APPENDIX F

MEMORANDUM: LANDSCAPE CONTEXT SENSITIVITY CRITERIA

Reata Wash
Flood Control Improvement Study

Contract No. 2014-168-COS

Memorandum: Landscape Context Sensitivity Criteria

August 31, 2016

Prepared for:

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Gannett Fleming

Technical Solutions

gci

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1. Introduction

The Reata Wash Flood Control Improvement Study's (Reata Wash Study) drainage corridor proposes to follow an alignment starting just north of Pinnacle Peak Road south to McDowell Mountain Ranch Road at Westworld. The existing landscape along the entire alignment consists primarily of native upper Sonoran Desert plant materials typified by Foothill Palo Verde, Ironwood and Mesquite trees, saguaro, barrel, prickly pear and cholla cacti, Jojoba, Creosote, burr sage and brittlebush perennial shrubs and native grasses. It is anticipated that there will be areas adjacent to the proposed channel that may be disturbed if channel construction occurred. These disturbed areas would be revegetated to reestablish the natural desert conditions consistent with existing conditions.

The Reata Study implemented a Context Sensitive Design approach to integrate a potential project in harmony with the existing landscape and community context including:

- Landscape Methodology
- Compliance with City of Scottsdale Native Plant Ordinance requirements
- Revegetation Methodology
- Landscape summaries of each Reach

2. Context Sensitive Design

Should the Reata Wash Study be approved by council and move forward, it would utilize a Context Sensitive Design (CSD) approach. CSD is a collaborative, interdisciplinary approach that involves all stakeholders to develop a design that fits a project's physical setting and preserves scenic, aesthetic and environmental resources, while maintaining safety and full function of the flood control system. CSD is an approach that considers the total context within which the Reata Wash Study area would exist by incorporating community values, physical needs and natural environment as an integral part of any future design.

3. Landscape Methodology

The Context Sensitive Design approach to the overall landscape would be to restore areas disturbed by construction to native desert conditions, including natural densities of

native trees, cacti, shrubs and grasses, as well as the use of native topdressing materials. The goal will be to reestablish the native desert vegetation and appearance to facilitate landscape transitions that would blend into the adjacent undisturbed desert. This would be accomplished through a process of native revegetation including the planting and transplanting of native trees and cacti salvaged from onsite and the installation of a native hydroseed mix throughout the entire zone of disturbance.

4. Native Plant Ordinance Compliance

All proposed landscape would comply with the City of Scottsdale Native Plant Ordinance (Section 7.500) and Chapter 10 of the City of Scottsdale Design Standards and Policy Manual, under which a Native Plant Inventory would be conducted within the proposed disturbance limit. As required, all native trees and cacti would be surveyed to determine each plant's viability to remain in place, be salvaged prior to construction or be destroyed. Plants designated to remain would be protected during the construction process. All plant designated to be salvaged would be transplanted by an authorized salvage contractor and would be held and maintained in an onsite nursery until the revegetation process, at which time the plants would be relocated onsite to reestablish natural plant densities throughout the area of construction disturbance.

5. Revegetation Methodology

Trees and cacti salvaged per the Native Plant Ordinance would be transplanted from the onsite nursery into the revegetation areas to reestablish natural plant densities and distributions. Transplanted trees would receive temporary, supplemental irrigation until established. All areas of construction disturbance would be sprayed with a native hydroseed mulch containing native species of grasses, perennials, shrubs and trees as listed below. Hydroseeded area would be allowed to establish naturally without supplemental irrigation. It is suggested that a hydroseed mulch be used as shown in Table-1.

Table -1 Revegetation Hydroseed Mix

Botanical name	Common name	Pounds/Acre
Grasses		
Aristida purpurea	Purple Three Awn	1.0
Bouteloua aristidoides	Needle grama	0.5
Bouteloua rothrockii	Six Week's Grama	0.5
Bouteloua rothrockii	Rothrock Grama	0.5
Wildflowers/Forbs		
Baileya multiradiata	Desert Marigold	1.0
Cassia couesii	Desert Senna	1.0
Escholtzia mexicana	Mexican Poppy	2.0
Lesquerella gordonii	Gordons Bladderpod	1.0
Penstemon parryi	Parry's Penstemon	0.5
Phacelia crenulata	Desert Phacelia	1.0
Plantago ovata	Desert Indian Wheat	2.0
Sphaeralcea ambigua	Desert Globemallow	1.0
Shrubs (suffrutescent)		
Ambrosia deltoids	Triangle Leaf Bursage	4.0
Encelia farinosa	Brittlebush	0.5
Eriogonum fasciculatum var. polifolium	Flat-top Buckwheat	0.5
Woody Shrubs and Trees		
Acacia constricta	White Thorn Acacia	1.0
Atriplex canescens	Four Wing Saltbush	0.5
Larrea tridentata	Creosote Bush	3.0

6. Landscape Summary Reach 1 through 5

The following outlines the Context Sensitive Landscape methods for each Reach based on this study's recommended solution (See Exhibit 1 – Study Location Reach Map).

- **Reach 1 – Pinnacle Peak Road to 1,000 feet north**

  The recommended solution creates a rough surfaced hard lined open channel using a "U" shaped channel within the existing corridor. As such, no landscape revegetation would be included within the drainage channel. Revegetation would be limited to only those areas necessarily disturbed during construction.

- **Reach 2 (north) – Pinnacle Peak Road to approximately 1,300 feet south**

  The recommended solution consists of a concrete 'U' channel. Construction of the 'U' channel would require disturbance outside of the final channel structure. A construction disturbance boundary would be established prior to construction and all native trees and cacti would be inventoried and salvaged per the Native Plant Ordinance, as noted above. After construction of the channel is complete, salvaged trees and cacti would be replanted throughout the areas of construction disturbance and adjacent to drainage channel to reestablish native densities. All disturbed areas would be treated with the native hydroseed, as shown in Table -1.

- **Reach 2 (south) – Pinnacle Peak Road to Cross Canyon Way**

  The recommended solution for the south portion of Reach 2 transitions from the 'U' channel design to a grouted rock trapezoidal channel. A construction disturbance boundary would be established prior to construction and all native trees and cacti would be inventoried and salvaged per the Native Plant Ordinance. After construction of the channel is complete, salvaged trees and cacti would be replanted throughout the areas of construction disturbance and adjacent to drainage channel to reestablish native densities. All disturbed areas would be treated with the native hydroseed, as shown in Table –1.

- **Reach 3 – Northern Segment**

  The recommended solution is an incised grouted rock trapezoidal channel, similar to the south section of Reach 2. A construction disturbance boundary would be established prior to construction and all native trees and cacti would be inventoried and salvaged per the Native Plant Ordinance. After construction of the channel is complete, salvaged trees and cacti would be replanted throughout the areas of construction disturbance and adjacent to drainage channel to reestablish native densities. All disturbed areas would be treated with the native hydroseed, as shown in Table –1.

- **Reach 3 – Southern Segment**

  Construction within the existing earthen channel would be limited to only those areas identified as requiring additional buried bank protection to achieve sufficient scour protection. Revegetation efforts would be limited to only those areas disturbed by construction of the additional buried bank protection.

- **Reach 4 – Thompson Peak Parkway to Bell Road**

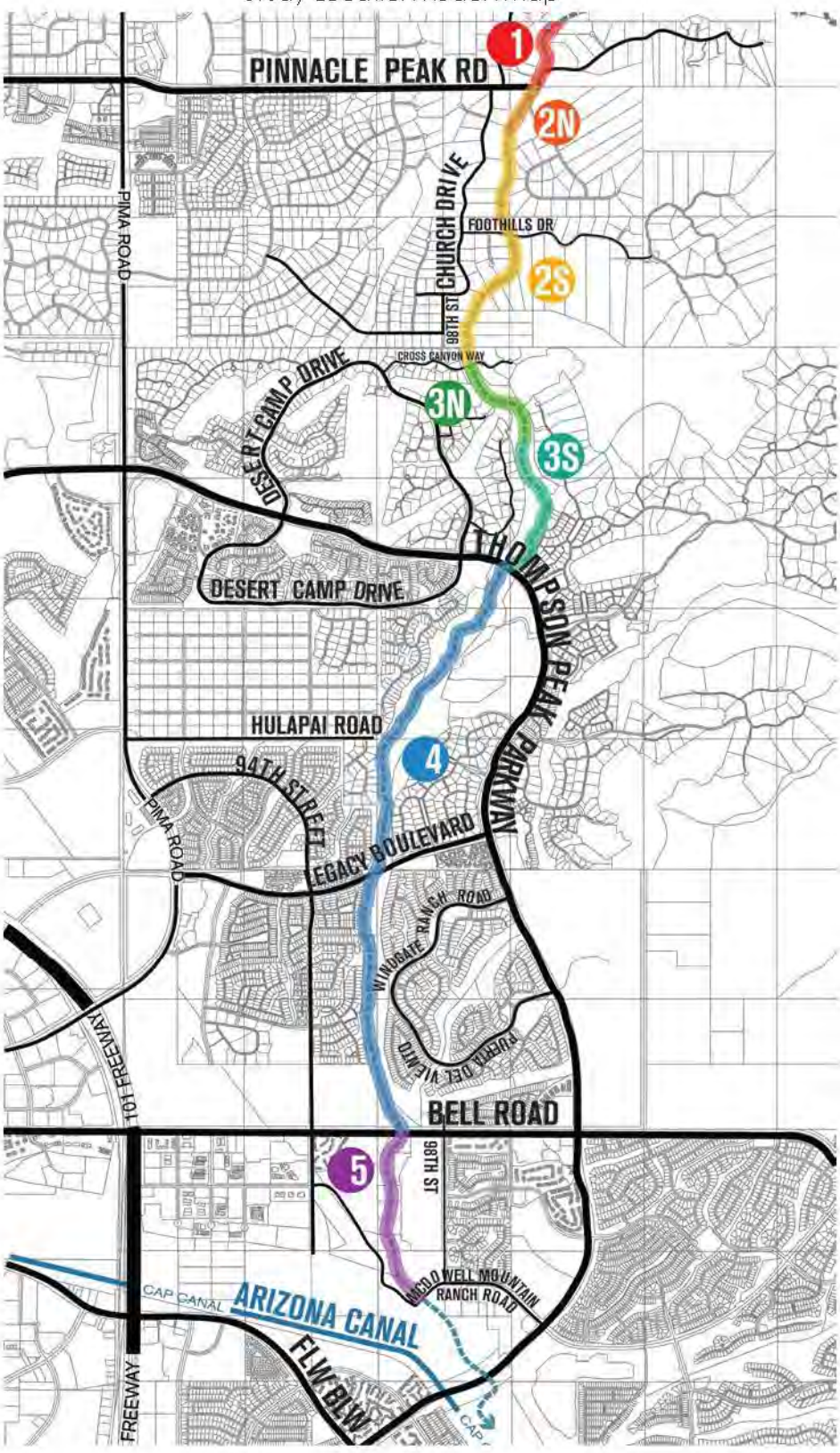
  Similar to the southern portion of Reach 3, construction within Reach 4's existing earthen channel would be limited to only those areas that may require additional buried bank protection to achieve sufficient scour protection. Revegetation efforts would be limited to only those areas disturbed by construction of the additional buried bank protection.

