - $30 cy |
| | | | TOTAL | $11,544 | | | $ 15,795.18 | |
| | | | | | | | $ (4,212.96) | Savings to spread vs haul & Dispose |
| | | | | | | | $ 11,582.21 | Total |

| Job No. | 10152-10020341 | Calc No. | |
|---|---|---|---|

# Computation

| | | | |
|---|---|---|---|
| Project | Rincon DMP | Computed | DAP |
| Task | Engineering Opinion of Cost | Date | 1/27/2016 |
| Page | Interstate 25 Access Ramp Improvements | Reviewed | MAF |
| | | Date | 6/23/2016 |

Item Description

| BID ITEM | UNIT | QUANTITY | UNIT COST | TOTAL | | Unit Rate | Total | Comments |
|---|---|---|---|---|---|---|---|---|
| DRAINAGE EXCAVATION | CU.YD | 160 | $5.00 | $800.93 | | $ 15.00 | $ 2,402.78 | Does not include haul off, dispose, or spread on site. If those elements are required add: $15 for haul and dispose, $3 for speard on site |
| REMOVE (PIPE) | L.FT. | 68 | $50.00 | $3,400.00 | | $ 19.31 | $ 1,313.08 | Demo existing RCP 27"-36" per cost data |
| STORM DRAIN PIPE, 24" | L.FT. | 136 | $85.00 | $11,560.00 | | $ 52.42 | $ 7,129.12 | Per Cost Data |
| METAL HANDRAIL | L.FT. | 9 | $15.00 | $135.00 | | $ 15.00 | $ 135.00 | Fine |
| CONCRETE CATCH BASIN (DUAL 623-17) | EACH | 1 | $6,000.00 | $6,000.00 | | $ 6,000.00 | $ 6,000.00 | Fine |
| HEADWALL | EACH | 1 | $1,500.00 | $1,500.00 | | $ 1,500.00 | $ 1,500.00 | Fine |
| RIPRAP (DUMPED) (8") | CU.YD. | 12 | $75.00 | $900.00 | | $ 30.00 | $ 360.00 | Dumped in place, no cage. No equipment to place - $30 cy |
| | | | TOTAL | $24,296 | | | $ 18,839.98 | |
| | | | | | | | $ (1,121.30) | Savings to spread vs haul & Dispose |
| | | | | | | | $ 17,718.68 | Total |

Job No. 10152-10020341 | Calc No.

# Computation

| | |
|---|---|
| Project | Rincon DMP |
| Task | Engineering Opinion of Cost |
| Page | Excavation Volume |

| | |
|---|---|
| Computed | DAP |
| Date | 1/27/2016 |
| Reviewed | MAF |
| Date | 6/23/2016 |

East Channel

| Cross Section | Length (ft) | Area Cut (sq.ft.) | Area Fill (sq.ft.) | Volume (cu.yds.) | Cut/Fill |
|---|---|---|---|---|---|
| 1 | 375 | 36 | 26 | -646 | Fill |
| 2 | 305 | 8 | 111 | 621 | Cut |
| 3 | 160 | 213 | 0 | 2,151 | Cut |
| 4 | 135 | 513 | 0 | 2,993 | Cut |
| 5 | 105 | 684 | 0 | 3,801 | Cut |
| 6 | 210 | 1,271 | 0 | 6,666 | Cut |
| 7 | 210 | 443 | 0 | 2,504 | Cut |
| 8 | 400 | 201 | 0 | 1,489 | Cut |
| 9 (EXISTING) | - | 0 | 0 | - | - |
| | | **TOTAL (cu.yds.)** | | 19,579 | |

West Channel

| Cross Section | Length (ft) | Area Cut (sq.ft.) | Area Fill (sq.ft.) | Volume (cu.yds.) | Cut/Fill |
|---|---|---|---|---|---|
| 11+05 | 365 | 48 | 21 | 1,095 | Cut |
| 7+40 | 185 | 135 | 0 | 685 | Cut |
| 5+55 | 267 | 65 | 0 | 1,295 | Cut |
| 2+88 | - | 197 | 0 | - | - |
| Downstream | 2,000 | 110 | 3 | 7,926 | Cut |
| | | **TOTAL (cu.yds.)** | | 11,002 | |

| Basins | Depth (ft.) | Side Slopes | Excavation Volume (cu.yds.) |
|---|---|---|---|
| West Channel | 6 | 4 | 16,297 |
| East Channel | 4 | 6 | 7,699 |

Roadside Ditches

| Cross Section | Length (ft.) | Area Cut (sq.ft.) | Volume (cu.yds.) |
|---|---|---|---|
| I-25 RN4 | 250 | 2.0 | 19 |
| I-25 RN5 | 850 | 4.5 | 142 |
| NM-140 | 1300 | 12.5 | 602 |

| Job No. | 10152-10020341 | Calc No. |
|---|---|---|

# Computation

| | |
|---|---|
| Project | Rincon DMP |
| Task | Engineering Opinion of Cost |
| Page | Culvert Details |

| | |
|---|---|
| Computed | DAP |
| Date | 1/27/2016 |
| Reviewed | MAF |
| Date | 6/23/2016 |

Culvert

| Channel | Diameter | Material | Length (ft.) |
|---|---|---|---|
| I-25 Ditches | 2 - 24-inch | CMP | 68 |
| West Channel | 3 - 10 ft. x 4 ft. | Concrete | 150 |

Drop Inlets

| Channel | Diameter | Number | NMDOT Std Drawing |
|---|---|---|---|
| I-25 Ditches | 2 - 24 inch | 2 | 623-17 |
| NM-140 Ditch | 1 -36 inch | 1 | 623-17 |

Headwall

| Channel | Diameter | Upstream | Downstream |
|---|---|---|---|
| I-25 Ditches | 2 - 24 inch | No | Yes |
| NM-140 Ditch | 1 -36 inch | No | Yes |
| West Channel | 3 - 10 ft. x 4 ft. | Yes | Yes |

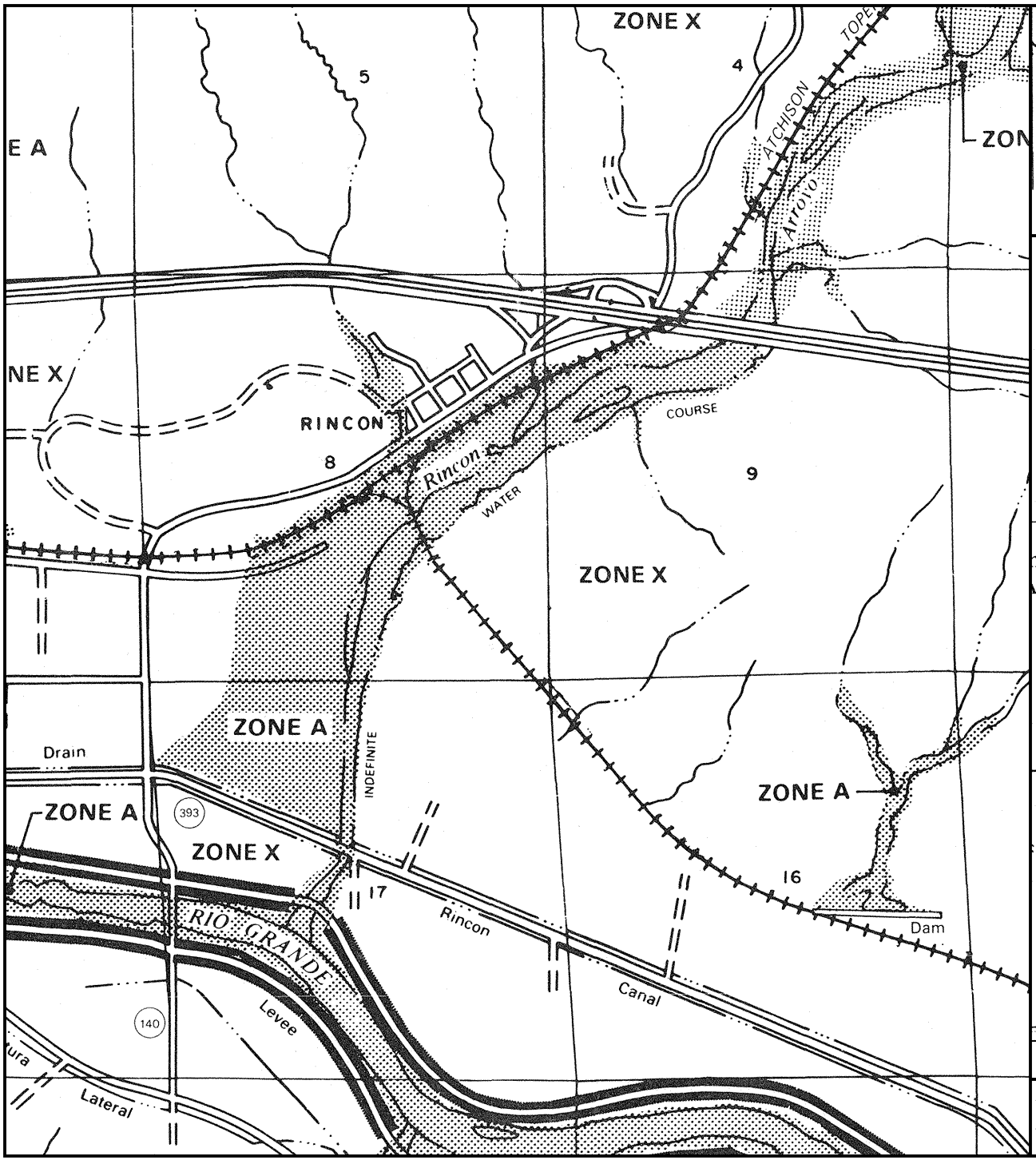


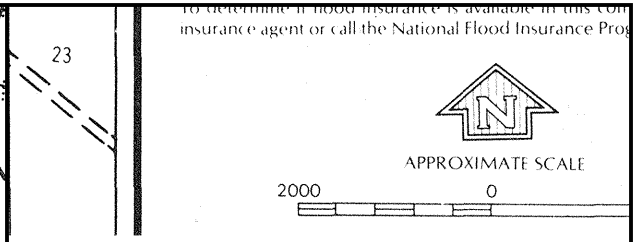


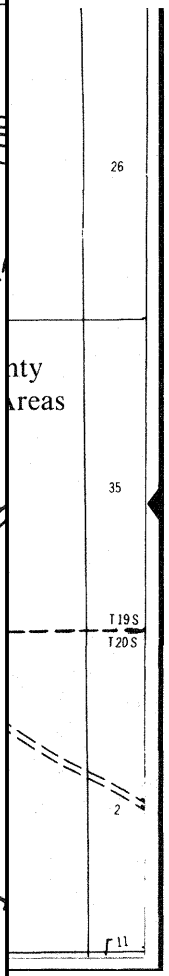



# APPENDIX E

*FEMA Documentation*




NATIONAL FLOOD INSURANCE PROGRAM

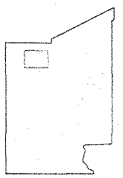
# FIRM
## FLOOD INSURANCE RATE MAP

## DONA ANA COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 250 OF 1050
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| UNINCORPORATED AREAS | 350012 | 0250 | E |



PANEL LOCATION

**MAP NUMBER**
**35013C0250 E**

**EFFECTIVE DATE:**
**SEPTEMBER 27, 1991**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

TABLE OF CONTENTS


| | | Page |
|---|---|---|
| 1.0 | INTRODUCTION | 1 |
| | 1.1 Purpose of Study | 1 |
| | 1.2 Authority and Acknowledgments | 1 |
| | 1.3 Coordination | 2 |
| 2.0 | AREA STUDIED | 2 |
| | 2.1 Scope of Study | 2 |
| | 2.2 Community Description | 8 |
| | 2.3 Principal Flood Problems | 9 |
| | 2.4 Flood Protection Measures | 9 |
| 3.0 | ENGINEERING METHODS | 13 |
| | 3.1 Hydrologic Analyses | 14 |
| | 3.2 Hydraulic Analyses | 22 |
| 4.0 | FLOODPLAIN MANAGEMENT APPLICATIONS | 23 |
| | 4.1 Floodplain Boundaries | 23 |
| | 4.2 Floodways | 24 |
| 5.0 | INSURANCE APPLICATIONS | 24 |
| 6.0 | FLOOD INSURANCE RATE MAP | 27 |
| 7.0 | OTHER STUDIES | 27 |
| 8.0 | LOCATION OF DATA | 27 |
| 9.0 | BIBLIOGRAPHY AND REFERENCES | 29 |
| 10.0 | REVISION DESCRIPTIONS | 31 |
| | 10.1 First Revision | 31 |

TABLE 1 - SCOPE OF STUDY - continued

| Flooding Source | Area of Detailed Study |
|---|---|
| Stream 3 | From confluence with Stream 1 to a point approximately 1.1 miles upstream of Playa 3 |
| Stream 4 | From confluence with Stream 3 to a point approximately 2,300 feet upstream |
| Stream 5 | From Playa 4 to a point approximately 0.8 mile upstream |
| Stream 6 | From Playa 4 to a point approximately 0.8 mile upstream |
| Stream 7 | From Quirke Lake to a point approximately 1,700 feet upstream of State Route 213 |
| Stream 8 | From confluence with Stream 7 to a point approximately 1,400 feet upstream of State Route 213 |
| Stream 9 | From Quirke Lake to a point approximately 1,800 feet upstream of State Route 213 |
| Stream 10 | From Quirke Lake to a point approximately 2,400 feet upstream of State Route 213 |
| Stream 11 | From Playa 5 to a point approximately 1,000 feet north of Mesilla Drive |

In addition, the entire areas of Playa 1, Playa 2, Playa 3, Playa 4, Playa 5, and Playa 6; Burn Lake; and Quirke Lake within the county were studied by detailed methods. Alluvial fan analyses were included in the detailed analyses of Stream Bilbo and Streams 13-17 and 21-24. The effects of sheet flow were considered in the analyses of Streams 1 through 11 and Stream 20. This study also incorporates the determination of a Letter of Map Revision issued by FEMA on March 21, 1989, for La Buena Vida Subdivision, in the City of Las Cruces. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

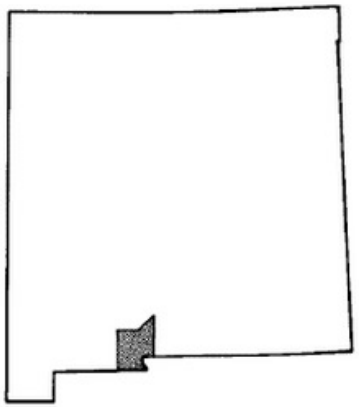
In this countywide FIS revision, an unnamed pond in the Anapra subdivision within the City of Sunland Park was studied by detailed methods.