- **Reach 5 – Bell Road to East McDowell Mountain Ranch Road**

  The recommended solution is an incised earthen trapezoidal channel with buried bank protection, including a sediment basin immediately upstream of the McDowell Mountain Ranch Road bridge. The area contained within this Reach is adjacent to WestWorld, and these overbank areas could be used for future event parking. Revegetation will be limited in this reach, but all areas disturbed would, at a minimum be treated with a dust control palliative to meet Maricopa County requirements.

EXHIBIT -1

Study Location Reach Map

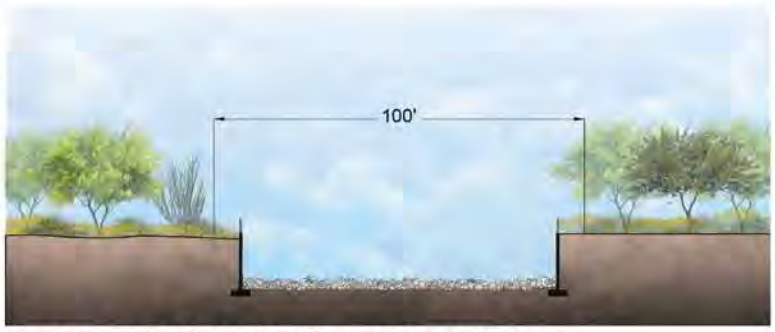


7. Landscape Graphics

The following represent the typical context sensitive native plant vegetation proposed for each Reach for the three alternative solutions identified in this study: the Recommended Solution, Alternative B and Alternative C.

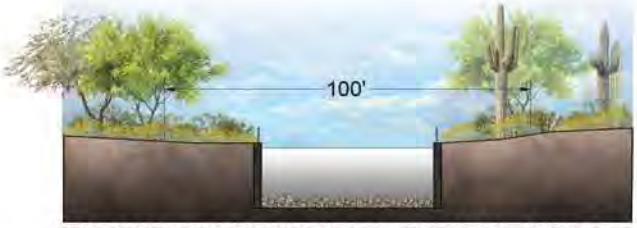
REACH 1

KEY MAP



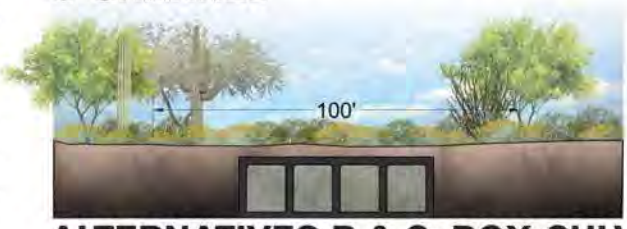
RECOMMENDED SOLUTION:
U-CHANNEL WALL &
CONCRETE ROCK INVERT

REACH 2 NORTH



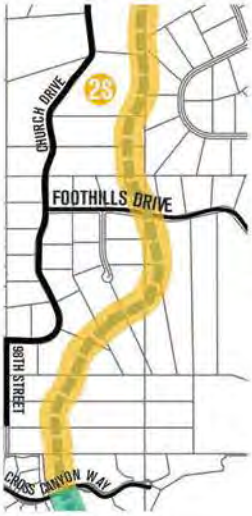
RECOMMENDED SOLUTION:
U-CHANNEL

KEY MAP

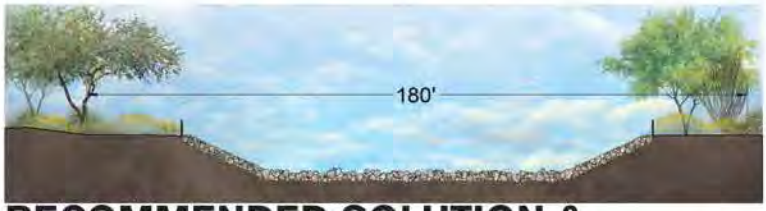


ALTERNATIVES B & C: BOX CULVERT

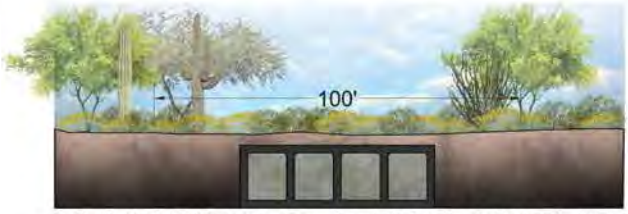
REACH 2 SOUTH



KEY MAP

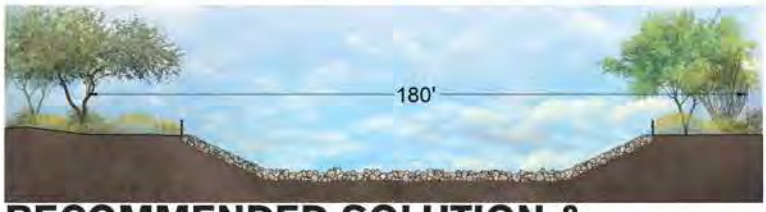


RECOMMENDED SOLUTION & ALTERNATIVE B: GROUTED ROCK CHANNEL



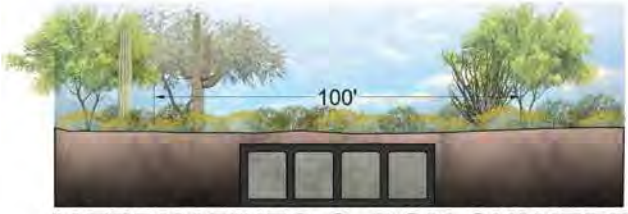
ALTERNATIVES C: BOX CULVERT

REACH 3 NORTH



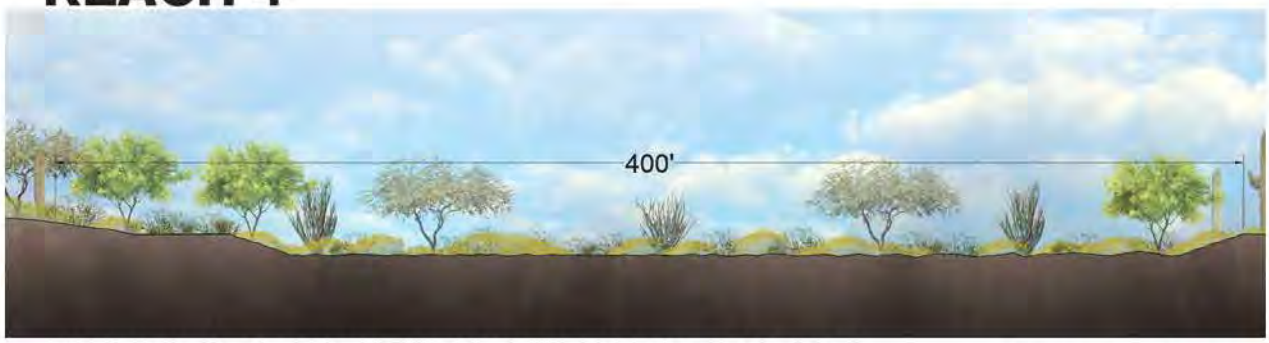
RECOMMENDED SOLUTION & ALTERNATIVE B: GROUTED ROCK CHANNEL

KEY MAP



ALTERNATIVES C: BOX CULVERT

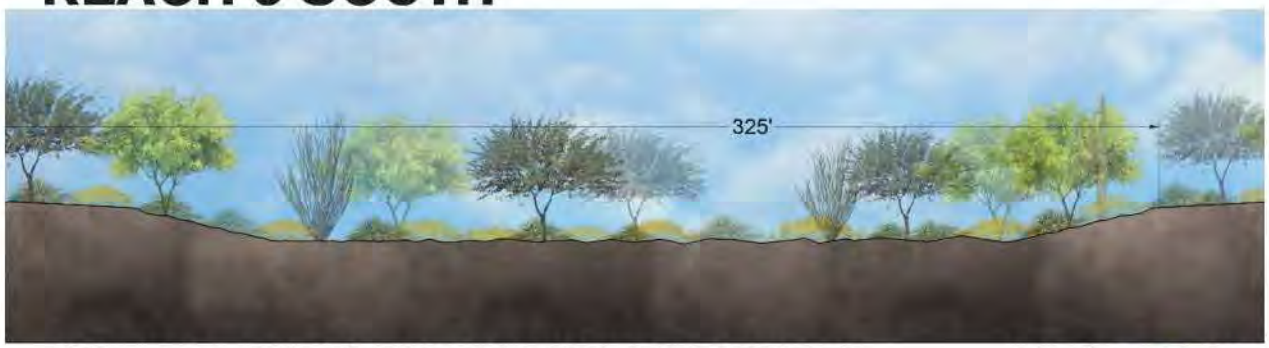
REACH 4



EXISTING EARTHEN CHANNEL TO REMAIN

KEY MAP

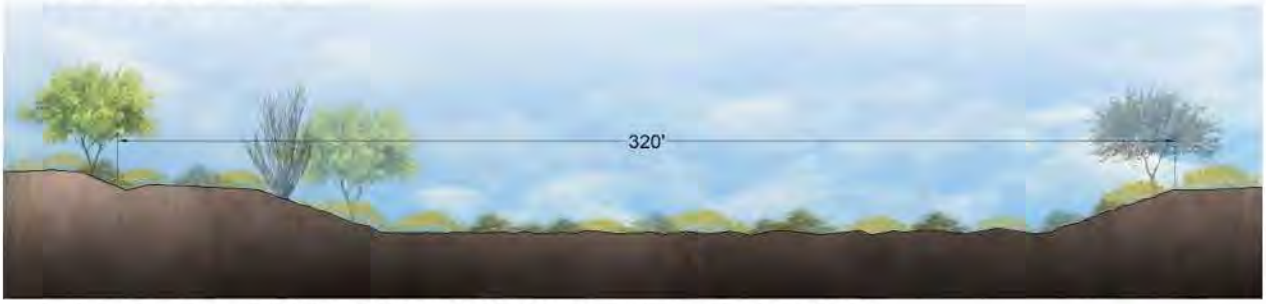
REACH 3 SOUTH



EXISTING EARTHEN CHANNEL TO REMAIN

KEY MAP

REACH 5



EARTHEN CHANNEL WITH REVEGETATION AND DUST CONTROL PALLIATIVE

KEY MAP

APPENDIX G

MEMORANDUM: HYDROLOGIC REVIEW

Reata Wash
Flood Control Improvement Study

Contract No. 2014-168-COS

Memorandum: Hydrologic Review

August 31, 2016

Prepared for:

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gci

EXPIRES: 9-30-17

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EXPIRES: 9-30-17

1. Executive Summary

A review and assessment of existing hydrologic models and reports pertinent to the Reata Wash Flood Control Improvement Study area was conducted. The purpose of this review was to determine the applicability of the existing hydrologic models to the current study, as well as assess the need for alterations and updates. Although a large portion of the historical hydrologic models meet the minimal Federal Emergency Management Agency (FEMA) requirements, the Draft Pinnacle Peak South (PPS) Area Drainage Master Study (ADMS) Hydrology and Hydraulics (H&H) Report model, prepared by TY Lin International (TY Lin) in 2012, was evaluated and advanced as the most appropriate hydrologic model for the following reasons:

- Most recent hydrologic modeling effort within the Reata Wash watershed.
- Hydrologic model used current Flood Control District of Maricopa County (FCDMC) standards and methods. Model includes updated land use, soils and hydrologic basin boundaries accounting for existing watershed conditions.
- Hydrologic model and model input data reviewed extensively by FCDMC staff.
- Hydrologic model covers approximately 85% of the Reata Wash watershed and will require less effort to adjust for the Reata Wash corridor.

The following modifications will be incorporated into the Draft PPS ADMS hydrologic model for use in the Reata Wash Flood Control Improvement Study:

- Land use categories and boundaries within the model limits will be checked against project aerials (2014) and flood control facilities not currently existing or under construction will be removed from the hydrologic model.
- The watershed boundaries will be extended to include the Reata Wash Corridor from Pinnacle Peak Road south to Bell Road. This area is approximately 1.6 square miles of the 2.0 square mile Reata Wash major basin.
- A full review of the input parameters will be conducted as part of the Reata Wash Flood Control Improvement Study Quality Control program.

The updates and adjustments to the Draft PPS ADMS hydrologic models described above will be documented in Reata Wash Flood Control Improvement Study, Hydrologic Modeling Memorandum. Refer to that memorandum for discussion of the results of the modeling effort recommended in this memorandum.

2. Overview

This memorandum documents the findings of the hydrologic Review and assessment conducted in support of the City of Scottsdale's (City) Reata Wash Flood Control Improvement Study. The assessment was performed by staff from JE Fuller/Hydrology & Geomorphology, Inc. (JE Fuller), as a subconsultant to Wood, Patel & Associates, Inc. (WPA), under Task 3 of City Contract # 2014-168-COS. The scope of services for Task 3 calls for a review of past hydrologic models and reports to assess their application and use to this project. The principal focus of the hydrologic model review will be addressing whether models are FEMA-compliant, and providing recommendations to eliminate any deficiencies. Recommendations may include updating the existing hydrologic model based on the findings of this review. Note that this memorandum was an initial project deliverable. The recommendations made in this memorandum were implemented after

authorization by City staff, and the results of the recommended modeling effort are described in the Hydrologic Modeling Memorandum, which was provided as a separate deliverable.

3. Study Area

The Reata Pass Alluvial Fan is located within the city limits of Scottsdale, Arizona along the western flank of the McDowell Mountains, and northeast of the Loop 101 Freeway and the Central Arizona Project (CAP) Canal (Figure 3–1).

Figure 3–1 General Study Area Location

4. Data Sources

Primary data sources include the City, FCDMC, and WPA. Full project data collection efforts were documented as part of Task 2 Data Collection. Relevant reports and hydrologic models are summarized in Section 5.

5. Existing Hydrologic Models

Table 5–1 is a listing of relevant reports and hydrologic modeling documentation within the Reata Wash watershed.

Table 5–1 Reata Wash Flood Control Improvement Study Hydrologic Report Summary

[(1)]Study Document Number	Title	Author	Date	Note
RW0180	Final Hydrology Report Outer Loop Freeway, North of the CAP Aqueduct	Simons, Li & Associates, Inc. (SLA)	4/1/87	Base hydrology for north Scottsdale First reference to CP51.
RW0187	Draft General Drainage Plan for North Scottsdale, Arizona	Water Resources Associates, Inc. (WRA)	9/2/88	Minor Adjustments to base model (RW0180)
RW0007	Hydrologic Analysis of Scottsdale Alluvial Fans 1-6, Maricopa County, AZ	Cella Barr Associates	9/4/88	Original FEMA Fan Hydrology and Delineation, Established FEMA flows for fans 1-6. Short Geomorphology Section
RW0008	Hydrologic Analysis of Scottsdale Alluvial Fan Area	FCDMC	5/1/91	Flows substantially lower than the CB flows. Doesn't appear to be used for any of the subsequent studies.
RW0140	Sensitivity Analysis of Reata Pass Hydrology, Scottsdale, Arizona	WRA	11/8/91	Using the Upper Indian Bend Wash HEC-1 models, WRA ran 15 separate scenarios/model parameter permutations. Recommended Scenario 13 for hydrologic modeling for regional flood control.
RW0186	Final Report, Upper Indian Bend Wash Regional Drainage and Flood Control Plan Vol_I	WRA	7/6/92	Includes analysis on CAP detention basins with Reata Channel in-place

Table 5–1 Reata Wash Flood Control Improvement Study Hydrologic Report Summary				
[(1)]Study Document Number	Title	Author	Date	Note
RW0185	HEC_1_InputOutputData_UpperIndianBendWash_RegionalDrainageandFloodControlPlan_Vol_II_IBW	WRA	7/6/92	Used hydrology from Draft General Drainage Plan for North Scottsdale, Arizona (RW0187). Suggested REAT4 HEC-1 model but Conditional Letter of Map Revision (CLOMR) used REAT3A.
RW0101	Scottsdale Desert Greenbelt Reata Pass/Beardsley Wash Hydrology Report	Greiner, Inc. and City	2/1/95	Project specific hydrology created from the WRA models used in RW0140. Also used as the basis for SLA design documents (RW0104, 0105, 0106, 0107, and 0110).
RW0073	City of Scottsdale Desert Greenbelt Project Reata Pass/Beardsley Wash CLOMR, Volume I, Preliminary Design and Analysis	Greiner, Inc.	5/1/95	Referenced RW0101
RW0017	North Scottsdale Drainage Area, Arizona, Reconnaissance Study Flood Control and Related Purposes, R-4 Package, Appendix A, B, and C.	United States Army Corps of Engineers (USACE)	2/1/96	First reference with Accepted FEMA discharges at Reata Apex. USACE review of existing and project hydrology.
RW0072	Scottsdale Desert Greenbelt Phase One Design Reata Pass Wash Supplemental CLOMR Report	Greiner, Inc.	5/1/96	Includes updated hydrology based on FEMA Comments.
RW0177	DC Ranch Planning Unit III, V & VI Addendum to Part 4 Drainage Plan Study	WPA	12/25/01	Hydrology and Hydraulics Report and calculations for local development.
RW0146	Preliminary Design Report, Basis of Design for Reata Drainage Corridor Between Union Hills Drive and Bell Road.	WPA	09/27/03	Pg 2. Not CLOMR study. Hydrology does not go below Union Hills. No backup data to Review.