All or portions of the following flooding sources were studied by approximate methods: the Rio Grande, Hembrillo Canyon Creek, Lost Man Canyon Creek, Dead Man Canyon Creek, Andrecito Creek, Garfield Canyon Creek, Broadhurst Arroyo, Arroyo Yeso, Rincon Arroyo, Bar B Draw, Flat Lake, Placitas Arroyo, Spring Canyon Creek, Rodey Canyon Creek, Arroyo Cuervo, Arroyo Angostura, Reed Arroyo, Bignell Arroyo

# FLOOD INSURANCE STUDY



## DONA ANA COUNTY, NEW MEXICO AND INCORPORATED AREAS

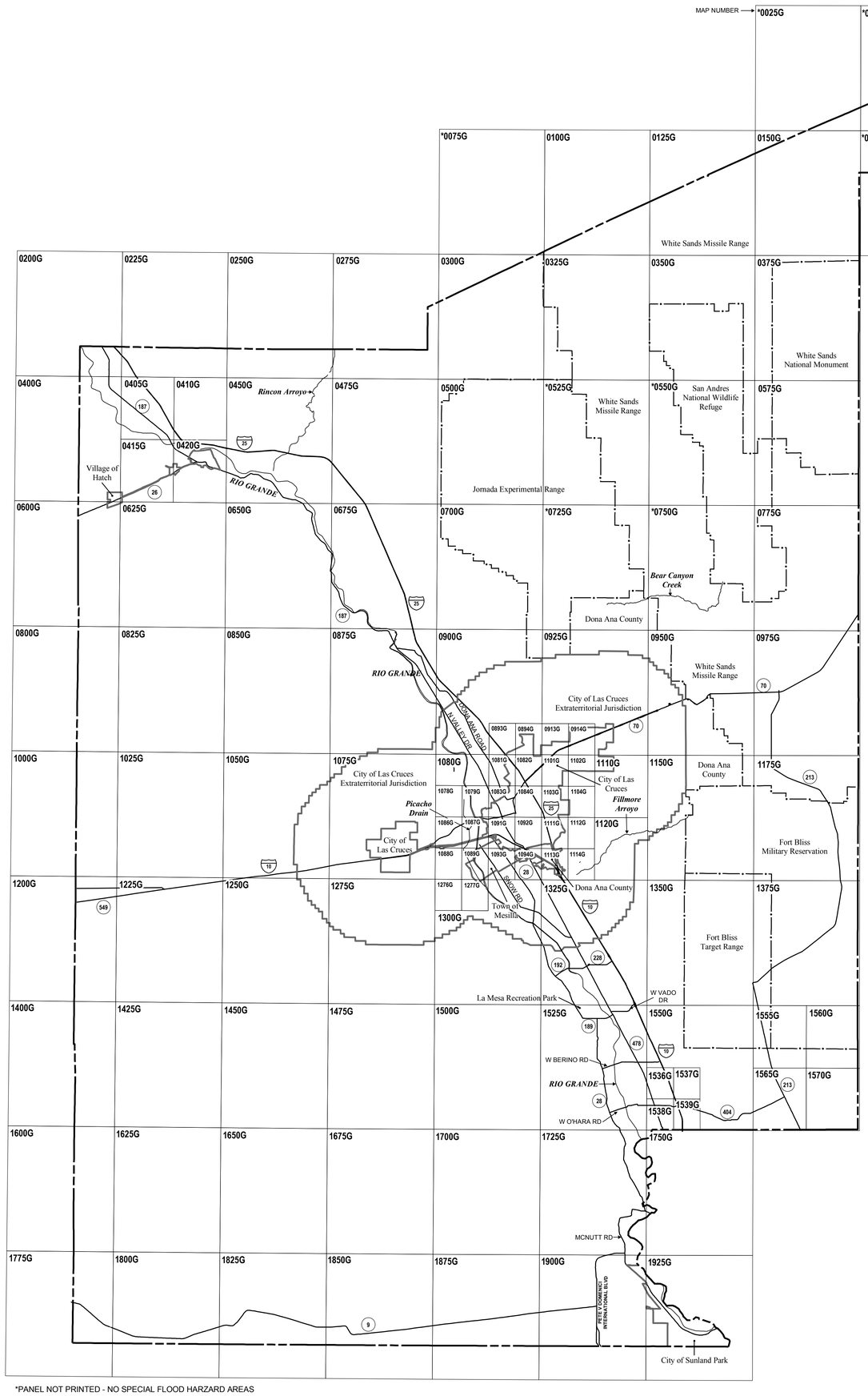


| COMMUNITY NAME | COMMUNITY NUMBER |
|---|---|
| HATCH, VILLAGE OF | 350013 |
| LAS CRUCES, CITY OF | 355332 |
| MESILLA, TOWN OF | 350113 |
| SUNLAND PARK, CITY OF | 350147 |
| UNINCORPORATED AREAS | 350012 |

SEPTEMBER 6,1995



Federal Emergency Management Agency




*PANEL NOT PRINTED - NO SPECIAL FLOOD HARZARD AREAS

**FIRM Panel Dates for Printed Panels of Dona Ana County, New Mexico (All Jurisdictions)**

| Panel | Effective Date | Panel | Effective Date | Panel | Effective Date | Panel | Effective Date |
|---|---|---|---|---|---|---|---|
| 35013C0100G | | 35013C0825G | | 35013C1092G | | 35013C1450G | |
| 35013C0125G | | 35013C0850G | | 35013C1093G | | 35013C1475G | |
| 35013C0150G | | 35013C0875G | | 35013C1095G | | 35013C1500G | |
| 35013C0200G | | 35013C0893G | | 35013C1101G | | 35013C1525G | |
| 35013C0225G | | 35013C0894G | | 35013C1102G | | 35013C1536G | |
| 35013C0250G | | 35013C0900G | | 35013C1103G | | 35013C1537G | |
| 35013C0275G | | 35013C0913G | | 35013C1104G | | 35013C1538G | |
| 35013C0300G | | 35013C0914G | | 35013C1110G | | 35013C1539G | |
| 35013C0325G | | 35013C0925G | | 35013C1111G | | 35013C1550G | |
| 35013C0350G | | 35013C0950G | | 35013C1112G | | 35013C1555G | |
| 35013C0375G | | 35013C0975G | | 35013C1113G | | 35013C1560G | |
| 35013C0400G | | 35013C1000G | | 35013C1114G | | 35013C1565G | |
| 35013C0405G | | 35013C1025G | | 35013C1120G | | 35013C1570G | |
| 35013C0410G | | 35013C1050G | | 35013C1150G | | 35013C1600G | |
| 35013C0415G | | 35013C1075G | | 35013C1175G | | 35013C1625G | |
| 35013C0420G | | 35013C1078G | | 35013C1200G | | 35013C1650G | |
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| 35013C0475G | | 35013C1080G | | 35013C1250G | | 35013C1700G | |
| 35013C0500G | | 35013C1081G | | 35013C1275G | | 35013C1725G | |
| 35013C0575G | | 35013C1082G | | 35013C1276G | | 35013C1750G | |
| 35013C0600G | | 35013C1083G | | 35013C1277G | | 35013C1775G | |
| 35013C0625G | | 35013C1084G | | 35013C1300G | | 35013C1800G | |
| 35013C0650G | | 35013C1086G | | 35013C1325G | | 35013C1825G | |
| 35013C0675G | | 35013C1087G | | 35013C1350G | | 35013C1850G | |
| 35013C0700G | | 35013C1088G | | 35013C1375G | | 35013C1875G | |
| 35013C0775G | | 35013C1089G | | 35013C1400G | | 35013C1900G | |
| 35013C0800G | | 35013C1091G | | 35013C1425G | | 35013C1925G | |

## LISTING OF COMMUNITIES

| COMMUNITY NAME | COMMUNITY NUMBER | LOCATED ON PANEL(S) | INITIAL NFIP MAP DATE | INITIAL FIRM DATE | MOST RECENT FIRM PANEL DATE |
|---|---|---|---|---|---|
| DONA ANA COUNTY | 350012 | 0025[1], 0050[1], 0075[1], 0100, 0125, 0150, 0175[1], 0200, 0225, 0250, 0275, 0300, 0325, 0350, 0375, 0400, 0405, 0410, 0415, 0420, 0450, 0475, 0500, 0525[1], 0550[1], 0575, 0600, 0625, 0650, 0675, 0700, 0725[1], 0750[1], 0775, 0800, 0825, 0850, 0875, 0893, 0894, 0900, 0913, 0925, 0950, 0975, 1000, 1025, 1050, 1075, 1078, 1079, 1080, 1081, 1082, 1083, 1086, 1087, 1088, 1089, 1091, 1092, 1093, 1094, 1101, 1103, 1104, 1110, 1111, 1112, 1113, 1114, 1120, 1150, 1175, 1200, 1225, 1250, 1275, 1276, 1277, 1300, 1325, 1350, 1375, 1400, 1425, 1450, 1475, 1500, 1525, 1536, 1537, 1538, 1539, 1550, 1555, 1560, 1565, 1570, 1600, 1625, 1650, 1675, 1700, 1725, 1750, 1775, 1800, 1825, 1850, 1875, 1900, 1925 | JANUARY 3, 1975 | SEPTEMBER 27, 1991 | |
| HATCH, VILLAGE OF | 350013 | 0400, 0415, 0420, 0600, 0625 | AUGUST 16, 1974 | JANUARY 3, 1986 | |
| LAS CRUCES, CITY OF | 355332 | 0875, 0893, 0894, 0900, 0913, 0914, 0925, 0950, 1050, 1075, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1086, 1087, 1088, 1089, 1091, 1092, 1093, 1094, 1101, 1102, 1103, 1104, 1110, 1111, 1112, 1113, 1114, 1120, 1150, 1250, 1275, 1276, 1277, 1325, 1300 | JUNE 11, 1971 | DECEMBER 31, 1974 | |
| MESILLA, TOWN OF | 350113 | 1087, 1089, 1091, 1092, 1093, 1094, 1277 | SEPTEMBER 27, 1991 | SEPTEMBER 27, 1991 | |
| SUNLAND PARK, CITY OF | 350147 | 1900, 1925 | SEPTEMBER 27, 1991 | SEPTEMBER 27, 1991 | |

[1] PANEL NOT PRINTED

### MAP DATES

This FIRM Index displays the map date for each FIRM panel at the time that this Index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website at http://msc.fema.gov or by calling the Map Service Center at 1-800-358-9616.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

### NOTE TO USER

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated [date] or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the Listing of Communities table to determine the most recent FIRM index date for each community.

### MAP REPOSITORIES

(Maps available for reference only, not for distribution.)

DONA ANA COUNTY
(UNINCORPORATED AREAS):
251 West Amador, Room 100B
Las Cruces, New Mexico 88001

HATCH, VILLAGE OF:
Hatch City Hall
112 Franklin Street
P.O. Box 220
Hatch, New Mexico 87937

LAS CRUCES, CITY OF :
200 North Church Street
Las Cruces, New Mexico 88001

MESILLA, TOWN OF :
Town Clerk's Office
Mesilla Town Hall
Calle de Parian
P.O. Box 10
Mesilla, New Mexico 88046

SUNLAND PARK, CITY OF
Sunland Park City Hall
3400 McNutt Road
Sunland Park, New Mexico 88063

### NOTE TO USERS

**FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.**

NATIONAL FLOOD INSURANCE PROGRAM

**MAP INDEX**

# FIRM

## FLOOD INSURANCE RATE MAP

## DONA ANA COUNTY, NEW MEXICO

AND INCORPORATED AREAS

(SEE LISTING OF COMMUNITIES TABLE)

# MAP INDEX

**PANELS PRINTED:** 100, 125, 150, 200, 225, 250, 275, 300, 325, 350, 375, 400, 405, 410, 415, 420, 450, 475, 500, 575, 600, 625, 650, 675, 700, 775, 800, 825, 850, 875, 893, 894, 900, 913, 914, 925, 950, 975, 1000, 1025, 1050, 1075, 1078,1079, 1080, 1081, 1082, 1083, 1084, 1086, 1087, 1088, 1089, 1091, 1092, 1093, 1094, 1101, 1102, 1103, 1104, 1110, 1111, 1112, 1113, 1114, 1120, 1150, 1175, 1200, 1225, 1250, 1275, 1276, 1277, 1300, 1325, 1350, 1375, 1400, 1425, 1450, 1475, 1500, 1525, 1536, 1537, 1538, 1539, 1550, 1555, 1560, 1565, 1570, 1600, 1625, 1650, 1675, 1700, 1725, 1750, 1775, 1800, 1825, 1850, 1875, 1900, 1925

**MAP NUMBER**
**35013CIND00**

PRELIMINARY
APR 09 2007

**Federal Emergency Management Agency**








# APPENDIX F

*Improvement Plans*

Proposed Drainage Sump
Width = 14 feet
Length = 20 feet
Side Slopes = 4:1

Proposed Three 36-Inch
Culverts with Upstream
and Downstream Heawalls

Improve Roadside
Ditch to Convey
Runoff from Factory
Slope = 0.7%
Depth = 3.5 feet
Side Slopes = 2:1

Proposed Channel
Grading Improvements

Proposed Two 36-Inch Culvert
with Riser to Drain Existing
Retention Area and Control
Discharge

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

## Legend

- 2 ft Contour
- 10 ft Contour
- Proposed Culvert
- Roadside Ditch
- Channel Improvements

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)

**NMDOT Roadside Improvements**
Alternative 3

N W E S

0 50 100 200 Feet

**Exhibit K**
**NMDOT Roadside Improvements**
**Alternative 3 - NM-140 Ditches**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016




## Legend

- 2 ft Contour
- 10 ft Contour
- Existing Culvert
- Roadside V-Ditch
- Channel Improvements

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)

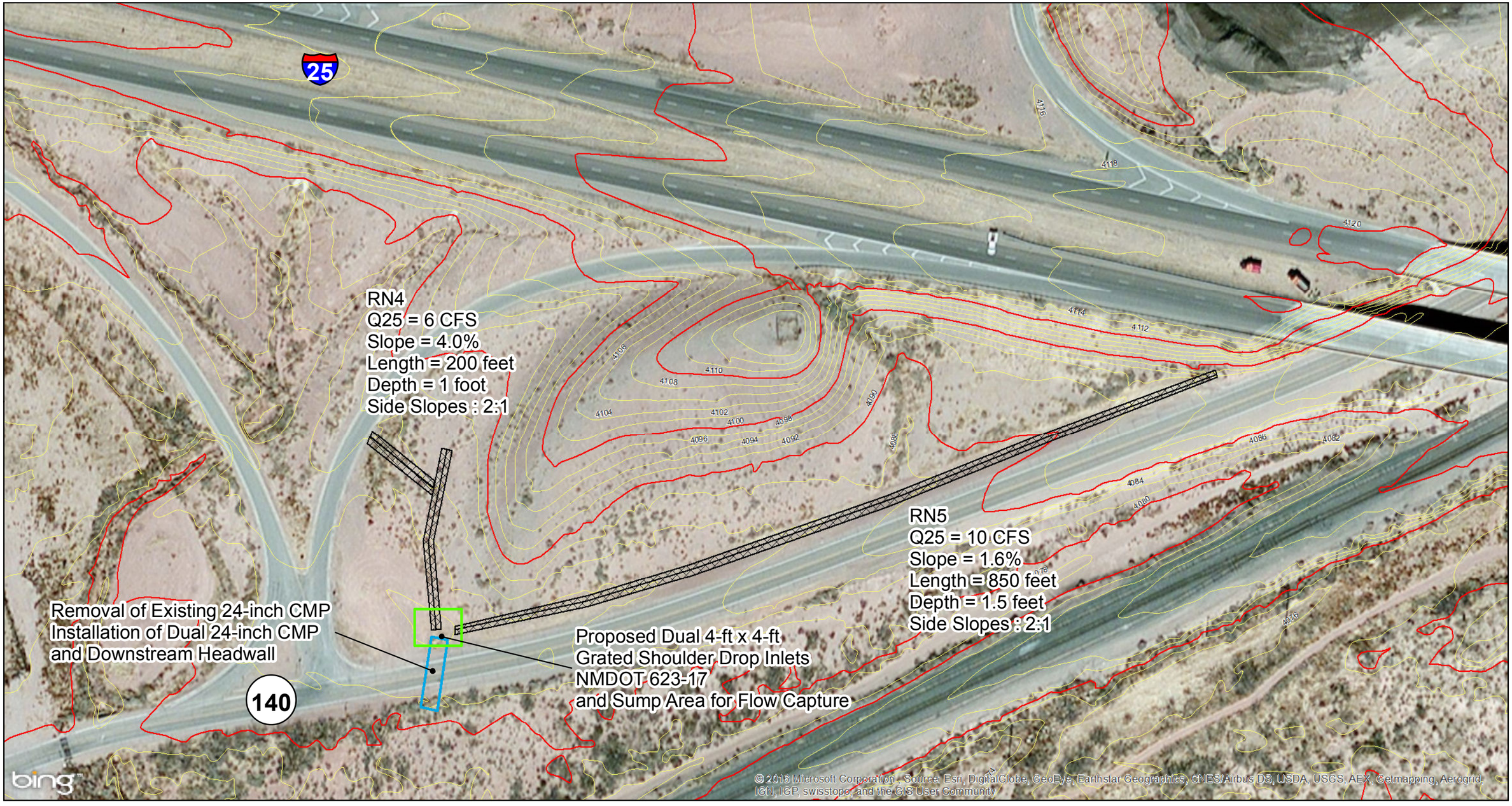
**NMDOT Roadside Improvements**
Alternative 2

N
W E
S

0 75 150 300 Feet

**Exhibit J**
**NMDOT Roadside Improvements**
**Alternative 2 - NM-140 Ditches**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016




## Legend

- 2 ft Contour
- 10 ft Contour
- Existing Culvert
- Roadside V-Ditches

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)

**NMDOT Roadside Improvements**
Alternative 1

N W E S

0 50 100 200 Feet

**Exhibit I**
**NMDOT Roadside Improvements**
**Alternative 1 - I-25 On-Ramp Ditches**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016




**Legend**

- 2 ft Contour
- 10 ft Contour
- West Channel
- West Channel Cross Sections
- West Channel Basin

# West Channel

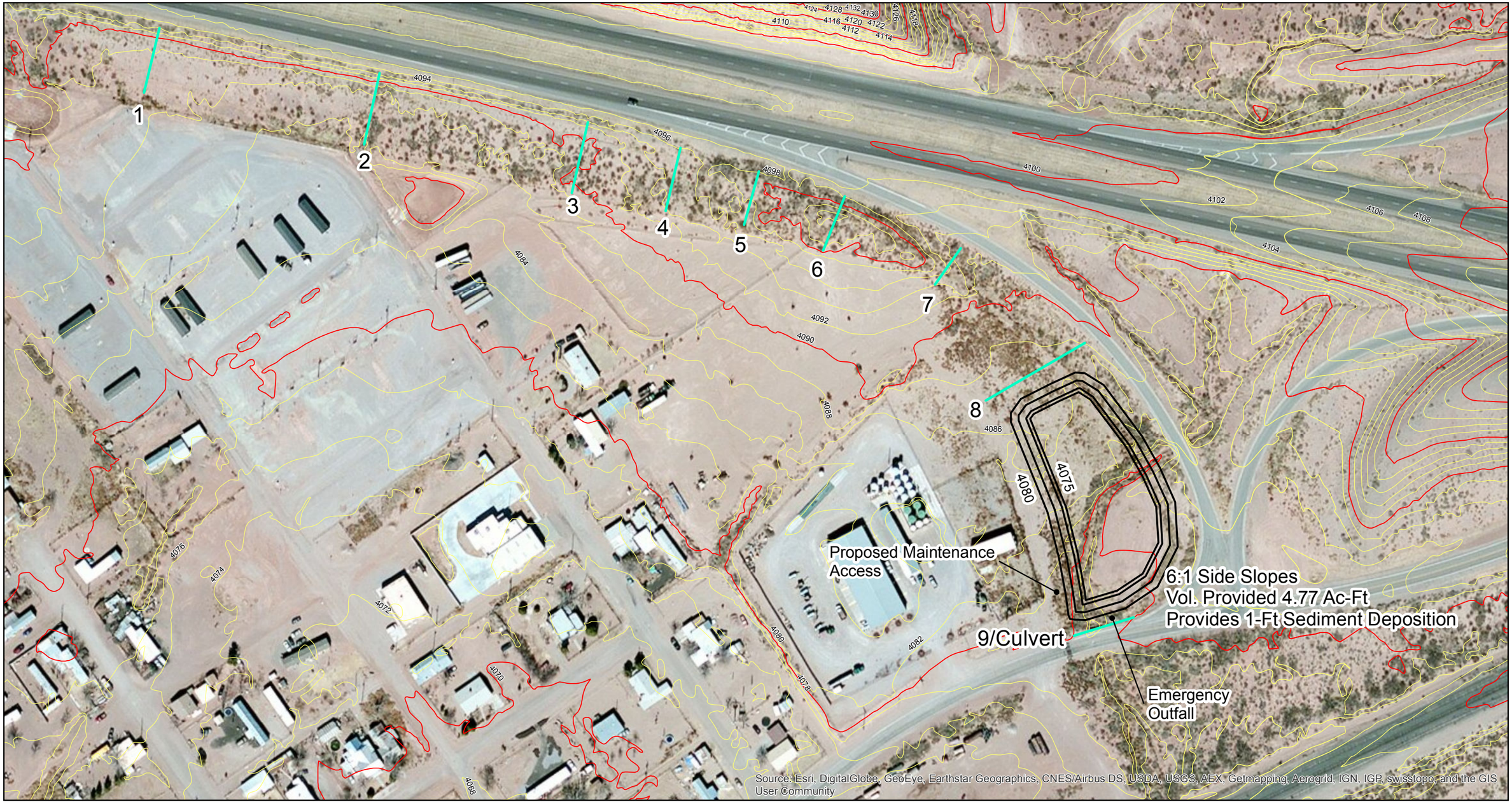
N
W E
S

0 37.5 75 150 Feet

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)

Imagery Sources: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Exhibit H**
**West Channel Alternative**
Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016




## Legend

- 2 ft Contour
- 10 ft Contour
- East Channel Cross Sections
- East Channel Basin

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)

Imagery Sources: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

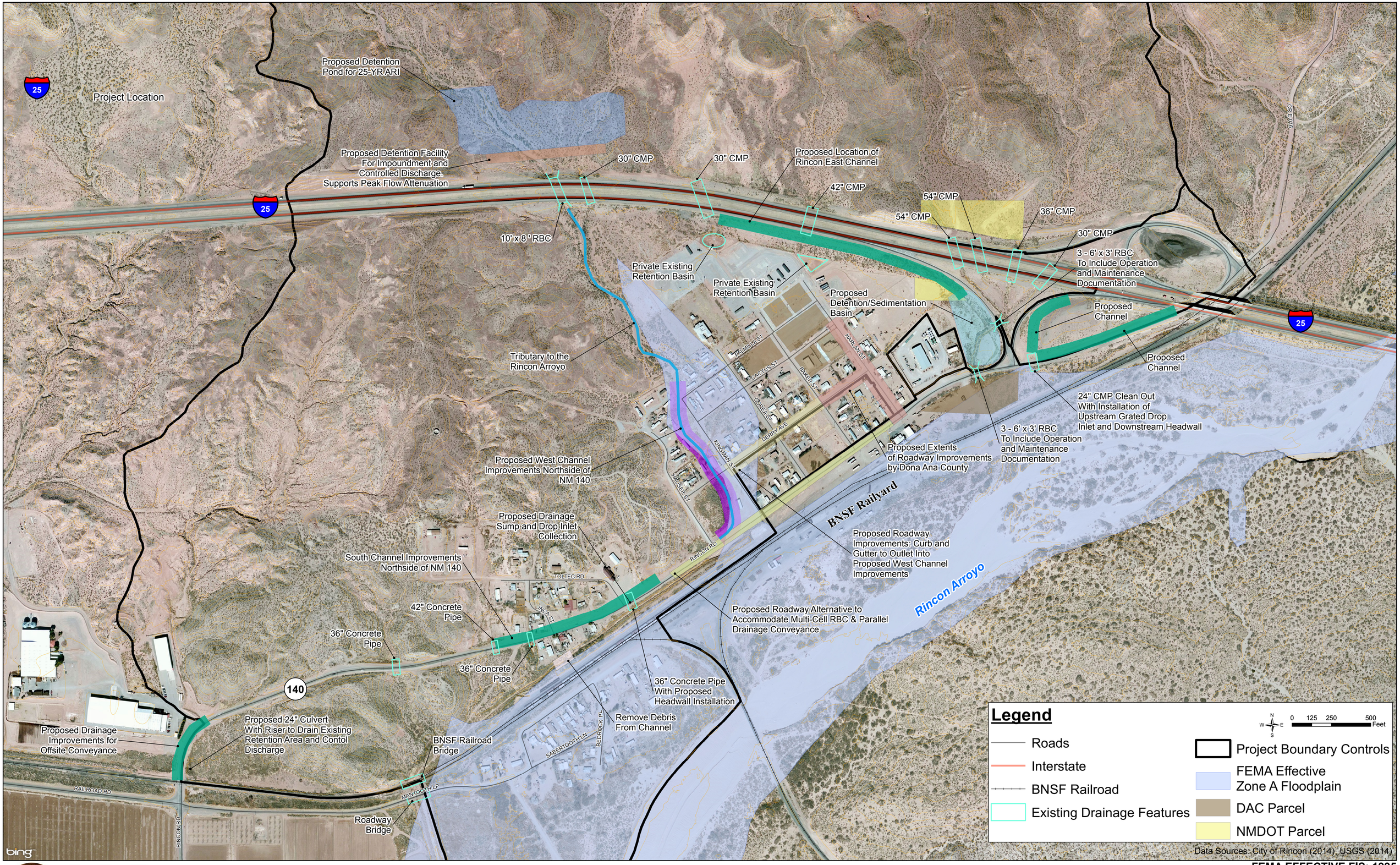
# East Channel

N W E S

0 75 150 300 Feet

**Exhibit G**
**East Channel Alternative**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016




# PROPOSED CONDITIONS ALTERNATIVES FOR RINCON DRAINAGE MASTER PLAN

**FEMA EFFECTIVE FIS: 1995**

**Exhibit F**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016








# APPENDIX G

*Photolog*



| Title: | Mantooth Loop facing northeast; west of Bedrock Place | File: | IPad_1_IMG_1832.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 1 |



| Title: | Mantooth Loop facing southwest; west of Bedrock Place | File: | IPad_1_IMG_1833.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 2 |



| Title: | West side of BNSF "T" intersection | File: | IPad_1_IMG_1834.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 3 |



| Title: | West side of BNSF "T" intersection | File: | IPad_1_IMG_1835.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 4 |



| Title: | West side of BNSF "T" intersection | File: | IPad_1_IMG_1836.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 5 |



| Title: | West side of BNSF "T" intersection | File: | IPad_1_IMG_1837.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 6 |




| Title: | Northwest corner of BNSF bridge over Rincon Arroyo | File: | IPad_1_IMG_1838.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 7 |



| Title: | Northwest corner of BNSF bridge over Rincon Arroyo; facing south | File: | IPad_1_IMG_1839.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 8 |



| Title: | West side of Rincon Arroyo; west of BNSF bridge over Rincon Arroyo | File: | IPad_1_IMG_1840.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 9 |



| Title: | West side of Rincon Arroyo; west of BNSF bridge over Rincon Arroyo | File: | IPad_1_IMG_1841.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 10 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | West side of Rincon Arroyo; west of BNSF bridge over Rincon Arroyo | File: | IPad_1_IMG_1842.jpg | Date: | 4/2/2014 6:58 |
| Desc: | Facing north | | | Slide: | 11 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | West side of Rincon Arroyo; west of BNSF bridge over Rincon Arroyo | File: | IPad_1_IMG_1843.jpg | Date: | 4/2/2014 6:58 |
| Desc: | Facing northwest | | | Slide: | 12 |



| Title: | West side of Rincon Arroyo; Northeast of wastewater treatment facility | File: | IPad_1_IMG_1844.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 13 |



| Title: | West side of Rincon Arroyo; Northeast of wastewater treatment facility | File: | IPad_1_IMG_1845.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 14 |



| Title: | North of wastewater treatment facility (WWTF) | File: | IPad_1_IMG_1846.jpg | Date: | 4//2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 15 |



| Title: | North of wastewater treatment facility (WWTF) | File: | IPad_1_IMG_1847.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 16 |



| Title: | North of wastewater treatment facility (WWTF) | File: | IPad_1_IMG_1848.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 17 |



| Title: | Manhole on southwest corner of Mantooth Loop and WWTF road | File: | IPad_1_IMG_1849.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 18 |




| Title: | Intersection of Mantooth Rd and Sabertooth Ln | File: | IPad_1_IMG_1850.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 19 |



| Title: | Mantooth Loop north of Sabertooth Lane | File: | IPad_1_IMG_1851.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 20 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Mantooth Loop north of Sabertooth Lane | File: | IPad_1_IMG_1852.jpg | Date: | 4/2/2014 6:58 |
| Desc: | Facing south | | | Slide: | 21 |




| | | | |
|---|---|---|---|
| Title: | Mantooth Loop facing BNSF to the North | | |
| Date: | 4/2/2014 6:58 | | |
| File: | IPad_1_IMG_1853.jpg | | |
| Desc: | | Slide #: | 22 |



| Title: | Mantooth Loop; facing east | File: | IPad_1_IMG_1854.jpg | Date: | 4/7/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 23 |



| Title: | South side of Mantooth Loop Bridge; facing north | File: | IPad_1_IMG_1855.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 24 |



| Title: | South side of Mantooth Loop Bridge; facing north | File: | IPad_1_IMG_1856.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 25 |



| Title: | South side of Mantooth Loop Bridge; facing north | File: | IPad_1_IMG_1857.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 26 |



| Title: | North side of Mantooth Loop Bridge; facing south | File: | IPad_1_IMG_1858.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 27 |



| Title: | North side of Mantooth Loop Bridge; facing south | File: | IPad_1_IMG_1859.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 28 |



| Title: | Sediment filled pipe west of Rincon Road | File: | IPad_1_IMG_1860.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | South of Rio Valley Chili factory; facing north | | | Slide: | 29 |



| Title: | South of Rincon Rd (SR140); east of Rio Valley Chili factory | File: | IPad_1_IMG_1861.jpg | Date: | 4/2/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 30 |




| Title: | South of Rincon Rd (SR140); east of Rio Valley Chili factory | File: | IPad_1_IMG_1862.jpg | Date: | 4/7/2014 6:58 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 31 |



| Title: | South of Rincon Rd (SR140); east of Rio Valley Chili factory | File: | IPad_1_IMG_1863.jpg | Date: | 4/7/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 32 |



| Title: | Erosion south of Rincon Rd (SR140); east of Rio Valley Chili factory | File: | IPad_1_IMG_1864.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 33 |



| Title: | South of Rincon Rd (SR140); west of Inca Street | File: | IPad_1_IMG_1865.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 34 |



| Title: | South of Rincon Rd (SR140); west of Inca Street | File: | IPad_1_IMG_1866.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 35 |



| Title: | South of Rincon Rd (SR140); west of Inca Street | File: | IPad_1_IMG_1867.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 36 |



| Title: | Debris covered 36" culvert inlet under Rincon Rd; west of Inca St | File: | IPad_1_IMG_1868.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 37 |



| Title: | Debris filled 36" culvert inlet under Rincon Rd; west of Inca St | File: | IPad_1_IMG_1869.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 38 |



| Title: | North of Rincon Rd (SR140); west of Inca Street | File: | IPad_1_IMG_1870.jpg | Date: | 4/7/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 39 |



| Title: | 42" culvert outlet under Rincon Rd; west of Inca St | File: | IPad_1_IMG_1871.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 40 |




| Title: | Gas warning sign south of Rincon Rd (SR140); west of Inca St | File: | IPad_1_IMG_1872.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 41 |



| Title: | Channel south of Rincon Rd (SR 140); facing southwest of Inca St | File: | IPad_1_IMG_1873.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 42 |



| Title: | Sediment filled 36" pipe outlet south of Rincon Rd (SR140) | File: | IPad_1_IMG_1874.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing north; west of Inca Street | | | Slide: | 43 |



| Title: | Sediment filled culvert outlet north of Rincon RD (SR140) east of Inca St | File: | IPad_1_IMG_1875.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Culvert under resident access driveway | | | Slide: | 44 |



| Title: | Roadside drainage ditch north of Rincon Rd (SR140) East of Inca St | File: | IPad_1_IMG_1876.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facng west | | | Slide: | 45 |



| Title: | Roadside drainage ditch north of Rincon Rd (SR140) East of Inca St | File: | IPad_1_IMG_1877.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 46 |



| Title: | Sediment filled culvert inlet north of Rincon RD (SR140) east of Inca St | File: | IPad_1_IMG_1878.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Culvert under resident access driveway | | | Slide: | 47 |



| Title: | Drainage channel south of Rincon Rd (SR140); west of Toltec Rd | File: | IPad_1_IMG_1879.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing South; North of BNSF | | | Slide: | 48 |




| Title: | Utilities manhole south of Rincon Rd (SR140); West of Toltec Rd | File: | IPad_1_IMG_1880.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 49 |



| Title: | Drainage channel south of Rincon Rd (SR140); west of Toltec Rd | File: | IPad_1_IMG_1881.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing west; North of BNSF | | | Slide: | 50 |



| Title: | Drainage channel south of Rincon Rd (SR140); west of Toltec Rd | File: | IPad_1_IMG_1882.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing West; North of BNSF | | | Slide: | 51 |



| Title: | 36" culvert outlet under Rincon Rd; East of Toltec Rd | File: | IPad_1_IMG_1883.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 52 |



| Title: | 36" culvert outlet under Rincon Rd; East of Toltec Rd | File: | IPad_1_IMG_1884.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 53 |



| Title: | Drainage channel south of Rincon Rd (SR140); west of Toltec Rd | File: | IPad_1_IMG_1885.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | North of BNSF; field clearing equipment shown for scale | | | Slide: | 54 |



| Title: | Drainage channel south of Rincon Rd (SR140); west of Toltec Rd | File: | IPad_1_IMG_1886.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing West; north of BNSF | | | Slide: | 55 |



| Title: | Drainage channel south of Rincon Rd (SR140); west of Toltec Rd | File: | IPad_1_IMG_1887.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | North of BNSF; field clearing equipment shown for scale | | | Slide: | 56 |




| Title: | Intersection of Toltec Rd and Inca St | File: | IPad_1_IMG_1888.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 57 |



| Title: | Intersection of Toltec Rd and Inca St; Facing South | File: | IPad_1_IMG_1889.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 58 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Manhole at intersection of Toltec Rd and Inca St | File: | IPad_1_IMG_1890.jpg | Date: | 4/2/2014 6:59 |
| Desc: | | | | Slide: | 59 |