Table 5–1 Reata Wash Flood Control Improvement Study Hydrologic Report Summary				
[(1)]Study Document Number	Title	Author	Date	Note
RW0175	Drainage Report for DC Ranch Planning Unit 1 - North Flood Protection	WPA	11/23/03	Hydrology and Hydraulics Report and calculations for local development.
RW0176	Drainage Report for DC Ranch Planning Unit 1 - South Flood Protection	WPA	10/2/03	Hydrology and Hydraulics Report and calculations for local development.
RW0124	Review of Pima Road DCR, AZ101 to Thompson Peak Parkway, Final Hydrology & Preliminary Design Report	Robert L. Ward, P.E.	06/19/04	General review of local modeling efforts by various consultants.
RW0126	Addendum to Master Plan for DC Ranch PU III, V, & VI Addendum to Part 4 Drainage Plan Study (10-27-04) folder	WPA	10/24/04	Updated hydrology used in RW0146. Hydrology and Hydraulics Report and calculations for local development.
RW0178	Addendum to Master Plan for DC Ranch Planning Unit III, V & VI Addendum to Part 4 Drainage Plan Study	WPA	10/27/04	Hydrology and Hydraulics Report and calculations for local development.
RW0173	DC Ranch, Parcel T7, Reata Wash LOMR	WPA	12/8/04	Hydrology and Hydraulics Report and calculations for local development.
RW0174	Drainage Report for DC Ranch Parcel T7	WPA	12/8/04	Hydrology and Hydraulics Report and calculations for local development.
RW0064	Pinnacle Peak South Area Drainage Master Study, Hydrology and Hydraulics Report- Volume 1	TY Lin	4/26/12	Draft Unsealed Hydrology (HEC-1 modeling to current FCDMC standards above Reata Pass Fan Apex and contributing watershed east of Thompson Peak Parkway).

Notes:
(1) **RW#### =** Study document number for Reata Wash Flood Control Improvement Study. RW for Reata Wash with 4 digits assigned to document. Documents collected as part of the Reata Wash Flood Control Improvement Study.

The nine (9) reports and accompanying hydrologic models in Table 6–1 could be directly correlated to the Reata Wash Flood Control Improvement Study area. Direct correlation included discussions of or direct inclusion of a concentration point for the hydrographic apex for the Reata Pass Fan. This concentration point is designated as either C51, CP51, C50, or CP22 depending on the particular hydrologic model. However, each of these points are in the same general location (as determined by report exhibit or discussion) and have a similar contributing drainage area. Refer to Figure 5–1 for a depiction of the location of this common concentration point.

The nine (9) hydrologic models, listed in Table 6–1, were broken out by hydrologic modeling methods and input variables for comparison purposes. They were then compared and assessed for FEMA compliance.

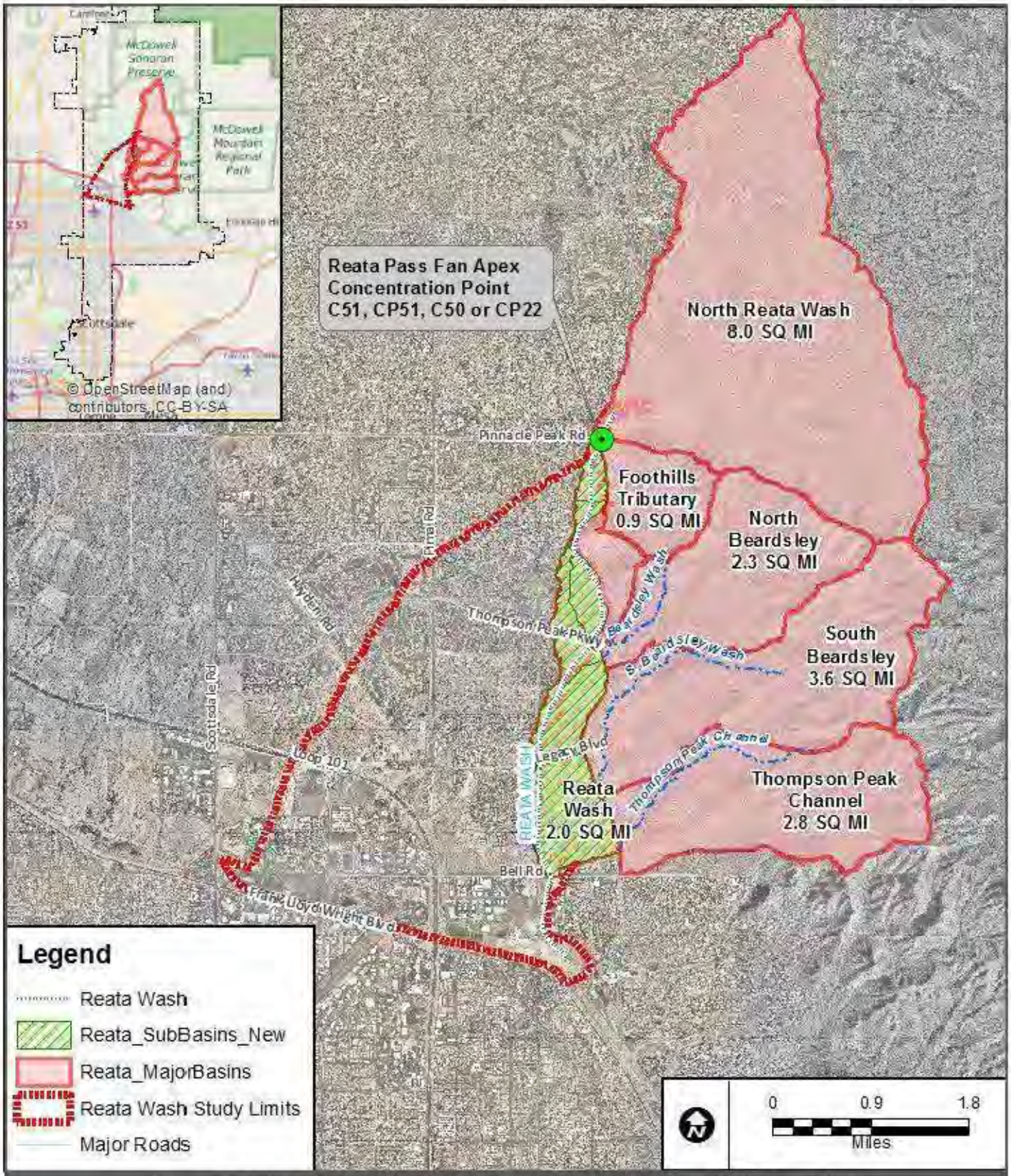

Figure 5–1 Location of Reata Pass Fan Apex within the Study Boundary

6. Criteria for Hydrologic Model Compliance

The following criteria were used to evaluate the level of compliance for the hydrologic models under review;

- Model methodology must meet current FEMA Standards. A list of FEMA-acceptable hydrologic models can be found on the following website;

  http://www.fema.gov/hydrologic-models-meeting-minimum-requirement-national-flood-insurance-program

- Model methodology must meet current City guidelines as outlined in 2009 Design Standards & Policies Manual (Effective Date February 7th 2010).
- Model methodology must meet current FCDMC standards (FCDMC Drainage Design Manual. Hydrology 2013).