| | | | |
|---|---|---|---|
| Title: | Intersection of Toltec Rd and Inca St | | |
| Date: | 4/2/2014 6:59 | | |
| File: | IPad_1_IMG_1891.jpg | | |
| Desc: | Facing east | Slide #: | 60 |



| Title: | Inca St north of Toltec Rd; Facing North | File: | IPad_1_IMG_1892.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 61 |




| Title: | Manhole north of Rincon Rd (SR140); between Toltec Rd and Inca St. | File: | IPad_1_IMG_1893.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 62 |



| Title: | Inca St north of Toltec Rd; Facing North | File: | IPad_1_IMG_1894.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 63 |



| Title: | Inca St north of Toltec Rd; Facing South | File: | IPad_1_IMG_1895.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 64 |



| Title: | Channel north of Rincon Rd (SR140) between Hauser St & Kingman St | File: | IPad_1_IMG_1896.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 65 |



| Title: | Channel north of Rincon Rd (SR140) between Hauser St & Kingman St | File: | IPad_1_IMG_1897.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 66 |



| Title: | Rincon Rd (SR140) between Hauser St and Kingman St | File: | IPad_1_IMG_1898.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing East | | | Slide: | 67 |



| Title: | Rincon Rd (SR140) between Hauser St and Kingman St | File: | IPad_1_IMG_1899.jpg | Date: | 4/7/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing West | | | Slide: | 68 |




| Title: | Manhole at intersection of Palmilla St and Kingman St | File: | IPad_1_IMG_1900.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 69 |



| Title: | Drainage channel north of Palmilla St and parallel to Kingman St | File: | IPad_1_IMG_1901.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 70 |



| Title: | Drainage channel north of Palmilla St and parallel to Kingman St | File: | IPad_1_IMG_1902.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing South | | | Slide: | 71 |



| Title: | Drainage channel north of Palmilla St and parallel to Kingman St | File: | IPad_1_IMG_1903.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 72 |



| Title: | Drainage channel north of Palmilla St and parallel to Kingman St | File: | IPad_1_IMG_1904.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 73 |



| Title: | Drainage channel north of Palmilla St and parallel to Kingman St | File: | IPad_1_IMG_1905.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 74 |



| Title: | Outlet of 10' x 8' Concrete Box Culvert below I-25; facing north | File: | IPad_1_IMG_1906.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 75 |




| Title: | Outlet of 10' x 8' Concrete Box Culvert below I-25; facing north | File: | IPad_1_IMG_1907.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 76 |




| Title: | Outlet of 10' x 8' Concrete Box Culvert below I-25; facing north | File: | IPad_1_IMG_1908.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 77 |



| Title: | Erosion on north side of I-25 east of 10' x 8' CBC; facing north | | IPad_1_IMG_1909.jpg | | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 78 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing northwest | File: | IPad_1_IMG_1910.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 79 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing northwest | File: | IPad_1_IMG_1911.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 80 |



| Title: | From drainage channel north of I-25 into 10' x 8' CBC | File: | IPad_1_IMG_1912.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 81 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing southeast | File: | IPad_1_IMG_1913.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 82 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing northwest | File: | IPad_1_IMG_1914.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 83 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing southeast | File: | IPad_1_IMG_1915.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 84 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing northwest | File: | IPad_1_IMG_1916.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 85 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing northwest | File: | IPad_1_IMG_1917.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 86 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing southeast | File: | IPad_1_IMG_1918.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 87 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing north | File: | IPad_1_IMG_1919.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 88 |



| Title: | Drainage channel into 10x8 culvert north of I-25; facing east | File: | IPad_1_IMG_1920.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 89 |



| Title: | East of drainage channel into 10x8 culvert north of I-25 | File: | IPad_1_IMG_1921.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 90 |



| Title: | East of drainage channel into 10x8 culvert north of I-25; facing south | File: | IPad_1_IMG_1922.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 91 |



| Title: | East of drainage channel into 10x8 culvert north of I-25; facing west | File: | IPad_1_IMG_1923.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 92 |



| Title: | East of drainage channel into 10x8 culvert north of I-25; facing southeast | File: | IPad_1_IMG_1924.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 93 |



| Title: | East of drainage channel into 10x8 culvert north of I-25 | File: | IPad_1_IMG_1925.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 94 |



| Title: | East of drainage channel into 10x8 culvert north of I-25 | File: | IPad_1_IMG_1926.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 95 |



| Title: | Channel into 30" CMP north of I-25 facing south | File: | IPad_1_IMG_1927.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | East of 10'x8' box culvert | | | Slide: | 96 |



| Title: | Channel into 30" CMP north of I-25 facing north | File: | IPad_1_IMG_1928.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | East of 10' x 8' CBC | | | Slide: | 97 |



| Title: | Outlet of 30" CMP below I-25 | File: | IPad_1_IMG_1929.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | South side of I-25; just east of 10x8 box culvert | | | Slide: | 98 |





| Title: | Sediment filled pipe north of Palmilla St along Baker St | File: | IPad_1_IMG_1930.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 99 |



| Title: | Resident access crossing over drainage channel | File: | IPad_1_IMG_1931.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | North of Palmilla St along Baker St | | | Slide: | 100 |



| Title: | Baker street facing south towards Palmilla St | File: | IPad_1_IMG_1932.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 101 |



| Title: | Blocked drainage channel due to garbage debris | File: | IPad_1_IMG_1933.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Palmilla St between Baker St and Corea St | | | Slide: | 102 |



| Title: | Sediment filled pipe crossing under Palmilla St | File: | IPad_1_IMG_1934.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Palmilla St between Baker St and Corea St | | | Slide: | 103 |



| Title: | Drainage channel between Corea St and Baker Street | File: | IPad_1_IMG_1935.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | North of Palmilla St; facing north | | | Slide: | 104 |



| Title: | Harlan St south of Cactus St; facing north | File: | IPad_1_IMG_1936.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 105 |



| Title: | Harlan St south of Cactus St; facing south | File: | IPad_1_IMG_1937.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 106 |



| | |
|---|---|
| Title: | Harlan St south of Cactus St; facing south |
| Date: | 4/2/2014 7:01 |
| File: | IPad_1_IMG_1938.jpg |
| Desc: | Slide #: 107 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Harlan St and Derry Ave intersection; facing west | File: | IPad_1_IMG_1939.jpg | Date: | 4/2/2014 7:01 |
| Desc: | | | | Slide: | 108 |



| Title: | Inlet into 6' x 3' box culvert under Rincon Rd (SR140) | File: | IPad_1_IMG_1940.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 109 |



| Title: | Outlet into 6' x 3' box culvert under Rincon Rd (SR140) | File: | IPad_1_IMG_1941.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 110 |



| Title: | South of culvert under Rincon Rd (SR140) looking north | File: | IPad_1_IMG_1942.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 111 |



| Title: | BNSF bridge over drainage channel south of SR140/I-25 interchange | File: | IPad_1_IMG_1943.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 112 |



| Title | North of BNSF bridge over channel south of SR140/I-25 interchange | File: | IPad_1_IMG_1944.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 113 |



| Title: | BNSF bridge over drainage channel south of SR140/I-25 interchange | File: | IPad_1_IMG_1945.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 114 |



| Title: | BNSF bridge over drainage channel south of SR140/I-25 interchange | File: | IPad_1_IMG_1946.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 115 |



| Title: | BNSF bridge over drainage channel south of SR140/I-25 interchange | File: | IPad_1_IMG_1947.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 116 |



| Title: | Intersection of Bedrock Pl and Sabertooth Ln facing west | File: | IPad_2_IMG_1829.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 117 |



| Title: | Intersection of Bedrock Pl and Sabertooth Ln facing north | File: | IPad_2_IMG_1830.jpg | Date: | 4/7/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 118 |



| Title: | Intersection of Bedrock Pl and Sabertooth Ln facing south | File: | IPad_2_IMG_1831.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 119 |



| Title: | Bedrock Pl south of Sabertooth Ln; facing south | File: | IPad_2_IMG_1832.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 120 |




| Title: | Bedrock Pl south of Sabertooth Ln | File: | IPad_2_IMG_1833.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 121 |



| Title: | Intersection of Bedrock Pl and Sabertooth Ln facing west | File: | IPad_2_IMG_1834.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 122 |




| Title: | Mailbox on corner of Sabertooth Ln and Bedrock Pl | File: | IPad_2_IMG_1835.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 123 |




| Title: | Manhole on Bedrock Place south of Mantooth Loop | File: | IPad_2_IMG_1836.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 124 |



| Title: | Bedrock Pl south of Mantooth Loop; facing south | File: | IPad_2_IMG_1837.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 125 |



| Title: | Intersection of Mantooth Loop and Bedrock Place; facing east | File: | IPad_2_IMG_1838.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 126 |



| Title: | Intersection of Mantooth Loop and Bedrock Place; facing southeast | File: | IPad_2_IMG_1839.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 127 |



| Title: | Intersection of Mantooth Loop and Bedrock Place; facing south | File: | IPad_2_IMG_1840.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 128 |



| Title: | Intersection of Mantooth Loop and Bedrock Place; facing west | File: | IPad_2_IMG_1841.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 129 |




| Title: | Intersection of Mantooth Loop and Bedrock Place; facing northeast | File: | IPad_2_IMG_1842.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 130 |



| Title: | Mantooth Loop east of Bedrock Place; facing east | File: | IPad_2_IMG_1843.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 131 |



| Title: | Mantooth Loop east of Bedrock Place; facing west | File: | IPad_2_IMG_1844.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 132 |



| Title: | Mantooth Loop along BNSF western "T" intersection | File: | IPad_2_IMG_1845.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing Southeast | | | Slide: | 133 |



| Title: | Mantooth Loop along BNSF western "T" intersection | File: | IPad_2_IMG_1846.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 134 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1847.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 135 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1848.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 136 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1849.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing Southwest | | | Slide: | 137 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1850.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 138 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1851.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 139 |



| Title: | Dirt pile along BNSF western "T" intersection | File: | IPad_2_IMG_1852.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 140 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1853.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 141 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1854.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 142 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1855.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 143 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1856.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 144 |



| Title | Along BNSF western "T" intersection | File: | IPad_2_IMG_1857.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 145 |



| Title: | Along BNSF western "T" intersection | File: | IPad_2_IMG_1858.jpg | Date: | 4/2/2014 7:01 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 146 |




| Title: | BNSF Sign on north side of Rincon Arroyo Bridge | File: | IPad_2_IMG_1859.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 147 |



| Title: | Rincon Arroyo from BNSF bridge; facing southwest | File: | IPad_2_IMG_1860.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 148 |



| Title: | BNSF Rincon Arroyo Bridge facing southeast | File: | IPad_2_IMG_1861.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 149 |



| Title: | BNSF Rincon Arroyo bridge; facing northeast | File: | IPad_2_IMG_1862.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 150 |



| Title: | BNSF Rincon Arroyo bridge; facing southeast | File: | IPad_2_IMG_1863.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 151 |



| Title: | BNSF Rincon Arroyo bridge; facing south | File: | IPad_2_IMG_1864.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 152 |



| Title: | Rincon Arroyo from BNSF bridge; facing southwest | File: | IPad_2_IMG_1865.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 153 |



| Title: | Rincon Arroyo from BNSF bridge; facing west | File: | IPad_2_IMG_1866.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 154 |



| Title: | Rincon Arroyo from BNSF bridge; facing west | File: | IPad_2_IMG_1867.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 155 |



| Title: | Rincon Arroyo from BNSF bridge; facing west | File: | IPad_2_IMG_1868.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 156 |



| Title: | Rincon Arroyo looking at BNSF bridge; facing east | File: | IPad_2_IMG_1869.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 157 |



| Title: | West of BNSF Rincon Arroyo bridge facing northwest | File: | IPad_2_IMG_1870.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 158 |



| Title: | West of BNSF Rincon Arroyo bridge facing northwest | File: | IPad_2_IMG_1871.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 159 |



| Title: | West of BNSF Rincon Arroyo bridge facing north | File: | IPad_2_IMG_1872.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 160 |



| Title: | West of BNSF Rincon Arroyo bridge facing north | File: | IPad_2_IMG_1873.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 161 |



| Title: | West of BNSF Rincon Arroyo bridge facing northeast | File: | IPad_2_IMG_1874.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 162 |



| Title: | West of BNSF Rincon Arroyo bridge facing east | File: | IPad_2_IMG_1875.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 163 |



| Title: | West of BNSF Rincon Arroyo bridge facing northwest | File: | IPad_2_IMG_1876.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 164 |



| Title: | West of BNSF Rincon Arroyo bridge facing west | File: | IPad_2_IMG_1878.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 165 |



| Title: | West of BNSF Rincon Arroyo bridge facing north | File: | IPad_2_IMG_1879.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 166 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Rincon Wastewater Treatment facility from Rincon Arroyo | File: | IPad_2_IMG_1880.jpg | Date: | 4/2/2014 7:02 |
| Desc: | Facing Southwest | | | Slide: | 167 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Rincon Wastewater Treatment facility; facing southwest | File: | IPad_2_IMG_1881.jpg | Date: | 4/7/2014 7:02 |
| Desc: | | | | Slide: | 168 |




| Title: | Observation well east of Rincon Wastewater Treatment Facility | File: | IPad_2_IMG_1882.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 169 |




| Title: | Observation well west of Rincon Wastewater Treatment Facility | File: | IPad_2_IMG_1883.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 170 |



| Title: | Look up road leading to Rincon Wastewater Treatment Facility | File: | IPad_2_IMG_1884.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 171 |




| Title: | Rincon Wastewater Treatment facility sign | File: | IPad_2_IMG_1885.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 172 |




| Title: | Observation well north of Rincon Wastewater Treatment Facility | File: | IPad_2_IMG_1886.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 173 |



| Title: | Rincon Wastewater Treatment Facility | File: | IPad_2_IMG_1887.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Southwest of Sabertooth LN and Mantooth Loop intersection | | | Slide: | 174 |




| Title: | Rincon Wastewater Treatment Facility | File: | IPad_2_IMG_1888.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Southwest of Sabertooth Lane and Mantooth Loop intersection | | | Slide: | 175 |



| Title: | Mantooth Loop west of Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1889.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 176 |



| Title: | Mantooth Loop west of Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1890.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 177 |



| Title: | Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1891.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 178 |




| Title: | Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1892.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 179 |



| Title: | Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1893.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 180 |



| Title: | Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1894.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 181 |




| Title: | Mantooth Loop and Sabertooth Ln Intersection | File: | IPad_2_IMG_1895.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 182 |



| Title: | Mantooth Loop along BNSF railroad | File: | IPad_2_IMG_1896.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 183 |



| Title: | South of BNSF and North of Mantooth Loop | File: | IPad_2_IMG_1897.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 184 |




| Title: | Gas pipeline warning along Mantooth Loop | File: | IPad_2_IMG_1898.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 185 |




| Title: | Southeast corner of Mantooth Loop; Fire Hydrant and Gas sign | File: | IPad_2_IMG_1899.jpg | Date: | 4/7/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 186 |




| Title: | West side of BNSF bridge over channel North of Mantooth Loop | File: | IPad_2_IMG_1900.jpg | Date: | 4/2/2014 7:02 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 187 |




| Title: | West side of BNSF bridge over channel North of Mantooth Loop | File: | IPad_2_IMG_1901.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 188 |



| Title: | South side of BNSF bridge over channel North of Mantooth Loop | File: | IPad_2_IMG_1902.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 189 |



| Title: | South side of BNSF bridge over channel North of Mantooth Loop | File: | IPad_2_IMG_1903.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 190 |



| Title: | North side of Mantooth Loop bridge over drainage channel | File: | IPad_2_IMG_1904.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 191 |



| Title: | North side of Mantooth Loop bridge over drainage channel | File: | IPad_2_IMG_1905.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 192 |



| Title: | Between Mantooth Loop and BNSF bridges | File: | IPad_2_IMG_1906.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 193 |



| Title: | Mantooth Loop from Mantooth Loop bridge | File: | IPad_2_IMG_1907.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 194 |



| Title: | East side of BNSF bridge parallel to Mantooth Loop | File: | IPad_2_IMG_1908.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing East | | | Slide: | 195 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1909.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 196 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1910.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 197 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1911.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 198 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1912.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 199 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1913.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 200 |



| Title: | Drainage channel south of Mantooth Loop bridge | File: | IPad_2_IMG_1914.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 201 |



| Title: | Drainage channel south of Mantooth Loop bridge | File: | IPad_2_IMG_1915.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 202 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1916.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 203 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1917.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | facing southwest | | | Slide: | 204 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1918.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 205 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1919.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 206 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1920.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 207 |



| Title: | Mantooth Loop Bridge pier | File: | IPad_2_IMG_1921.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 208 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1922.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 209 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1923.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 210 |



| Title: | Fire hydrant east of Mantooth Loop and SR140 intersection | File: | IPad_2_IMG_1924.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 211 |



| Title: | Northeast of Mantooth Loop and SR140 intersection | File: | IPad_2_IMG_1925.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 212 |



| Title: | Northeast of Mantooth Loop and SR140 intersection | File: | IPad_2_IMG_1926.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 213 |




| Title: | Northeast of Mantooth Road and SR140 intersection | File: | IPad_2_IMG_1927.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 214 |




| Title: | West of SR140 and Mantooth Loop/Railroad Rd Intersection | File: | IPad_2_IMG_1928.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 215 |




| Title: | Railroad Rd and SR140 Intersection | File: | IPad_2_IMG_1929.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 216 |




| Title: | Railroad Rd and SR140 Intersection | File: | IPad_2_IMG_1930.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 217 |




| Title: | Rincon Rd (SR140) North of BNSF crossing | File | IPad_2_IMG_1931.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west; east of Rio Valley Chili factory | | | Slide: | 218 |




| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1932.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing west; east of Rio Valley Chili factory | | | Slide: | 219 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1933.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing northwest; east of Rio Valley Chili factory | | | Slide: | 220 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1934.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing northwest; east of Rio Valley Chili factory | | | Slide: | 221 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1935.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east; northeast of Rio Valley Chili factory | | | Slide: | 222 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1936.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south; northeast of Rio Valley Chili factory | | | Slide: | 223 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1937.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north; north of Rio Valley Chili factory | | | Slide: | 224 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1938.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north; north of Rio Valley Chili factory | | | Slide: | 225 |



| Title: | Start of basin north of factory along Rincon Rd north of BNSF | File: | IPad_2_IMG_1939.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing south; north of Rio Valley Chili factory | | | Slide: | 226 |



| Title: | Rincon Rd (SR140) North of BNSF crossing | File: | IPad_2_IMG_1940.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north; east of Rio Valley Chili factory | | | Slide: | 227 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1941.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 228 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1942.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 229 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1943.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 230 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1944.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 231 |



| Title: | Erosion south of  Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1945.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 232 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1946.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 233 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1947.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 234 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1948.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 235 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1949.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 236 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1950.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 237 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1951.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 238 |



| Title: | Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1952.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 239 |



| Title: | Erosion on North side of Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1953.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 240 |



| Title: | South side of Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1954.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 241 |



| Title: | South side of Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1955.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 242 |



| Title: | South side of Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1956.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 243 |



| Title: | South side of Rincon Rd east of Rio Valley Chili factory | File: | IPad_2_IMG_1957.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 244 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | South side of Rincon Rd east of Rio Valley Chili factory | | IPad_2_IMG_1958.jpg | | 4/2/2014 7:04 |
| Desc: | Facing east | | | Slide: | 245 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | 36" culvert outlet of concrete pipe under Rincon Rd East of RVC factory | File: | IPad_2_IMG_1959.jpg | Date: | 4/2/2014 7:04 |
| Desc: | Facing north | | | Slide: | 246 |



| Title: | Rincon Rd west of Inca Street | File: | IPad_2_IMG_1960.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 247 |



| Title: | Erosion off south side of Rincon Rd west of Inca Street | | IPad_2_IMG_1961.jpg | File | | 4/2/2014 7:04 | Date: |
|---|---|---|---|---|---|---|---|
| Desc: | Facing east | | | | Slide: | 248 | |



| Title: | South side of Rincon Rd west of Inca Street | File: | IPad_2_IMG_1962.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 249 |



| Title: | Channel leading from Rincon Rd west of Inca Street | File: | IPad_2_IMG_1963.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 250 |



| Title: | Channel leading to Rincon Rd west of Inca Street | File: | IPad_2_IMG_1964.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 251 |



| Title: | Rincon Rd west of Inca Street | File: | IPad_2_IMG_1965.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 252 |



| Title: | Rincon Rd west of Inca Street | File: | IPad_2_IMG_1966.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 253 |



| Title: | Rincon Rd west of Inca Street | File: | IPad_2_IMG_1967.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 254 |



| Title: | Rincon Rd west of Inca Street | File: | IPad_2_IMG_1968.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 255 |



| Title: | 42" culvert inlet to pipe under Rincon Rd, west of Inca Street | File: | IPad_2_IMG_1969.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 256 |



| Title: | House west of Inca St along Rincon Rd | File: | IPad_2_IMG_1970.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 257 |



| Title: | Manhole along Rincon Rd, west of Inca St | File: | IPad_2_IMG_1971.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 258 |



| Title: | Water line access point south of Rincon Rd, west of Inca St | File: | IPad_2_IMG_1972.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 259 |



| Title: | Small drainage channel covered in brush west of Inca St, N. of Rincon Rd | File: | IPad_2_IMG_1973.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 260 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, west of Inca St | File: | IPad_2_IMG_1974.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 261 |



| Title: | Sediment filled CMP under access road along Rincon Rd, west of Inca St | File: | IPad_2_IMG_1975.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 262 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, west of Inca St | File: | IPad_2_IMG_1976.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 263 |



| Title: | Sediment filled CMP under access road along Rincon Rd, west of Inca St | File: | IPad_2_IMG_1977.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 264 |




| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1978.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 265 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1979.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 266 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1980.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 267 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1981.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 268 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1982.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 269 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1983.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 270 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1984.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 271 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1985.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 272 |



| Title: | Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1986.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 273 |



| Title: | Manhole at Intersection of Inca St and Rincon Rd | File: | IPad_2_IMG_1987.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 274 |



| Title: | Manhole west of Toltec Rd north of Rincon Rd | File: | IPad_2_IMG_1988.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 275 |



| Title: | Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1989.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 276 |



| Title: | Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1990.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 277 |



| Title: | Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1991.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 278 |



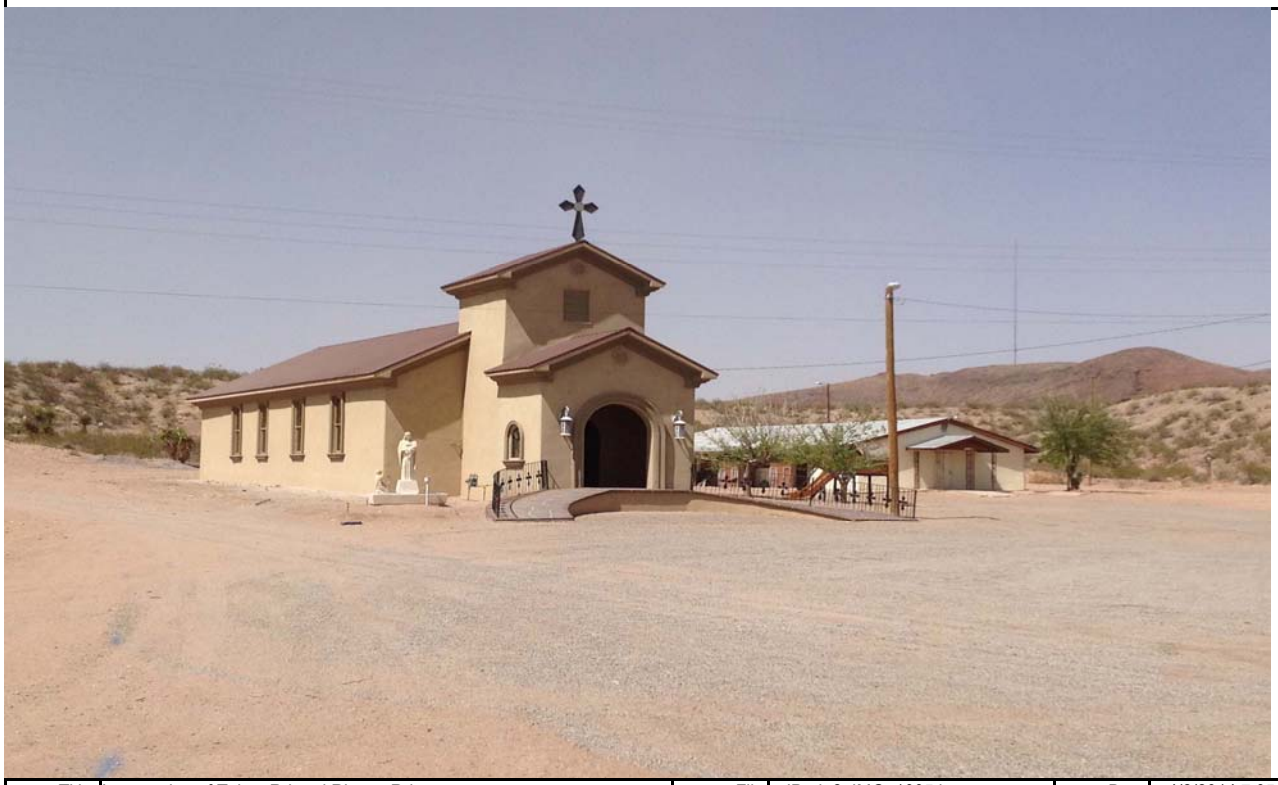
| Title: | Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1992.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 279 |



| Title: | Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1993.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide | 280 |



| Title: | Blue stake markings near Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1994.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 281 |



| Title: | Intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_1995.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 282 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, east of Toltec Rd | File: | IPad_2_IMG_1996.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 283 |



| Title: | East of Toltec Rd, Along Rincon Rd | File: | IPad_2_IMG_1997.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 284 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, east of Toltec Rd | File: | IPad_2_IMG_1998.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 285 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, east of Toltec Rd | File: | IPad_2_IMG_1999.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 286 |



| Title: | East of intersection of Rincon Rd and Toltec Rd | File: | IPad_2_IMG_2001.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing East | | | Slide: | 287 |



| Title: | East of intersection of Rincon Rd and Toltec Rd | File: | IPad_2_IMG_2002.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 288 |




| Title: | Manhole at intersection of Toltec Rd and Rincon Rd | File: | IPad_2_IMG_2003.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 289 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2004.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing east; south of Toltec Rd and Rincon Rd intersection | | | Slide: | 290 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2005.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west; south of Toltec Rd and Rincon Rd intersection | | | Slide: | 291 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2006.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Southwest of Toltec Rd and Rincon Rd intersection | | | Slide: | 292 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2007.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing northwest; between Toltec Rd and Inca St intersections with and Rincon Rd | | | Slide: | 293 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2008.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing east; between Toltec Rd and Inca St intersections with and Rincon Rd | | | Slide: | 294 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2009.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west; between Toltec Rd and Inca St intersections with and Rincon Rd | | | Slide: | 295 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2010.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing northwest; between Toltec Rd and Inca St intersections with and Rincon Rd | | | Slide: | 296 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2011.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west; between Toltec Rd and Inca St intersections with and Rincon Rd | | | Slide: | 297 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2012.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west; south of Inca St and Rincon Rd intersection | | | Slide: | 298 |





| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2013.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing east; south of Inca St and Rincon Rd intersection | | | Slide: | 299 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2014.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north; south of Inca St and Rincon Rd intersection | | | Slide: | 300 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2015.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north; south of Inca St and Rincon Rd intersection | | | Slide: | 301 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2016.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north; south of Inca St and Rincon Rd intersection | | | Slide: | 302 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2017.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing northwest; debris pile behind residence; south of Inca St and Rincon Rd intersection | | | Slide: | 303 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2018.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west; south of Inca St and Rincon Rd intersection | | | Slide: | 304 |



| Title: | Debris pile along drainage channel between Rincon Rd and BNSF | File: | IPad_2_IMG_2019.jpg | Date | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north; south of Inca Street and Rincon Rd intersection | | | Slide: | 305 |



| Title: | Debris pile along drainage channel between Rincon Rd and BNSF | File: | IPad_2_IMG_2020.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north; south of Inca St and Rincon Rd Intersection | | | Slide: | 306 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2021.jpg | Date: | 4/2/2014 7:05 |
| Desc: | Facing east; south of Inca St and Rincon Rd intersection | | | Slide: | 307 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Debris pile on north side of drainage channel | File: | IPad_2_IMG_2022.jpg | Date: | 4/2/2014 7:05 |
| Desc: | Facing north from inside channel; south of Rincon Rd and North of BNSF railroad | | | Slide: | 308 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2023.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west; south of Inca St | | | Slide: | 309 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2024.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing east; south of Inca St | | | Slide: | 310 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2025.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 311 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2026.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 312 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2027.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing southwest; southwest of Inca St and Rincon Rd intersection | | | Slide: | 313 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2028.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing southwest; southwest of Inca St and Rincon Rd intersection | | | Slide: | 314 |



| Title: | North of drainage channel between Rincon Rd and BNSF | File: | IPad_2_IMG_2029.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east; southwest of Inca St and Rincon Rd intersection | | | Slide: | 315 |



| Title: | North of drainage channel between Rincon Rd and BNSF | File: | IPad_2_IMG_2030.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east; southwest of Inca St and Rincon Rd intersection | | | Slide: | 316 |



| Title: | North of drainage channel between Rincon Rd and BNSF | File: | IPad_2_IMG_2031.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing eastl southwest of Inca St and Rincon Rd intersection | | | Slide: | 317 |



| Title: | North of drainage channel between Rincon Rd and BNSF | File: | IPad_2_IMG_2032.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing southeast; southwest of Inca St and Rincon Rd intersection | | | Slide: | 318 |



| Title: | Sediment partially covered fire hydrant west of Inca St on Toltec Rd | File: | IPad_2_IMG_2033.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 319 |



| Title: | West of Toltec Rd and Inca St intersection | File: | IPad_2_IMG_2034.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 320 |



| Title: | Outlet of CMP under Toltec Rd west of Inca St | File: | IPad_2_IMG_2035.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 321 |



| Title: | Drainage channel leading to CMP under Toltec Rd west of Inca St | File: | IPad_2_IMG_2036.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 322 |



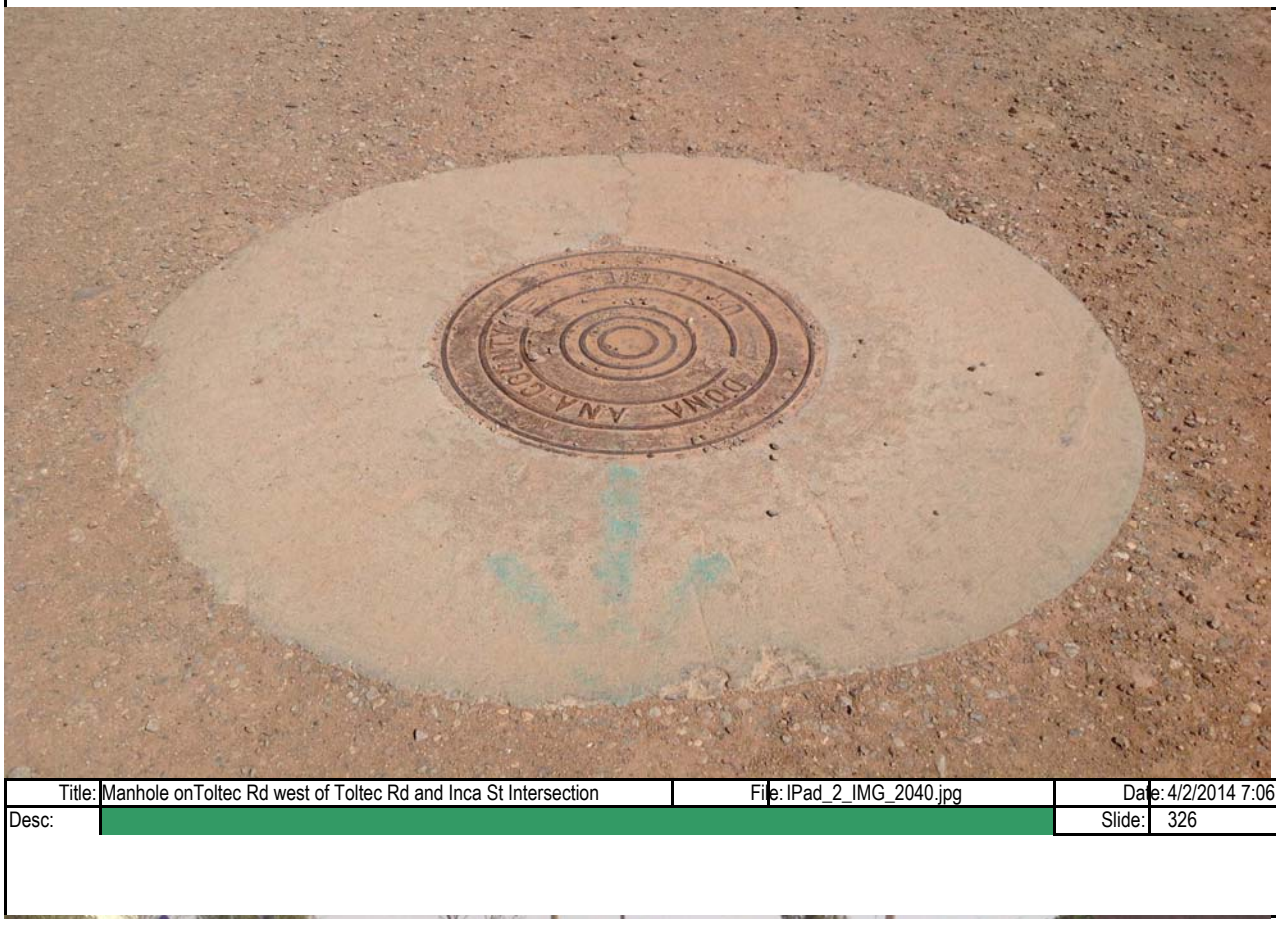
| Title: | Drainage channel leading to CMP under Toltec Rd west of Inca St | File: | IPad_2_IMG_2037.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 323 |