Table 6–1 Hydrologic Model Summary

Study Document Number	Title	Author	Date	Common Reata Pass Alluvial Fan Apex ID	Calculated Flow at Reata Apex ID (cfs)	Model Method	Rainfall Duration (hours)	Rainfall Distribution	Aerial Reduction	Loss Method	Unit Hydrograph	Routing	Analysis
RW0007	Hydrologic Analysis of Scottsdale Alluvial Fans 1-6, Maricopa County, AZ	Cella Barr Associates	9/4/88	C51	14,867	HEC-1	24	Type 2A	Point rainfall reduced in model	Curve Number (CN)	Kinematic Wave	Kinematic Wave	Meets minimal City and FEMA Standards
RW0008	Hydrologic Analysis of Scottsdale Alluvial Fan Area	FCDMC	5/1/91	CP51	5,370	HEC-1	24	Type 2A	No Data Available	Green & Ampt	S-Graph	Normal Depth	Meets minimal City and FEMA Standards
RW0140	Sensitivity Analysis of Reata Pass Hydrology, Scottsdale, Arizona	WRA	11/8/91	CP51	9,324	HEC-1 (Scenario 13)	6	Hypothetical Storms (PH)	Depth/Area Storm (JD)	CN	Kinematic Wave	Kinematic Plus Modified Puls 8-pt	Meets minimal City and FEMA Standards
RW0101	Scottsdale Desert Greenbelt Reata Pass/Beardsley Wash Hydrology Report	Greiner, Inc.	2/1/95	C50	11,236	HEC-1 (Model 4)	6	PH	JD	CN	Kinematic Wave	Modified Puls 8-pt	Meets minimal City and FEMA Standards
RW0073	City of Scottsdale Desert Greenbelt Project Reata Pass/Beardsley Wash CLOMR, Volume I, Preliminary Design and Analysis	Greiner, Inc.	5/1/95	C50	11,236	HEC-1 (Model 4)	6	PH	JD	CN	Kinematic Wave	Modified Puls 8-pt	Meets minimal City and FEMA Standards
RW0017	North Scottsdale Drainage Area, Arizona, Reconnaissance Study Flood Control and Related Purposes, R-4 Package, Appendix A, B, and C.	USACE	2/1/96	CP51	No Data Available	HEC-1	6	Local Storm	No Data Available	Exponential (LE)	No Data Available	Muskingum	Meets minimal City and FEMA Standards
RW0072	Scottsdale Desert Greenbelt Phase One Design Reata Pass Wash Supplemental CLOMR Report	Greiner, Inc.	5/1/96	C50	11,236	HEC-1	6	PH	JD	CN (LS)	Kinematic Wave	Modified Puls 8-pt	Meets minimal City and FEMA Standards
RW0126	Addendum to Master Plan for DC Ranch PU III, V, & VI Addendum to Part 4 Drainage Plan Study (10-27-04) folder	WPA	10/24/04	CP51	11,650	HEC-1	6	PH	JD	CN (LS)	Kinematic Wave	Kinematic Plus Modified Puls 8-pt	Meets minimal City and FEMA Standards
RW0064	Pinnacle Peak South Area Drainage Master Study, Hydrology and Hydraulics Report- Volume Un-sealed, 95% draft	TY Lin	4/26/12	CP22	13,065	HEC-1	24	Type 2	JD	Green & Ampt	S-Graph	Modified Puls 8-pt	Meets minimal City and FEMA Standards, Meets Current FCDMC Standards. Most recent watershed study.

Abbreviations: cfs – cubic feet per second

7. Conclusions and Recommendations

All models in Table 6–1 meet the minimum FEMA requirements for hydrologic modeling within the Reata Wash Watershed. The Draft PPS ADMS H&H Report (hydrologic modeling) was advanced as the most appropriate model for the following reasons:

- Most recent hydrologic modeling effort within the Reata Wash watershed.
- Hydrologic model used current Flood Control District of Maricopa County (FCDMC) standards and methods. Model includes updated land use, soils and hydrologic basin boundaries accounting for existing watershed conditions.
- Hydrologic model and model input data reviewed extensively by FCDMC staff.
- Hydrologic model covers approximately 85% of the Reata Wash watershed and will require less effort to adjust for the Reata Wash corridor.

The following adjustments will be incorporated into the Draft PPS ADMS H&H Report hydrologic models for use in the Reata Wash Flood Control Improvement Study;

- Land use categories and boundaries within the model limits will be checked against project aerials (2014) and flood control facilities not currently existing or under construction will be removed from the hydrologic model.
- The watershed boundaries will be extended to include the Reata Wash Corridor from Pinnacle Peak Road south to Bell Road. This area is approximately 1.6 square miles of the 2.0 square mile Reata Wash major basin.
- A full review of the input parameters will be conducted as part of the Reata Wash Flood Control Improvement Study Quality Control program.

Updates and adjustments to the Draft PPS ADMS, hydrologic models will be documented in Reata Wash Flood Control Improvement Study, Hydrologic Modeling Memorandum.

APPENDIX H

MEMORANDUM: HYDROLOGIC MODELING

Reata Wash
Flood Control Improvement Study

Contract No. 2014-168-COS

Memorandum: Hydrologic Modeling

August 31, 2016

Prepared for:

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LOGANSIMPSON

FLOOR associates

Gannett Fleming

Technical Solutions

gci

EXPIRES: 9-30-17

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1. Introduction

1.1 Purpose of Hydrologic Study

This memorandum is prepared for the City of Scottsdale, Arizona (City) as part of the Reata Wash Flood Control Improvement Study. It summarizes the hydrologic modeling efforts for the Reata Wash Flood Control Improvement Study.

The purpose of the hydrologic modeling and documentation is to help establish a hydrologic model to be used as a basis for the Reata Wash Flood Control Improvement Study. This hydrologic information will be significant for the development of preliminary recommendations for corridor drainage alternatives.

1.2 Authority of Study

This study was authorized by the City under contract 2014-168-COS. JE Fuller/Hydrology & Geomorphology, Inc. (JE Fuller) is working as a subconsultant to Wood, Patel & Associates (WPA).

1.3 Location of Study

The Reata Wash Flood Control Improvement Study is located within the city limits of Scottsdale, Arizona along the western flank of the McDowell Mountains, and northeast of the Loop 101 Freeway and the Central Arizona Project (CAP) Canal (see Figure 1–1).

1.4 Methodology

As part of Task 3A of the Reata Wash Flood Control Improvement Study, a hydrologic review was performed. Based on this review, it was recommended that the Draft Pinnacle Peak South (PPS) Area Drainage Master Study (ADMS) Hydrology and Hydraulics (H&H) Report model prepared by TY Lin International (TY Lin) in 2012, be used as a base model for the hydrology of the Reata Wash Flood Control Improvement Study. The following modifications were recommended to the Draft PPS ADMS hydrologic model for use in the Reata Wash Flood Control Improvement Study:

- As stated in the Draft PPS ADMS H&H Report, the hydrologic model was developed for future land use conditions and included future flood control facilities, such as retention/detention basins utilized to attenuate the peak discharge and reduce the storm water runoff volume. For the Reata Wash Flood Control Improvement Study, land use categories and boundaries within the model limits will be checked against project aerials (2014), and features not currently existing or under construction will be removed from the hydrologic model.
- The watershed boundaries will be extended to include the Reata Wash Corridor from Pinnacle Peak Road south to Bell Road. This area is approximately 1.6 square miles of the 2.0 square mile Reata Wash major basin (see Figure 1–1).

The hydrologic modeling as originally prepared for the PPS ADMS, was completed using the Corps of Engineer's Hydrologic Engineering Center's HEC-1 modeling program version 4.1 (see Figure 1–1 for HEC-1 Study Area location).

1.5 Study Results

The study resulted in the development of rainfall-runoff models for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year events of 24-hour duration for the watershed. This memorandum documents the results of these models for the 19.58 square mile watershed upstream of Bell Road.

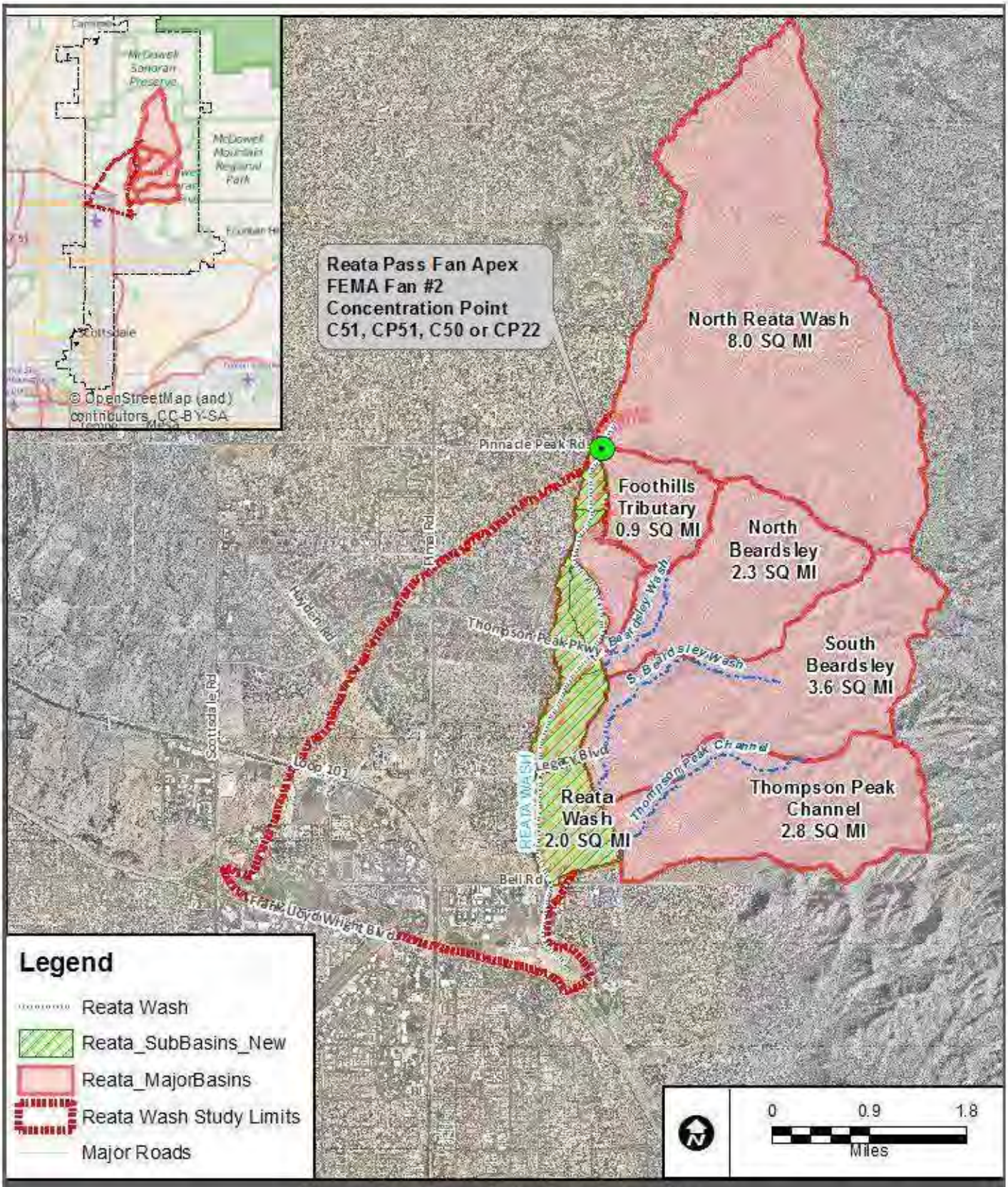

Figure 1–1 General Study Area Location

2. Mapping and Survey Information

2.1 Field Survey and Mapping Information[1]

Topographic Mapping was provided by the Flood Control District of Maricopa County (FCDMC). Aerial photography was taken in 2007 and processed in 2010. Supplementary ground survey was conducted in certain areas in the watershed of special concern with respect to storm water conveyance. These areas included channels that were constructed after 2007. The details/results of aerial mapping and supplementary survey used for the project are provided in the PPS ADMS Data Collection Report.