| Title: | Inlet of CMP under Toltec Rd west of Inca St | File: | IPad_2_IMG_2038.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 324 |



| Title: | Toltec Rd west of Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2039.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 325 |




| Title: | Manhole onToltec Rd west of Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2040.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 326 |



| Title: | Water meter west of Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2041.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 327 |



| Title: | Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2042.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 328 |



| Title: | Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2043.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 329 |



| Title: | Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2044.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 330 |



| Title: | Manhole on Toltec Rd east of Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2045.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 331 |



| Title: | Manhole on Toltec Rd west of Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2046.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 332 |



| Title: | East of Toltec Rd and Inca St Intersection | File: | IPad_2_IMG_2047.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 333 |



| Title: | Start of drainage channel between Rincon Rd and BNSF railroad | File: | IPad_2_IMG_2048.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing west; between Kingman St and Hauser St | | | Slide: | 334 |



| Title: | Southeast corner of Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2049.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 335 |



| Title: | Southeast corner of Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2050.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 336 |



| Title: | Southeast corner of Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2051.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 337 |



| Title: | Southeast corner of Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2052.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 338 |



| Title: | Southeast corner of Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2053.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 339 |




| Title: | Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2054.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 340 |



| Title: | Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2055.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 341 |



| Title: | Hauser St and Rincon Rd intersection | File: | IPad_2_IMG_2056.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 342 |



| Title: | Fire hydrant west of Kingman St and Rincon Rd intersection | File: | IPad_2_IMG_2057.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 343 |




| Title: | Rincon Post Office at intersection of Kingman St and Rincon Rd | File: | IPad_2_IMG_2058.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 344 |




| Title: | Rincon Post Office at intersection of Kingman St and Rincon Rd | File: | IPad_2_IMG_2059.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 345 |



| Title: | Water blowoff valve on Kingman St | File: | IPad_2_IMG_2061.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing West | | | Slide: | 346 |



| Title: | Kingman St and Derry Ave intersection | File: | IPad_2_IMG_2062.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 347 |



| Title: | Drainage channel between Kingman St and Hauser St along Derry Ave | File: | IPad_2_IMG_2063.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 348 |



| Title: | Drainage channel between Kingman St and Hauser St along Derry Ave | File: | IPad_2_IMG_2064.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 349 |



| Title: | Manhole on Derry Ave between Kingman St and Hauser St | File: | IPad_2_IMG_2065.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 350 |



| Title: | Fire hydrant on northeast corner of Derry Ave and Hauser St | File: | IPad_2_IMG_2066.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 351 |



| Title: | Home along Derry Ave on Northeast corner of Derry Ave and Hauser St | File: | IPad_2_IMG_2067.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 352 |



| Title: | Manhole at intersection of Hauser St and Derry Ave | File: | IPad_2_IMG_2068.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 353 |



| Title: | Water blowoff valve on Hauser St north of Derry Ave | File: | IPad_2_IMG_2069.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 354 |



| Title: | Hauser St north of Derry Ave | File: | IPad_2_IMG_2070.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 355 |



| Title: | Drainage channel scour protection between Hauser St and Kingman St | File: | IPad_2_IMG_2071.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 356 |



| Title: | Drainage channel scour protection between Hauser St and Kingman St | | IPad_2_IMG_2072.jpg | Date: | 4/2/2014 7:07 | File: |
|---|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 357 | |



| Title: | Drainage channel scour protection between Hauser St and Kingman St | File: | IPad_2_IMG_2073.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 358 |



| Title: | Drainage channel between Hauser St and Kingman | File: | IPad_2_IMG_2074.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north; North of Derry Ave | | | Slide: | 359 |



| Title: | Drainage channel between Hauser St and Kingman St | File: | IPad_2_IMG_2075.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south; west of Cactus St and Kingman St intersection | | | Slide: | 360 |



| Title: | Kingman St south of Cactus St | File: | IPad_2_IMG_2076.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 361 |



| Title: | Kingman St south of Cactus St | File: | IPad_2_IMG_2077.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 362 |




| Title: | Manhole on Kingman St between Derry Ave and Cactus St | File: | IPad_2_IMG_2078.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 363 |



| Title: | Kingman St between Derry Ave and Cactus St | File: | IPad_2_IMG_2079.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 364 |



| Title: | Kingman St between Derry Ave and Cactus St | File: | IPad_2_IMG_2080.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 365 |



| Title: | Kingman St between Derry Ave and Cactus St | File: | IPad_2_IMG_2081.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 366 |



| Title: | Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2082.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 367 |



| Title: | Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2083.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 368 |



| Title: | Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2084.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 369 |



| Title: | Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2085.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 370 |



| Title: | Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2086.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 371 |



| Title: | North of Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2088.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 372 |



| Title: | North of Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2089.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 373 |



| Title: | North of Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2090.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 374 |



| Title: | North of Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2091.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 375 |



| Title: | Scour protection north of Kingman St and Palmilla St intersection | File: | IPad_2_IMG_2092.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 376 |



| Title: | North of Kingman St looking into drainage channel | File: | IPad_2_IMG_2093.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 377 |



| Title: | North of Kingman St looking into drainage channel | File: | IPad_2_IMG_2094.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 378 |



| Title: | North of Kingman St looking into drainage channel | File: | IPad_2_IMG_2095.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 379 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2096.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 380 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2097.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 381 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2098.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 382 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2099.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 383 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2100.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 384 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2101.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 385 |



| Title: | North of Kingman St next to drainage channel | File: | IPad_2_IMG_2102.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 386 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2103.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 387 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2104.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 388 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2105.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 389 |



| Titl e: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2106.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 390 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2107.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 391 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2108.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 392 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2109.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 393 |



| Title: | Drainage channel north of Kingman Ave | File: | IPad_2_IMG_2110.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 394 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2111.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 395 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2112.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 396 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2113.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 397 |



| Title: | Outlet 30" pipe under I-25 | File: | IPad_2_IMG_2114.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 398 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2115.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 399 |



| Title: | North of Kingman St and Palmilla St | File: | IPad_2_iMG_2087.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 400 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2116.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 401 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2117.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 402 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2118.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 403 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2119.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 404 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2120.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 405 |



| Title: | South of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2121.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 406 |



| Title: | 10' x 8' Box culvert under I-25 | File | IPad_2_IMG_2122.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 407 |



| Title: | Headwall for inlet of 10' x 8' box culvert under I-25 | File: | IPad_2_IMG_2123.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 408 |



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|---|---|---|---|---|---|
| Title: | 10 ' x 8' box culvert under I-25 inlet side | File: | IPad_2_IMG_2124.jpg | Date: | 4/2/2014 7:08 |
| Desc: | Facing north | | | Slide: | 409 |




| | | | | | |
|---|---|---|---|---|---|
| Title: | Headwall for inlet of 10' x 8' box culvert under I-25 | | IPad_2_IMG_2125.jpg | File: | 4/2/2014 7:08 |
| Desc: | Facing northeast | | | Slide: | 410 |



| Title: | 10 ' x 8' box culvert under I-25 inlet side | File: | IPad_2_IMG_2126.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 411 |



| Title: | Scour near inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2127.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 412 |



| Title: | Inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2128.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 413 |



| Title: | Inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2129.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 414 |



| Title: | Inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2130.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 415 |



| Title: | Channel to inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2131.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 416 |



| Title: | Channel to inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2132.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 417 |



| Title: | Channel to inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2133.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 418 |



| Title: | North of I-25; near 10' x 8' CBC | File: | IPad_2_IMG_2134.jpg | Date: | 4/7/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 419 |



| Title: | Erosion north of I-25; near 30" culvert east of 10' x 8' CBC | File: | IPad_2_IMG_2135.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 420 |



| Title: | Inlet to 30" pipe next to 10' x 8' box culvert | File: | IPad_2_IMG_2136.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 421 |



| Title: | Channel leading to inlet of 30" pipe north side of I-25 | File: | IPad_2_IMG_2137.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 422 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2138.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west; between 30" culverts | | | Slide: | 423 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2139.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing east; between 30" culverts | | | Slide: | 424 |



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|---|---|---|---|---|---|
| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2140.jpg | Date: | 4/2/2014 7:08 |
| Desc: | Facing east; between 30" culverts | | | Slide: | 425 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2141.jpg | Date: | 4/2/2014 7:08 |
| Desc: | Facing southeast; between 30" culverts | | | Slide: | 426 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2142.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west; between 30 " culverts | | | Slide | 427 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2143.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing east; between 30" culverts | | | Slide: | 428 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2144.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing east; between 30" culverts | | | Slide: | 429 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2145.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north; between 30" culverts | | | Slide: | 430 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2146.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing north; between 30" culverts | | | Slide: | 431 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2147.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing northeast; between 30" culverts | | | Slide: | 432 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2148.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing northeast; between 30" culverts | | | Slide: | 433 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2149.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing east; between 30" culverts | | | Slide: | 434 |



| Title: | Maintenance path along the north side of I-25 | File: | IPad_2_IMG_2150.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing east; between 30" culverts | | | Slide: | 435 |



| Title: | Inlet to 30" CMP under I-25 | File: | IPad_2_IMG_2151.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south; leads into Retention basin | | | Slide: | 436 |



| Title: | Erosion near inlet to 30" CMP under I-25 | File: | IPad_2_IMG_2152.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 437 |



| Title: | Inlet to 30" CMP under I-25 | File: | IPad_2_IMG_2153.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 438 |



| Title: | Drainage channel leading to 30" CMP under I-25 | File: | IPad_2_IMG_2154.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing Northeast | | | Slide: | 439 |



| Title: | Data collection station north side of I-25 | File: | IPad_2_IMG_2155.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 440 |




| Title: | Data collection station north side of I-25 | File: | IPad_2_IMG_2156.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 441 |



| Title: | Data collection station north side of I-25 | File: | IPad_2_IMG_2157.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 442 |



| Title: | Data collection station north side of I-25 | File: | IPad_2_IMG_2158.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 443 |



| Title: | North side of I-25 near data collection station | File: | IPad_2_IMG_2159.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 444 |



| Title: | North side of I-25 near data collection station | File: | IPad_2_IMG_2160.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 445 |



| Title: | North side of I-25 near data collection station | File: | IPad_2_IMG_2161.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 446 |



| Title: | North side of I-25 near data collection station | File: | IPad_2_IMG_2162.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 447 |



| Title: | North side of I-25 near data collection station | File: | IPad_2_IMG_2163.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 448 |



| Title: | Inlet for 42" CMP under I-25 | File: | IPad_2_IMG_2164.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 449 |



| Title: | Inlet for 42" CMP under I-25 | File: | IPad_2_IMG_2165.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south; pipe feeds into retention basin | | | Slide: | 450 |



| Title: | I-25 Median drop-inlet west of I-25 and SR140 intersection | File: | IPad_2_IMG_2166.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 451 |




| Title: | Southbound I-25 exit sign for Rincon | File: | IPad_2_IMG_2167.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 452 |




| Title: | Southside of I-25 near Rincon exit looking toward Rincon | File: | IPad_2_IMG_2168.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 453 |



| Title: | Southside of I-25 near Rincon exit looking toward Rincon | File: | IPad_2_IMG_2169.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 454 |



| Title: | Southside of I-25 near Rincon exit looking toward Rincon | File: | IPad_2_IMG_2170.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 455 |



| Title: | Southside of I-25 near Rincon exit looking toward Rincon | File: | IPad_2_IMG_2171.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 456 |



| Title: | Southside of I-25 near Rincon exit looking toward Rincon | File: | IPad_2_IMG_2172.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 457 |



| Title: | Southside of I-25 near Rincon exit | File: | IPad_2_IMG_2173.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 458 |



| Title: | Southside of I-25 near Rincon exit | File: | IPad_2_IMG_2174.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 459 |




| Title: | South side of I-25 near Rincon exit | File: | IPad_2_IMG_2175.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 460 |



| Title: | Upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2176.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 461 |



| Title: | Upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2177.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 462 |



| Title: | Upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2178.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 463 |



| Title: | Upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2179.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 464 |



| Title: | Upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2180.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 465 |



| Title: | Upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2181.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north towards I-25 | | | Slide: | 466 |



| Title: | Inside upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2182.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 467 |



| Title: | Inside upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2183.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 468 |



| Title: | West side of upper retention basin along north side of FEMA site | File: | IPad_2_IMG_2184.jpg | Date: | 4/2/2014 7:09 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 469 |



| Title: | Shoulder drainage channel off I-25 southbound | File: | IPad_2_IMG_2185.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 470 |



| Title: | Drainage channel north of Kingman St | File: | IPad_2_IMG_2186.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 471 |



| Title: | Cactus St between Corea St and Kingman St | File: | IPad_2_IMG_2187.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 472 |



| Title: | Drainage along south side of Cactus St; between Corea and Kingman St | File: | IPad_2_IMG_2188.jpg | Date | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 473 |



| Title: | Cactus St between Corea St and Kingman St | File: | IPad_2_IMG_2189.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 474 |



| Title: | Culvert under residential property | File: | IPad_2_IMG_2190.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing east; Northwest corner of Corea St and Cactus St | | | Slide: | 475 |



| Title: | Culvert under residential property | File: | IPad_2_IMG_2191.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing east; Northwest corner of Corea St and Cactus St | | | Slide: | 476 |




| Title: | Manhole at intersection of Corea St and Cactus St | File: | IPad_2_IMG_2192.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 477 |



| Title: | Intersection of Corea St and Cactus St | File: | IPad_2_IMG_2193.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 478 |



| Title: | Intersection of Corea St and Cactus St | File: | IPad_2_IMG_2194.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 479 |



| Title: | Intersection of Corea St and Cactus St | File: | IPad_2_IMG_2195.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 480 |



| Title: | Intersection of Corea St and Cactus St | File: | IPad_2_IMG_2196.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 481 |



| Title: | Drainage channel west of Kingman St and Cactus St | File: | IPad_2_IMG_2197.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 482 |



| Title: | Drainage channel west of Kingman St and Cactus St | File: | IPad_2_IMG_2198.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 483 |



| Title: | Drainage channel west of Kingman St and Cactus St | File: | IPad_2_IMG_2199.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 484 |



| Title: | Pipes running east to west along FEMA site | File: | IPad_2_IMG_2200.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 485 |



| Title: | Eroded channel along FEMA site | File: | IPad_2_IMG_2202.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 486 |



| Title: | Sediment filled pipe within FEMA site | File: | IPad_2_IMG_2203.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 487 |



| Title: | Sediment filled pipe within FEMA site | File: | IPad_2_IMG_2204.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 488 |



| Title: | Sediment filled pipe within FEMA site | File: | IPad_2_IMG_2205.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 489 |



| Title: | Baker St north of Palmilla St | File: | IPad_2_IMG_2206.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 490 |



| Title: | Baker St north of Palmilla St | File: | IPad_2_IMG_2207.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 491 |



| Title: | Crossing over drainage channel along Baker St | File: | IPad_2_IMG_2208.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 492 |



| Title: | Rock piles on Northeast corner of Baker St and Palmilla St | File: | IPad_2_IMG_2209.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 493 |



| Title: | Rock piles on Northeast corner of Baker St and Palmilla St | File: | IPad_2_IMG_2210.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 494 |



| Title: | Rock piles on southwest corner of Baker St and Palmilla St | File: | IPad_2_IMG_2211.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 495 |



| Title: | Rock piles on southwest corner of Baker St and Palmilla St | File: | IPad_2_IMG_2212.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 496 |



| Title: | Rock piles on southwest corner of Baker St and Palmilla St | File: | IPad_2_IMG_2213.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 497 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2214.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 498 |





| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2215.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 499 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2216.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 500 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2217.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 501 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2218.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 502 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2219.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing southwest; scouring along property | | | Slide: | 503 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2220.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Property owners scour protection | | | Slide: | 504 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2221.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Drainage channel facing south | | | Slide: | 505 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2222.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Drainage channel facing south | | | Slide: | 506 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2223.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Culvert for drainage channel built by residents; facing south | | | Slide: | 507 |



| Title: | South of Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2224.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Drainage channel facing northwest | | | Slide: | 508 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2225.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 509 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2226.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 510 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2227.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 511 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2228.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 512 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2229.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 513 |



| Title: | Palmilla St between Baker St and Corea St | File: | IPad_2_IMG_2230.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 514 |



| Title: | Harlan St south of Cactus St | File: | IPad_2_IMG_2231.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 515 |



| Title: | Harlan St south of Cactus St | File: | IPad_2_IMG_2232.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 516 |



| Title: | Rincon Fire Department on Harlan St | File: | IPad_2_IMG_2233.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 517 |



| Title: | Harlan St south of Cactus St | File: | IPad_2_IMG_2234.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 518 |



| Title: | Harlan St south of Cactus St | File: | IPad_2_IMG_2235.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 519 |



| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2236.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 520 |



| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2237.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 521 |



| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2238.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 522 |



| Title: | Manhole at Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2239.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 523 |



| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2240.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 524 |



| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2241.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 525 |



| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2242.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 526 |




| Title: | Harlan St and Derry Ave intersection | File: | IPad_2_IMG_2243.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 527 |




| Title: | Manhole at intersection of Harlan St and Cactus St | File: | IPad_2_IMG_2244.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 528 |



| Title: | Rincon Fire department on Harlan St | File: | IPad_2_IMG_2245.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 529 |



| Title: | Rincon Fire department on Harlan St | File: | IPad_2_IMG_2246.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 530 |




| Title: | Rincon Rd (SR140) east of Harlan St | File: | IPad_2_IMG_2247.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 531 |



| Title: | Upstream side of culvert under Rincon Rd (SR140) near I-25 intersection | File | IPad_2_IMG_2248.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 532 |



| Title: | Drainage area around offramp for I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2249.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 533 |



| Title: | Upstream side of culvert under Rincon Rd (SR140) near I-25 intersection | File: | IPad_2_IMG_2250.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 534 |



| Title: | Upstream side of culvert under Rincon Rd (SR140) near I-25 intersection | File: | IPad_2_IMG_2251.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 535 |



| Title: | Drainage area around offramp for I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2252.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 536 |



| Title: | Drainage area around offramp for I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2253.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 537 |



| Title: | Drainage area around offramp for I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2254.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 538 |



| Title: | Drainage area around offramp for I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2255.jpg | Date: | 4/7/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 539 |



| Title: | Drainage area around offramp for SB I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2256.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 540 |



| Title: | Drainage area around offramp for SB I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2257.jpg | Date: | 4/2/2014 7:11 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 541 |



| Title: | Drainage area around offramp for SB I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2258.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 542 |




| Title: | For sale sign in drainage area around SB offramp of I-25 for Rincon | File: | IPad_2_IMG_2259.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 543 |



| Title: | Drainage area around offramp for SB I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2260.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 544 |



| Title: | Drainage area around offramp for SB I-25 at Rincon Rd (SR140) | File: | IPad_2_IMG_2261.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 545 |



| Title: | SB I-25 offramp to Rincon Rd (SR140) | File: | IPad_2_IMG_2262.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing northwest | | | Slide: | 546 |



| Title: | SB I-25 offramp to Rincon Rd (SR140) | File: | IPad_2_IMG_2263.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 547 |



| Title: | SB I-25 offramp to Rincon Rd (SR140) | File: | IPad_2_IMG_2264.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 548 |



| Title: | SB I-25 offramp to Rincon Rd (SR140) | File: | IPad_2_IMG_2265.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 549 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2266.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 550 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2267.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 551 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2268.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 552 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2269.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 553 |




| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2270.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 554 |



| Title: | Drainage area for pipes under I-25 near Rincon exit | File: | IPad_2_IMG_2271.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 555 |



| Title: | Drainage area for pipes under I-25 near Rincon exit | File: | IPad_2_IMG_2272.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing South | | | Slide: | 556 |



| Title: | Drainage area for pipes under I-25 near Rincon exit | File: | IPad_2_IMG_2273.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 557 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2274.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 558 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2275.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 559 |



| Title: | Drainage channel coming from 54" CMP pipe under I-25 | File: | IPad_2_IMG_2276.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 560 |



| Title: | Outlet of 30" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2277.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 561 |



| Title: | Outlet of 30" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2278.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 562 |



| Title: | Drainage channel coming from 30" pipe under I-25 | File: | IPad_2_IMG_2279.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 563 |



| Title: | Drainage channel leading to box culvert under SB I-25 exit ramp | File: | IPad_2_IMG_2280.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 564 |



| Title: | Drainage channel leading to box culvert under SB I-25 exit ramp | File: | IPad_2_IMG_2281.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 565 |



| Title: | Upstream side of box culvert under SB I-25 exit for Rincon | File: | IPad_2_IMG_2282.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 566 |



| Title: | Upstream side of box culvert under SB I-25 exit for Rincon | File: | IPad_2_IMG_2283.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 567 |



| Title: | Upstream side of box culvert under SB I-25 exit for Rincon | File: | IPad_2_IMG_2284.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 568 |



| Title: | Drainage for I-25 offramp for Rincon Rd (SR140) | File: | IPad_2_IMG_2285.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 569 |



| Title: | Drainage for I-25 offramp for Rincon Rd (SR140) | File: | IPad_2_IMG_2286.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 570 |



| Title: | Drainage for I-25 offramp for Rincon Rd (SR140) | File: | IPad_2_IMG_2287.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 571 |



| Title: | Downstream side of box culvert under SB I-25 exit for Rincon | File: | IPad_2_IMG_2288.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 572 |



| Title: | Drainage channel leading from culvert under SB I-25 offramp for Rincon | File: | IPad_2_IMG_2289.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 573 |



| Title: | Drainage channel leading from culvert under SB I-25 offramp for Rincon | File: | IPad_2_IMG_2290.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 574 |




| Title: | SB I-25 off and onramp for Rincon | File: | IPad_2_IMG_2291.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 575 |



| Title: | SB I-25 Offramp at Rincon Rd (SR140) | File: | IPad_2_IMG_2292.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 576 |



| Title: | SB I-25 onramp from Rincon Rd (SR140) | File: | IPad_2_IMG_2293.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 577 |



| Title: | SB I-25 Offramp at Rincon Rd (SR140) | File: | IPad_2_IMG_2294.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 578 |



| Title: | Inlet of 24" CMP under SR140 east of I-25 onramp | File: | IPad_2_IMG_2295.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 579 |



| Title: | Erosion near I-25 onramp and SR140 | File: | IPad_2_IMG_2296.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 580 |



| Title: | Outlet of 24" CMP under SR140 east of I-25 onramp | File: | IPad_2_IMG_2297.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 581 |



| Title: | Outlet of 24" CMP under SR140 east of I-25 onramp | File: | IPad_2_IMG_2298.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 582 |



| Title: | Hills north of Rincon along CR E-016 | File: | IPad_2_IMG_2299.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 583 |



| Title: | Hills north of Rincon along CR E-016 | File: | IPad_2_IMG_2300.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 584 |



| Title: | Inlets for CMPs under CR E-016 north of I-25 | File: | IPad_2_IMG_2301.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 585 |



| Title: | Drainage area north of I-25 offramp at CR E-016 | File: | IPad_2_IMG_2302.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 586 |



| Title: | Drainage area north of I-25 offramp at CR E-016 | File: | IPad_2_IMG_2303.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 587 |



| Title: | Drainage area north of I-25 offramp at CR E-016 | File: | IPad_2_IMG_2304.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 588 |



| Title: | BNSF bridge over drainage channel north of I-25 | File: | IPad_2_IMG_2305.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 589 |



| Title: | Outlets for CMPs under CR E-016 north of I-25 | File: | IPad_2_IMG_2306.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 590 |



| Title: | BNSF bridge over drainage channel north of I-25 | File: | IPad_2_IMG_2307.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 591 |



| Title: | Outlets for CMPs under CR E-016 north of I-25 | File: | IPad_2_IMG_2308.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 592 |



| Title: | SR140 at NB I-25 off and onramp | File: | IPad_2_IMG_2309.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 593 |



| Title: | SR140 at NB I-25 off and onramp | File: | IPad_2_IMG_2310.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 594 |



| Title: | Drainage for SB I-25 onramp from SR140 | File: | IPad_2_IMG_2311.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 595 |



| Title: | Drainage for SB I-25 onramp from SR140 | File: | IPad_2_IMG_2312.jpg | Date: | 4/7/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 596 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Sediment filled pipe through FEMA site | File: | IPad_2_MG_2201.jpg | Date: | 4/2/2014 7:13 |
| Desc: | Facing southwest | | | Slide: | 597 |



| Title: | Rocks along north side of Rincon RD (SR140) | File: | IMG_7069.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 598 |



| Title: | Rocks along north side of Rincon RD (SR140) | File: | IMG_7070.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 599 |



| Title: | Rincon Rd (SR140) near fertilizer plant | File: | IMG_7071.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 600 |



| Title: | Rincon Rd (SR140) near fertilizer plant | File: | IMG_7072.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 601 |



| Title: | Drainage along NB I-25 onramp | File: | IMG_7073.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 602 |



| Title: | North of NB I-25 onramp from SR140 | File: | IMG_7074.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 603 |



| Title: | North of NB I-25 onramp from SR140 | File: | IMG_7075.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 604 |



| Title: | North of NB I-25 onramp from SR140 | File: | IMG_7076.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 605 |



| Title: | North of NB I-25 onramp from SR140 | File: | IMG_7077.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing northeast | | | Slide: | 606 |



| Title: | NB I-25 onramp from SR140 | File: | IMG_7078.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 607 |



| Title: | NB I-25 onramp from SR140 | File: | IMG_7079.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 608 |



| Title: | Drop inlet between NB I-25 onramp and I-25 | File: | IMG_7080.jpg | Date: | 6/25/2014 9:09 |
|---|---|---|---|---|---|
| Desc: | Facing southeast | | | Slide: | 609 |



| | | | | | |
|---|---|---|---|---|---|
| Title: | Drop inlet between NB I-25 onramp and I-25 | File: | IMG_7081.jpg | Date: | 6/25/2014 9:09 |
| Desc: | Facing south | | | Slide: | 610 |



| Title: | Debris covered 36" culvert inlet under Rincon Rd; west of Inca St | File: | IPad_1_IMG_1868.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 37 |



| Title: | Debris filled 36" culvert inlet under Rincon Rd; west of Inca St | File: | IPad_1_IMG_1869.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 38 |



| Title: | Channel north of Rincon Rd (SR140) between Hauser St & Kingman St | File: | IPad_1_IMG_1896.jpg | Date: | 4/2/2014 6:59 |
|---|---|---|---|---|---|
| Desc: | Facing North | | | Slide: | 65 |



| Title: | Channel north of Rincon Rd (SR140) between Hauser St & Kingman St | File: | IPad_1_IMG_1897.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 66 |



| Title: | Sediment filled pipe north of Palmilla St along Baker St | File: | IPad_1_IMG_1930.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 99 |



| Title: | Resident access crossing over drainage channel | File: | IPad_1_IMG_1931.jpg | Date: | 4/2/2014 7:00 |
|---|---|---|---|---|---|
| Desc: | North of Palmilla St along Baker St | | | Slide: | 100 |



| Title: | South side of BNSF bridge over channel North of Mantooth Loop | File: | IPad_2_IMG_1902.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 189 |



| Title: | South side of BNSF bridge over channel North of Mantooth Loop | File: | IPad_2_IMG_1903.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 190 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1922.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 209 |



| Title: | South side of Mantooth Loop bridge | File: | IPad_2_IMG_1923.jpg | Date: | 4/2/2014 7:03 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 210 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, west of Inca St | File: | IPad_2_IMG_1974.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 261 |



| Title: | Sediment filled CMP under access road along Rincon Rd, west of Inca St | File: | IPad_2_IMG_1975.jpg | Date: | 4/2/2014 7:04 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 262 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, east of Toltec Rd | File: | IPad_2_IMG_1998.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 285 |



| Title: | 36" inlet of concrete pipe under Rincon Rd, east of Toltec Rd | File: | IPad_2_IMG_1999.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 286 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2027.jpg | Date: | 4/2/2014 7:05 |
|---|---|---|---|---|---|
| Desc: | Facing southwest; southwest of Inca St and Rincon Rd intersection | | | Slide: | 313 |



| Title: | Drainage channel south of Rincon Rd and north of BNSF railroad | File: | IPad_2_IMG_2028.jpg | Date: | 4/2/2014 7:06 |
|---|---|---|---|---|---|
| Desc: | Facing southwest; southwest of Inca St and Rincon Rd intersection | | | Slide: | 314 |



| Title: | Drainage channel between Hauser St and Kingman | File: | IPad_2_IMG_2074.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing north; North of Derry Ave | | | Slide: | 359 |



| Title: | Drainage channel between Hauser St and Kingman St | File: | IPad_2_IMG_2075.jpg | Date: | 4/2/2014 7:07 |
|---|---|---|---|---|---|
| Desc: | Facing south; west of Cactus St and Kingman St intersection | | | Slide: | 360 |



| Title: | Inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2128.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 413 |



| Title: | Inlet of 10' x 8' box culvert | File: | IPad_2_IMG_2129.jpg | Date: | 4/2/2014 7:08 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 414 |



| Title: | Culvert under residential property | File: | IPad_2_IMG_2190.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing east; Northwest corner of Corea St and Cactus St | | | Slide: | 475 |



| Title: | Culvert under residential property | File: | IPad_2_IMG_2191.jpg | Date: | 4/2/2014 7:10 |
|---|---|---|---|---|---|
| Desc: | Facing east; Northwest corner of Corea St and Cactus St | | | Slide: | 476 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2267.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing north | | | Slide: | 551 |



| Title: | Outlet of 54" CMP culvert under I-25 near SB I-25 Rincon exit | File: | IPad_2_IMG_2268.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 552 |



| Title: | Drainage channel leading to box culvert under SB I-25 exit ramp | File: | IPad_2_IMG_2281.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing southwest | | | Slide: | 565 |



| Title: | Upstream side of box culvert under SB I-25 exit for Rincon | File: | IPad_2_IMG_2282.jpg | Date: | 4/2/2014 7:12 |
|---|---|---|---|---|---|
| Desc: | Facing west | | | Slide: | 566 |



| Title: | Outlet of 24" CMP under SR140 east of I-25 onramp | File: | IPad_2_IMG_2297.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing east | | | Slide: | 581 |



| Title: | Outlet of 24" CMP under SR140 east of I-25 onramp | File: | IPad_2_IMG_2298.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 582 |



| Title: | BNSF bridge over drainage channel north of I-25 | File: | IPad_2_IMG_2305.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | Facing south | | | Slide: | 589 |



| Title: | Outlets for CMPs under CR E-016 north of I-25 | File: | IPad_2_IMG_2306.jpg | Date: | 4/2/2014 7:13 |
|---|---|---|---|---|---|
| Desc: | | | | Slide: | 590 |








# APPENDIX H

*Exhibits*

F1 (397cfs)
F2 (293cfs)
F3 (47cfs)
F4 (123cfs)
F5 (254cfs)
F6 (21cfs)
F7 (167cfs)
F8 (90cfs)
F9 (99cfs)
R1 (260cfs)
R2 (262cfs)
R3 (609cfs)
R4 (118cfs)
R5 (9cfs)
R6 (20cfs)
R7 (133cfs)
R8 (30cfs)
R9 (36cfs)
R10 (731cfs)
R11 (742cfs)
R12 (19cfs)
R13 (34cfs)
R14 (38cfs)
R15 (26cfs)
R16 (750cfs)
R17 (774cfs)
R18 (774cfs)
R19 (15cfs)
R20 (22cfs)
R21 (24cfs)

25
140
BNSF Railyard
Rincon Arroyo

bing

## Legend

- HEC-HMS Concentration Point
- Peak Discharge Associated with HEC-HMS Sub-basin
- Main
- Route
- Sub-basins