3. Hydrology

3.1 Method Description

The hydrologic modeling from the PPS ADMS was used as a base for the development of the Reata Wash Flood Control Improvement Study hydrology. The hydrologic model for the watershed was completed using the Corps of Engineer's Hydrologic Engineering Center's HEC-1 modeling program version 4.1 (see Figure 1–1 for HEC-1 Study Area location). The HEC-1 input data was generated from topographic mapping, aerial photographs, Environmental Systems Research Institute (ESRI) ArcMap v10.2, and the FCDMC's Drainage Design Management System for Windows (DDMSW) version 4.8.2. The 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year, 24-hour storm events were modeled. The S-graph method was selected as the unit hydrograph and Green-Ampt was used to calculate rainfall losses.

3.2 Flow Splits

No additional flow splits were modeled.

3.3 Diversion/Storage[2]

The Echo Ridge subdivision, located in the northern portion of the watershed, provides some on-site retention within the developed community. Though these retention areas are relatively small, they have been included within the HEC-1 modeling to account for development storage. At the outfall of the Echo Ridge subdivision, flow passes through two existing detention basins which are connected in series. The site with these two regional basins is owned by the City and is designated as Troon North Park. The existing basin (Troon North Park) has been redesigned to enlarge the basin's storage capacity, as well as to add recreation amenities. The second basin (FCD#1) will remain in its current configuration. The culvert connection between the two basins has an equalizing discharge greater than that of the culvert/spillway outlet of FCD#1. Therefore, the two basins were modeled together with a single stage-storage-discharge relationship having an outfall at concentration point CP6 (see tables in Draft PPS ADMS H&H Report).

A regional sedimentation basin is located at the intersection of Happy Valley Road and Alameda Road, noted as concentration point CP20 (FCD#2). This basin was modeled with a stage-storage-discharge relationship (see tables in Draft PPS ADMS H&H Report) and discharges flow into a downstream wash which runs west adjacent to Happy Valley Road.

[1] Pinnacle Peak South Area Drainage Master Study, Draft Hydrology and Hydraulics Report Volume 1, July 26.2013. Pg. 5.
[2] Pinnacle Peak South Area Drainage Master Study, Draft Hydrology and Hydraulics Report Volume 1, July 26.2013. Pg. 7-8.

Reata Wash Flood Control Improvement Study used the existing retention basins in the HEC-1 model with the exception of an as-yet unbuilt regional basin (i.e., future conditions) located east of Alma School Road just north of Pinnacle Vista Dr. (HEC-1 Model ID DET6). Table 3–1 is a summary of modeled retention/detention basins. As noted above, detailed information regarding each basin is included in the Draft PPS ADMS H&H Report.

Table 3–1 Modeled Retention/Detention Basins

HEC-1 Model ID	Sub-Area	Retention/Detention Basin Designation	Note
RET1	01	LP002 LPC001	Aggregate from a series of small (2) upstream Basins. Very small and do not show up well on Topo.
RET2	02	LPC005 LPC006 LPC007 LPC009 LPC012 LPC013 LPC014 LPC13i	Aggregate from a series of small (8) upstream Basins. Very small and do not show up well on Topo. Upstream of road embankments in existing development.
RET3	03	LP022 LP023	Retention basin at basin outlet (Sub Area 3) upstream of roadway embankment.
RET4	04		Aggregate from a series of small (4) upstream Basins. Small but visible on topo through an existing development.
RET5	05	LP016	Unknown Location.
RET6	06	LPC024	Single basin visible on topo and aerial images.
RET7	07	LPC032	Small single basin within existing development. Upstream of road crossing.
DET20	20		Large area upstream of road crossing.

3.4 Parameter Estimation

3.4.1 Drainage Area Boundaries

The study area watershed and hydrologic subbasins are shown on Exhibit C. The watershed area is approximately 19.58 square miles, with 8.00 square miles contributing to the apex of the Reata Pass Alluvial Fan (Federal Emergency Management Agency (FEMA) Fan #2). The ultimate outfall for the study area is at the southern boundary of the watershed at Reata Wash and Bell Road.

3.4.2 Watershed Work Maps

The following maps have been prepared to document the HEC-1 modeling input and results. These exhibits include the original Draft PPS ADMS watershed as well as the additional sub-basins added for the Reata Wash Corridor:

Exhibit A - Soil Type Map – prepared from the FCDMC's soils information - this exhibit shows the soils located within each sub-basin.

Exhibit B - Land Use Map – prepared from the City's land use and zoning information. For areas outside of the Draft PPS ADMS hydrologic modeling area, new land use codes were converted to the applicable FCDMC's codes within each sub-basin.

Exhibit C - Watershed Map – prepared using the topographic data provided by the FCDMC as a background. This map depicts the overall watershed boundary, sub-basin drainage boundaries, sub-basin identification nomenclature, longest flow path lengths and slopes, the length from the sub-basin centroid to the downstream concentration point along the longest flow path from a point perpendicular to the centroid, and the routing lengths. Nomenclature for the Reata Wash corridor hydrologic basins is consistent with the Draft PPS ADMS hydrologic modeling.

3.4.3 Gage Data

There have been several rain and stream gages (see Table 3–2 and Table 3–3) installed within the project watershed over the past 23 years. The stream and rainfall gages located within the watershed have a relatively short period of record. However, the following events have been identified from FCDMC telemetry data.

Table 3–2 Rainfall Data

Gage	Installed (Date)	Location	Storm (Date)	Largest Storm (inches)	Most Intense Duration (inches/time)
4585	5/15/01	1.6 miles east of Pima Rd. on Pinnacle Peak Rd.	9/08/14 1/27/08 9/3/06 7/31/05 3/4/04	2.28 1.97 1.02 1.65 2.20	2.28/24-hr 0.25/1-hr 0.98/17-min 1.53/1-hr 0.59/1-hr
4935	8/26/93	0.5 miles south of Dynamite Blvd. and 112th St.	11/15/93 9/8/14 8/29/96 8/29/96	No Data Available	2.64/24-hrs 2.20/6-hrs 1.54/1-hr 0.91/15-min

Table 3–3 Stream Gages

Gage	Installed (Date)	Location	Largest Event (Date)	Peak Stage (feet)	Peak Q (cfs)
4588	5/15/01	1.6 miles east of Pima Rd. on Pinnacle Peak Rd.	9/08/14	2.08	1,197
4938	10/2/01	0.5 miles south of Dynamite Blvd. and 112th St.	9/08/14	5.70	n/a

Abbreviations:
cfs – cubic feet per second

3.4.4 Statistical Parameters

The rain and stream gages located within this HEC-1 study area are of limited use due to their short history since installation. Therefore, the methods used in the Water Resources Council Bulletin 17B were

not used. Instead, the precipitation was predicted for the 10-year and 100-year, 24-hour storms using National Ocean and Atmospheric Administration (NOAA) Atlas 14 generated isopluvial maps. The FCDMC's DDMSW program uses Geographic Information System (GIS) to spatially average the NOAA Atlas 14 data to arrive at a representative point rainfall for the watershed.

3.4.5 Precipitation

NOAA Atlas 14, Precipitation Frequency Atlas of the Western United States, Arizona was utilized to obtain isopluvial maps evaluated to determine the values associated with the 10-year and 100-year, 24-hour rainfall events. Within the DDMSW program a shapefile of each the watershed was imported delineating the outer boundary of the project watershed. The FCDMC's program spatially averaged the isopluvials within the study boundary resulting in an area average rainfall. Table 3–4 summarizes these results.