**Notes**

1. Peak flows displayed are representative of the magnitude of the total flow experienced at the outlet of the subbasin.

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)




N
W E
S

0 200 400 800
Feet

**Exhibit E**
**Hydrologic Assessment - Existing Conditions**
**HEC-HMS 25-year Recurrence Interval Flow**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016

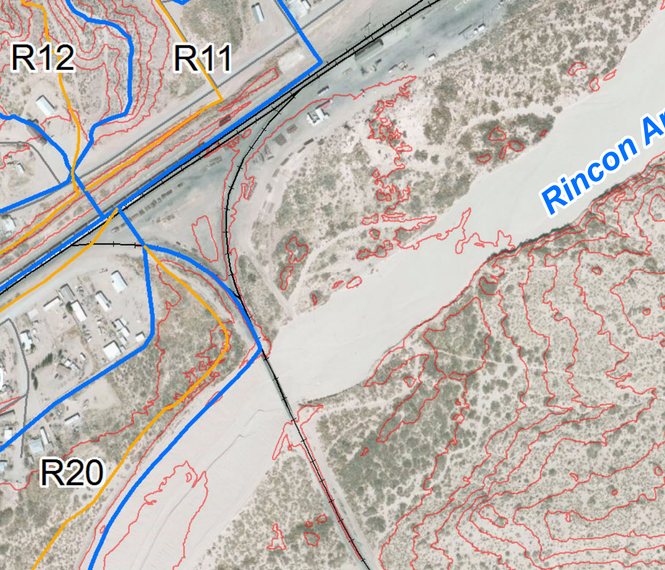
F1
F2
F3
F4
F5
F6
F7
F8
F9
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
25
140
BNSF Railyard
Rincon Arroyo
bing

F: Indicates subbasin boundaries for areas classified as footbills
R: Indicates subbasin boundaries for areas classified as residential

## Legend

- 10 ft Contour
- Roads
- Interstate
- Railroad
- Flowpath
- Parcel Boundary
- Subbasin Boundary

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)




N
W E
S

0 200 400 800
Feet

# Exhibit D
# Basin Delineation Map

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016

25

25

140

BNSF Railyard

Rincon Arroyo

140

bing

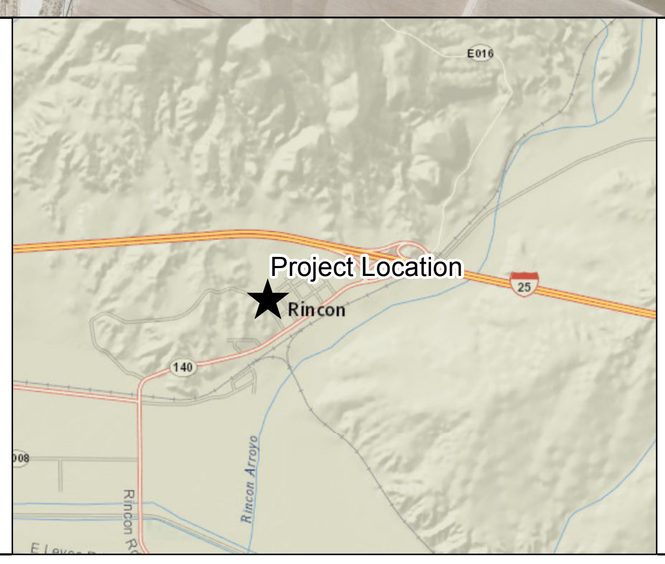
## Legend

- Roads
- Interstate
- Railroad
- Parcel Boundary

**Hydrologic Soil Group**

- A
- B
- D

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)




N
W E
S

0 200 400 800
Feet

**Exhibit C**
**Soils Map**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016

25

25

140

BNSF Railyard

Rincon Arroyo

140

bing

## Legend

Data Sources: City of Rincon (2014), USGS (2014), Doña Ana Flood Commision (2014)

- Roads
- Interstate
- Railroad
- Parcel Boundary
- Commercial and business
- Desert shrub
- Dirt (including ROW)
- Gravel (including ROW)
- Impervious
- Pinon
- Residential 1/2 acre lots
- Residential 1/4 acre lots
- Residential 1/8 acre lots
- Residential 3/4 acre lots




N
W E
S

0 200 400 800
Feet

DONA ANA COUNTY NEW MEXICO

HDR

**Exhibit B**
**Land Use Map**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016

10' x 8 ' RBC
ID 63

30" CMP
ID 62

30" CMP
ID 61

42" CMP
ID 60

54" CMP
ID 54

54" CMP
ID 55

36" CMP
ID 56

30" CMP
ID 57

Private Existing
Retention Basin 1

Private Existing
Retention Basin 2

Three 6' x 3' RBC
ID 53

24" CMP
ID 58

Tributary to
the Rincon
Arroyo

3' x 3' RBC
ID 66

Three 6' x 3' RBC
ID 52

BNSF Railyard

Depressed Roadway
Crossing

36" Concrete Pipe
ID 70

Rincon Arroyo

36" Concrete Pipe
ID 78

36" Concrete Pipe
ID 75

42" Concrete Pipe
ID 76

BNSF Railroad Bridge

Roadway Bridge

25

140

CR E-016

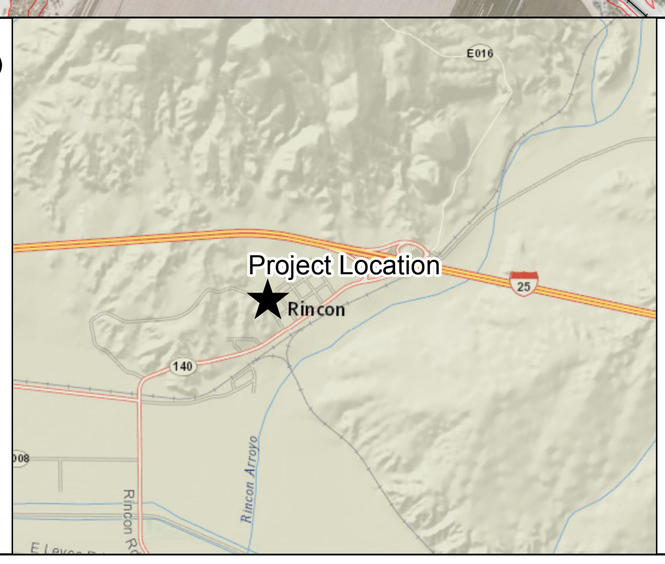
PALMILLA ST
CACTUS ST
COREA ST
BAKE
HARLAN ST
DERRY AVE
KINGMAN ST
HAUSER ST
RINCON RD
TOLTEC RD
INCA ST
SABERTOOTH LN
BEDROCK PL
MANTOOTH LP

bing

## Legend

- 10 ft Contour
- Roads
- Interstate
- BNSF Railroad
- Tributary
- Project Area
- Drainage Features

Data Sources: City of Rincon (2014), USGS (2014)




N
W E
S

0 150 300 600
Feet

DONA ANA COUNTY NEW MEXICO

HDR

**Exhibit A**
**Existing Drainage Features Map**

Rincon Drainage Master Plan
Project Number: 035-230142
Date: January 2016








# APPENDIX I

*Public Meeting Documents*

# Doña Ana County Flood Commission

## Notice of Public Meeting

The Doña Ana County Flood Commission recently began a process to develop a Drainage Master Plan for the **Town of Rincon.** The Drainage Master Plan will identify areas where there are drainage problems and recommend cost-effective solutions and steps for implementation.

You are invited to a public meeting to share your observations about flooding, poor drainage, soil erosion, and soil movement in your community.

***The Flood Commission wants to hear from you!***

**Wednesday, May 28**
6:00 p.m. to 7:00 p.m.

**Rincon Community Center**
220 Baker St.
Rincon, NM

Those who would like to offer input but are unable to attend the meeting can submit written comments to: Rincon DMP, HDR Engineering, Inc., 2155 Louisiana Blvd. NE, Suite 9500, Albuquerque, NM 87110, Fax: (505) 830-5454, email: kelly.sims@hdrinc.com.

To request Americans with Disabilities Act (ADA)-related accommodations for this meeting, please contact Carl Lukesh, (575) 525-5566, at least 48 hours before the meeting.

Este anuncio está disponible en español llamando (505) 830-5417.

Public Meeting

# The Doña Ana County Flood Commission needs information from you !

The Doña Ana County Flood Commission recently began a process to develop a Drainage Master Plan for the Town of Rincon. The Drainage Master Plan will identify areas where there are drainage problems and recommend cost-effective solutions and steps for implementation.

You are invited to a public meeting to share your observations about flooding, poor drainage, soil erosion, and soil movement in your community. A presentation will be provided and the planning team will be available before and after the presentation to answer any questions.

**Wednesday, May 28**
**Rincon Community Center**
**225 Baker Street**
**6:00 p.m. to 7:00 p.m.**

Those who would like to offer input but are unable to attend the meeting can submit written comments to: Rincon DMP, HDR Engineering, Inc., 2155 Louisiana Blvd. NE, Suite 9500, Albuquerque, NM 87110, Fax: (505) 830-5454, email: kelly.sims@hdrinc.com.

To request Americans with Disabilities Act (ADA)-related accommodations for this meeting, please contact Carl Lukesh, (575) 525-5566, at least 48 hours before the meeting.

Este anuncio está disponible en español llamando (505) 830-5417.

**We hope to see you there!**








# APPENDIX J

*Doña Ana County Meeting Minutes*

## Fountain, Mark

**From:** Tambri Hunteman <tambrih@donaanacounty.org>
**Sent:** Friday, July 18, 2014 9:31 AM
**To:** Fountain, Mark
**Subject:** Update
**Attachments:** DAC_2010_LiDAR-Derived_Bald_Earth_DTM_FGDC.html

Hi Mark,

Sorry for the delay! I got caught between an unexpected software upgrade and two awkward deadlines.

If I understood your questions correctly, the answers are:

1) Bohannan-Huston Inc was the contractor for the 2010 project. I do not know with whom they subcontracted to do the actual aerial flying. Dennis Sandin is our main contact with BHI. He can be reached at
   Dennis Sandin
   Senior Vice President
   505-798-7925
   dsandin@bhinc.com
2) The accuracy of the data is +/- 1.3 ft horizontal and +/- 1.15 ft vertical. However, I don't think that is what you were asking. I've enclosed a copy of the Metadata document for the LiDAR portion of the 2010 project.

Hope this helps! If you need anything else, please let me know.

Thanks!

Tambri

Tambri L Hunteman
GIS Mapping Specialist
Doña Ana County
Flood Commission
(575) 525-5552

# Meeting Minutes

| | | |
|---|---|---|
| Project: | Doña Ana County Rincon Drainage Master Plan | |
| Subject: | Project Status | |
| Date: | Wednesday, September 10, 2014 | |
| Location: | Type location here | |
| Attendees: | John Gwynne, Doña Ana County | Carl Lukesh, Doña Ana County |
| | Mark Fountain, HDR | Angela Valdez, HDR |

**Discussion:**

Property Contacts:

- Contact with property owners has been unsuccessful.
  - County has sent letters and placed call to owners
  - County will consider sending certified letters or
  - Contacting via Community Development staff

Project Budget:

- Project construction costs for offsite detention must remain below $1M.
- Improvement funds can be leveed from Colonies Trust Fund monies.
- Improvement services can be completed in Phases for funding sequencing

On-Site Area Improvements

- Discussed possibility of adding channel along south side of I-25 to drain to detention facility north of fertilizer plant.
- May be issues with property owner wanting to sell “Prime” real estate near the interchange.
- County would consider a property swap between property owned by County and area near gore.
- Channel along south side of Rincon
  - Consider raising NM 140 and adding a box culvert crossing at sag in road.
  - Consider low flow crossing – some liability due to difficulty of emergency vehicle crossing.
  - Provides benefit from reduction of sediment removal from roadway surface from NMDOT crew
  - Contingent upon adjacent parcel or drainage tract purchase

Design Storm Events

- John to discuss with Paul Dugie the potential for designing this project to lesser return event (more frequent than 100-year), and make a determination for the potential use of NOAA 14 instead of SCS Type II-75. John to provide guidance to HDR on how to proceed with development of proposed Capital Improvements Projects and alternatives.
- Determination of path forward may require and adjustment to SOW and schedule for documentation of agreed upon efforts and timeline.

Moving Forward:

- Design off-site capital improvements in conjunction with on-site channel design are contingent upon both occupied and unoccupied parcels being obtained.
- At west channel, assume channel and basin and identify restrictions from NMDOT Access on north side of road.
- Final Drainage Report to be used as a tool for justifying projects to be built in phases.
- Need to provide documentation for explanation of alternatives to public.
    - HDR to prepare alternatives map to depict “what” and “where.”
- Discuss FEMA mapping methodologies versus the limits of our study during the public meeting.
    - Review of effective vs current state of the practices for approximate Zone A.

Schedule Next Public Meeting – Primary 10/7; Secondary 10/9

- John and Carl to verify availability of Community Center
    - Provide confirmation to HDR
- HDR to update public meeting materials, prepare advertisements and update flyers for distribution by County (possibly with water bills)
    - John to notify HDR regarding cutoff date for mailer inclusion.

Action Items

- John to verify and provide direction regarding design event and methodology for final development of existing conditions and forthcoming proposed CIP’s.
- John & Carl to contact local residents to inquire about property for the use of constructing channels and ponds. (Certified Mail)
- HDR to prepare materials and advertisements for Public Meeting
- HDR to provide updated flyers for distribution by County staff
- John & Carl to verify Community Center availability, make reservation, and notify HDR
- John to notify HDR regarding cutoff date for mailer inclusion with water bills
- John to confirm or provide alternate name for area noted as “Extended Residential”

Materials Provided at Meeting

- HDR provided a copy of the following materials related to the existing conditions hydrology modeling:

- HEC-HMS Storage Exchange North of I-25, Figures (2-yr through 100-yr)
- Excel Spreadsheet – Hydrologic Assessment for Existing Conditions (Discharges and Volumes)
- Excel Spreadsheet – Hydrologic Assessment larger array of metrological model return events (SCS, NOAA Atlas 14)
- Excel Spreadsheet – Hydrologic Assessment for Existing Conditions (Regression Equation Evaluation)
- The SCS Dimensionless rainfall distributions comparison

- HDR provided the following items for visual reference:
  - Project Location Description Map (Foothills, Onsite, Local Residential, Offsite, and Extended Residential)
  - Existing West Channel (between NM 140 and I-15)
  - Existing South Channel (Parallel and south of NM 140)
  - Proposed East Channel (South of I-15 to gore at NM 14))
- Items provided via email (09/15/2014)
  - HEC-HMS Model (Rincon_DMP_09.05.2014.zip)
  - Working AOI Concentration Points Map SCS Type II-75 (Rincon_DMP_09.05.2014.pdf)

## Valdez, Angela

**From:** Valdez, Angela
**Sent:** Monday, May 19, 2014 11:27 AM
**To:** Carl Lukesh (carll@donaanacounty.org)
**Subject:** Rincon DMP - Project Update
**Attachments:** RinconProject Schedule_0514.pdf

Carl,
Progress on the project is moving well. The following is an update on the progress that has been made to date.

**Project Schedule**

- Attached is the updated schedule for your review. Please let me know if milestone dates conflict with DACFC schedules.

**Collection of Project Data**

- Water and sewer as-built information was provided by DACFC
- I believe we've collected all the as-built data that the NMDOT has in their files with respect to the structures on I-25 and the Rincon ramps.
- An AutoCAD drawing was provided by DACFC for the proposed Harlan Street improvements. HDR will coordinate with DACFC and provide the necessary drainage information needed.

**Development of Watersheds**

- Offsite and Onsite basins have been delineated; flow routes are developed in preparation for Time of Concentration calculations.
- Preliminary QC will be completed this week on basin delineations.

**Public Meeting**

- Flyers were developed and approved by DACFC for distribution
- Newspaper advertisements for the meeting were also developed
- Public meeting is scheduled for May 28th at the Rincon Community Center. A team meeting is tentatively scheduled for May 22nd to discuss the public meeting.

**Upcoming**

- Soils data will be collected for offsite basins in preparation of hydrologic calculations
- Land treatments will be identified for on-site basins based on existing County platting and zoning.
- HDR will begin setup of HEC-HMS models to quantify runoff
- HDR will begin to evaluate culvert capacities based on information provided by the NMDOT and collected field data

**Needed Information**

- Please let me know if Dona Ana County has zoning information for Rincon that would assist us in establishing Land Treatment and curve number values for hydrologic analysis.

Please feel free to call me if you have any questions or need additional information. Thank you!

Angela Valdez, PE, CFM
*Sr. Water Resources Engineer*

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