Table 3–4 NOAA Atlas 14 Rainfall Data (in inches)

Duration	2-year	5-year	10-year	25-year	50-year	100-year
5 Minute	0.300	0.404	0.482	0.585	0.663	0.741
10 Minute	0.456	0.615	0.734	0.890	1.008	1.127
15 Minute	0.566	0.762	0.910	1.104	1.250	1.397
30 Minute	0.762	1.026	1.225	1.487	1.684	1.882
1 Hour	0.943	1.270	1.516	1.840	2.084	2.329
2 Hour	1.079	1.431	1.700	2.061	2.334	2.614
3 Hour	1.149	1.497	1.773	2.156	2.458	2.771
6 Hour	1.362	1.730	2.024	2.425	2.737	3.060
12 Hour	1.618	2.035	2.365	2.812	3.155	3.508
24 Hour	1.986	2.582	3.062	3.740	4.283	4.857

3.4.6 Sub-basin Parameters

The following sections describe how the sub-basin parameters were determined. DDMSW output tables can be found in Appendix A. Development of sub-basin parameters for the Reata Wash corridor are consistent with the Draft PPS ADMS hydrologic modeling. For ease of comparison the following sections were taken directly from the Draft PPS ADMS H&H Report with small changes to reflect the inclusion of the Reata Wash corridor sub-basins.

Rainfall Losses

Rainfall infiltration losses were calculated using DDMSW. The rainfall loss method used was Green and Ampt. Soil parameters were taken from the Natural Resources Conservation Service (NRCS) soil surveys. The DDMSW model partially bases rainfall losses on both soils and land use data. The appendices include output tables for soils and land use data that documents parameter estimation for each sub-basin.

Surface retention losses include all rainfall losses not associated with infiltration. These losses include depression storage, interception and evaporation. For this study, these losses are based upon land use and surface cover. The FCDMC has a prepared table in their Drainage Design Manual for Maricopa County,

Arizona, Volume I, Hydrology covering land use and surface retention loss. These values, for the initial abstraction (IA), were applied to the sub-basins in the DDMSW program.

The percent impervious input data is based upon a combination of soils and land use data. The mountainous areas include areas of rock outcrop. However, these areas are not hydraulically connected. Therefore, the percent effective for the rock outcropping was set to a minimum value of 1 percent. For the other areas representative values are described within the FCDMC Drainage Design Manual and are included in the default parameters of the DDMSW program.

Soils

Soils data for the current study was taken from the NRCS soil survey, found within Book 645, entitled *Aquila-Carefree Area, Arizona*. Using soil GIS shapefiles provided by the FCDMC and the delineated sub-basin drainage boundaries, soil data was clipped for each sub-basin and imported to DDMSW. The soils data can be found in Appendix C and on Exhibit A.

Land Use/Vegetative Cover

Land use was assigned based upon the shapefiles in the City's GIS zoning database. These boundaries were inspected against the aerial photographs to confirm that existing development corresponded with the GIS zoning database. The zoning also included areas where undeveloped and partially developed conditions exist. The land use information was developed for individual sub-basins and then imported into DDMSW. Vegetative cover for sample areas in the watershed were evaluated by reviewing tree/bush cover. This included numbers of trees and estimated tree canopy diameter. A reduction factor was applied to the effective blockage of tree canopies. The Land Use data can be found in Appendix C and on Exhibit B.

Unit Hydrograph

The S-Graph method (Phoenix Mountain) was selected as the unit hydrograph for this study. The watershed that contributes to the Reata Pass Fan has a contributing drainage area of 8 square miles and the full contributing watershed is 19.58 square miles in area at Reata Wash and Bell Road. The watershed includes multiple sub-basins which vary in size from a fraction of a square mile up to approximately 1.5 square miles.

Lag

Basin lag was estimated from watershed characteristics using the following equation.

$$Lag = C\{(L*L_{ca})/S^{0.5}\}^m$$

where L = length of the longest watercourse in miles

Lca = length along the watercourse to a point opposite the centroid in miles

S = watercourse slope in feet per mile

C = 24Kn and m = 0.38 (US Army Corps of Engineers (USACE), 1982)

or C = 26Kn and m = 0.33 (United States Bureau of Reclamations (USBR), 1987)

and Kn = variable dependent upon the selection of S-Graph type and Land Use

Routing Steps (NSTPS)

Initially, the number of routing steps for each route was set to one within the HEC-1 model. The model was run and discharges determined for each route. The HEC-1 cross-section data along with the discharge

was then modeled in FlowMaster to obtain estimated velocities. A new number of routing steps for each channel route was then estimated using the following equation:

NSTPS = [Length of Route (ft) / ($Velocity_{avg}$ (ft/sec)*60 seconds / minute)] / NMIN

The routing lengths were measured in GIS, the velocities calculated within the FlowMaster worksheets, and the NMIN (HEC-1 model variable) was held constant at 3 minutes. Once new NSTPS were calculated, these values were replaced within the model and it was rerun. The process was repeated for as many iterations as was necessary to minimize fluctuation in the NSTPS. If the NSTPS value continually fluctuated between two numbers, the lower value was used. Routing information can be found in Appendix A.

3.5 Problems Encountered During the Study

3.5.1 Special Problems and Solutions

Directly south of the Reata Pass Fan Apex, Dobson Wash is capable of splitting away from the main channel of Reata Wash. In order to be compliant with agency environmental requirements concerning Dobson Wash, flood flows will be released at the Reata Pass Fan Apex. It is anticipated the Clean Water Act, Section 404 Permit will require the release of flows. For the purposes of this study, it was preliminarily assumed that a split flow of up to 2,000 cubic feet per second (100-year, 24-hour rainfall event) will be released from the main channel of Reata Wash to Dobson Wash. The final split flow release rate will be determined after further study, as well as consideration of Federal and State environmental requirements, as well as feedback from FEMA. Flood flow will otherwise be contained within the Reata Wash corridor south to the Reach 11, Dike 4 East basins behind the CAP canal. To model the split flow release, a diversion record was included in the HEC-1 models at this location and a rating table was developed to allow a maximum of 2,000 cubic feet per second. No other special problems were encountered. See Figure 3–1.

3.5.2 Modeling Warning and Error Messages

There were no error messages encountered in the Reata Wash Flood Control Improvement Study hydrologic modeling. This was consistent with the Draft PPS hydrologic models. A single warning was included in the model run. The warning: *Excess at ponding less than zero for period. Excess set to zero.* This warning indicates that for a specified period the rainfall excess was calculated to be less than zero and since it cannot be negative it was set to zero. This warning does not negatively or significantly affect the hydrologic model results.

3.6 Calibration

Stream gage data within the watershed are insufficient to extract for a direct comparison. As with the Draft PPS Hydrologic modeling, calibration of the current hydrologic model was conducted by comparison of the study results to Regional Regression equations, as well as two local independent studies. These studies are:

- Hydrologic Analysis of Scottsdale Alluvial Fans 1-6 was prepared for the FCDMC in August of 1988.
- Refinement of Methodology: Alluvial Fan Flood Hazard Identification & Mitigation Methods was prepared for the FCDMC in August of 2010.

The following table summarizes the results of these studies.

Table 3–5 Calibration of Peak Discharges at Reata Pass Fan Apex (8.0 square miles)

Study	Year	Concentration Point	Method				
			HEC-1	TR-55	Regional Regression		
			100-yr, 24-hr Peak Discharge (cfs)	Discharge (cfs)	Upper Limit (cfs)	Q100 (cfs)	Lower Limit (cfs)
Cella Barr (for FEMA)	1988	Reata Fan Apex FEMA Fan #2 (CP51)	14,867	8,986	13,170	7,934(2)	2,698
JE Fuller (for FCDMC)	2004	Reata Fan Apex FEMA Fan #2 (C60)	11,913	No Data Available	No Data Available	No Data Available	No Data Available
TY Lin/JE Fuller	2016	Reata Fan Apex FEMA Fan #2 (CP22)	13,015	No Data Available	9,355	6,730(1)	4,105

Notes:
(1) Estimation based on FCDMC effective Hydrology Manual (Table 8.2) Arizona Region 12 – Standard Error (39%);
(2) Standard Error (66%) – Reference: "Methods for Estimating the Magnitude and Frequency of Floods in Arizona, ADOT-RS-15(121)," Arizona Department of Transportation (ADOT), September 1978.

Abbreviations:
cfs – cubic feet per second

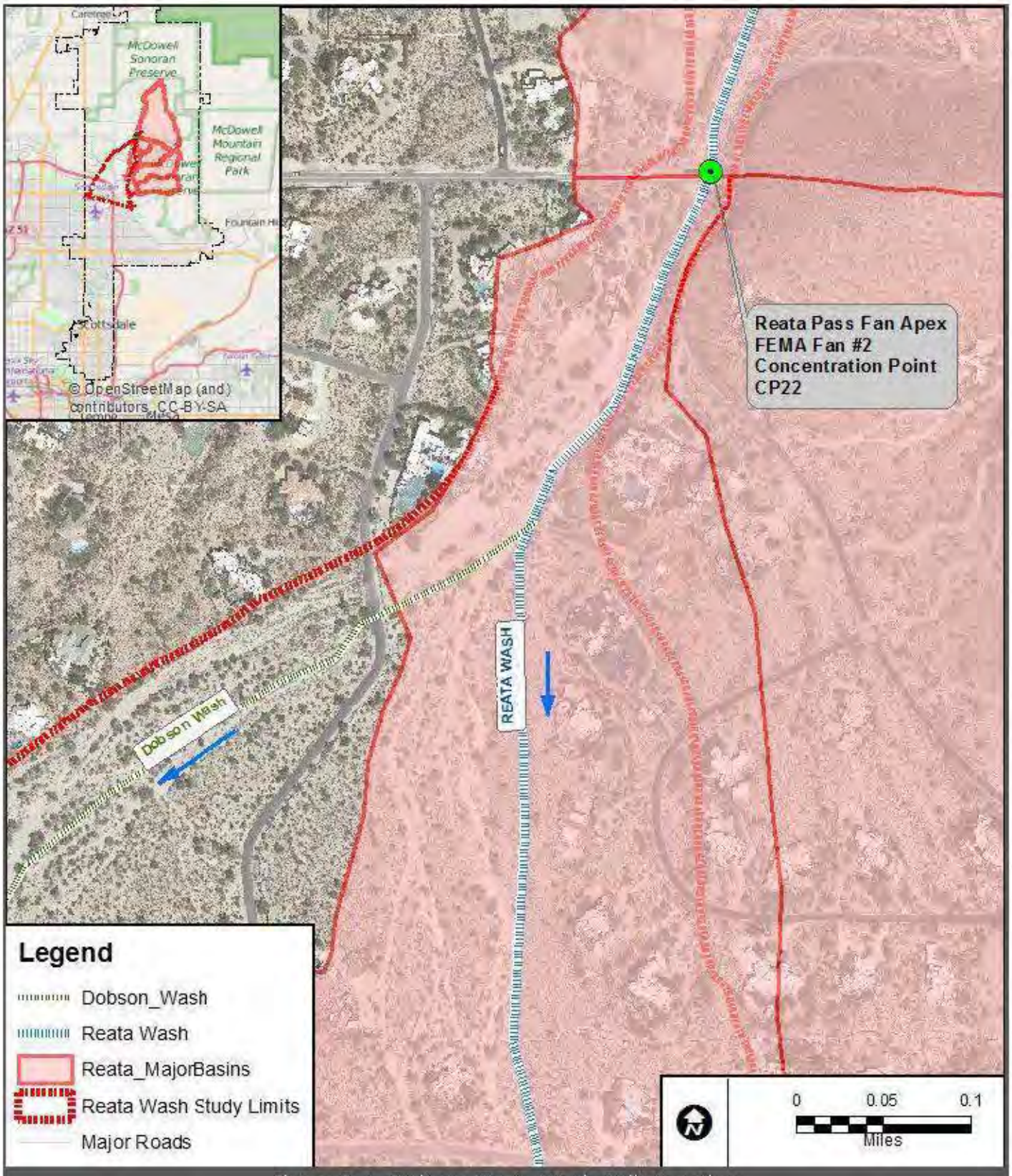

Figure 3–1 Dobson/Reata Wash Split Location

3.7 Final Results

3.7.1 Hydrologic Analysis Results

Table 3–6 and Table 3–7 summarize the output from the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year, 24-hour HEC-1 models. The HEC-1 model output data for the 100-year, 24-hour storm event can be found in Appendix B.

Table 3–6 Subbasin Peak Discharges

Subbasin	Area (square miles)	2-year (cfs)	5-year (cfs)	10-year (cfs)	25-year (cfs)	50-year (cfs)	100-year (cfs)
01	0.160	105	162	206	268	316	366
02	0.140	122	178	222	284	333	384
03	0.150	130	194	243	312	367	424
04	0.120	105	157	198	255	300	347
05	0.140	143	200	246	311	362	416
06	0.180	161	231	286	364	425	489
07	0.120	108	156	194	247	289	333
08	0.130	113	167	208	267	313	361
09	0.110	87	133	169	219	259	300
10	0.460	339	507	640	824	969	1,120
11	0.170	133	204	260	336	397	460
12	0.300	201	307	390	507	599	695
13	0.260	145	230	301	399	477	558
14	0.150	116	177	225	291	343	397
15	0.700	462	712	908	1,182	1,397	1,621
16	0.520	317	489	626	818	968	1,125
17	0.320	300	435	543	691	808	931
18	0.140	108	163	206	266	312	361
19	0.150	127	190	238	306	360	416
20	0.260	196	301	383	498	588	682
21	0.130	109	166	210	271	319	369
22	0.220	120	191	248	327	389	453
23	0.280	230	325	400	503	585	671
24	0.380	182	293	386	518	622	730
25	0.270	150	239	312	413	493	576
26	0.060	47	73	94	122	145	168
27	0.110	75	119	153	199	236	275
28	0.170	124	189	240	310	364	422
29	0.150	118	180	229	296	349	404
30	0.390	155	264	357	484	586	692
31	0.500	207	363	492	675	818	968
32	0.440	235	388	512	683	820	963
33	0.180	130	202	258	336	397	460
34	0.460	296	492	642	849	1,014	1,186

Table 3–6 Subbasin Peak Discharges							
Subbasin	Area (square miles)	2-year (cfs)	5-year (cfs)	10-year (cfs)	25-year (cfs)	50-year (cfs)	100-year (cfs)
35	0.410	245	421	556	742	889	1,043
37	0.630	319	555	748	1,013	1,222	1,439
38	0.060	40	68	90	119	142	166
39	0.150	87	155	209	283	341	401
40	0.150	86	152	203	272	327	385
41	0.350	124	260	363	506	623	745
42	0.320	106	222	310	440	544	651
43	0.140	24	88	136	200	252	305
44	0.130	8	56	99	157	201	248
45	0.160	9	40	89	155	207	259
46	0.170	94	170	228	307	370	436
47	0.550	197	349	477	658	800	951
48	1.570	402	745	1,032	1,456	1,792	2,150
49	0.430	76	203	300	430	540	660
50	0.140	28	65	110	170	217	265
51	0.720	177	381	534	755	941	1,135
52	0.600	240	431	590	814	989	1,174
53	0.700	143	329	466	681	856	1,037
54	0.490	127	273	382	547	679	818
55	0.340	154	275	373	513	623	737
56	1.230	321	621	861	1,225	1,509	1,809
57	0.080	2	42	77	123	158	194
58	0.110	90	140	179	233	275	319
59	0.050	26	51	70	95	115	136
60	0.180	31	79	134	209	266	326
61	0.120	102	147	183	233	272	313
62	0.120	72	133	179	240	288	338
63	0.390	120	217	321	460	569	683
64	0.640	179	383	540	751	928	1,119

Abbreviations:
cfs – cubic feet per second

Table 3–7 Concentration Point Peak Discharges							
Concentration Points	Area (sq. mi.)	2-year (cfs)	5-year (cfs)	10-year (cfs)	25-year (cfs)	50-year (cfs)	100-year (cfs)
CP2	0.300	131	250	374	501	602	703
CP5	0.440	218	343	467	719	875	1,021
CP6	1.130	557	909	1,287	1,843	2,286	2,713
CP7	0.360	207	353	482	656	779	939
CP10	1.900	861	1,364	1,851	2,620	3,226	3,914
CP12	0.460	311	478	610	793	937	1,086
CP13	2.620	1,194	1,927	2,586	3,588	4,392	5,282
CP16	3.140	1,301	2,191	2,978	4,139	5,052	6,071
CP19	2.050	994	1,811	2,631	3,388	4,055	4,731
CP20	1.380	882	1,404	1,805	2,363	2,805	3,262
CP21	0.280	216	332	422	547	645	748
CP22	8.000	2,340	3,861	5,393	7,815	10,096	13,015
CP23	0.600	431	649	817	1,057	1,242	1,513
CP24	3.640	1,120	1,854	2,625	4,049	5,245	6,864
CP24A	4.240	1,316	2,220	3,133	4,701	6,154	8,015
CP25	3.260	1,404	2,459	3,569	4,858	5,848	6,863
CP26	1.900	947	1,849	2,393	3,155	3,756	4,387
CP28	0.450	261	423	552	732	873	1,038
CP31	0.940	378	677	921	1,271	1,548	1,836
CP34	0.870	470	822	1,108	1,471	1,757	2,057
CP41	2.390	566	1,196	1,814	2,626	3,249	3,950
CP42	1.790	585	1,130	1,613	2,273	2,784	3,352
CP45	0.250	9	40	89	155	207	264
CP46	0.720	266	478	654	903	1,097	1,302
CP49	1.910	353	726	1,054	1,528	1,902	2,337
CP50	2.910	396	874	1,301	1,999	2,547	3,158
CP53	1.300	279	600	873	1,291	1,619	2,027
CP54	2.140	373	804	1,165	1,753	2,229	2,841
CP54A	3.440	631	1,372	1,984	2,996	3,795	4,812
CP56	1.570	438	839	1,160	1,644	2,022	2,423
CP58	8.110	1,877	3,102	4,294	6,191	7,932	10,859
CP59	9.090	1,911	3,164	4,387	6,256	8,025	11,274
CP59A	9.240	1,905	3,166	4,375	6,228	8,039	11,214
CP60	9.580	1,779	3,065	4,250	6,102	7,837	10,990
CP62	12.210	1,891	3,434	4,819	6,952	8,992	12,119
CP63	12.590	1,751	3,228	4,618	6,784	8,766	11,652
CP64	19.580	2,027	4,149	6,193	9,499	12,370	15,618

Abbreviations:
cfs – cubic feet per second

3.7.2 Verification of Results

The HEC-1 watershed concentrates at the Reata Pass Fan Apex (CP22). Therefore, it is a key location to compare runoff values. The model results shown in Table 3–7 fall in between the two previous studies, lower than the Cella Barr study (1988, completed for FEMA) and slightly higher but close to the values from the JE Fuller study (2010, completed for FCDMC). Figure 3–2 is a comparison between the HEC-1 100-year peak discharges for each subbasin and the USGS regional regression discharges for the same subbasins.

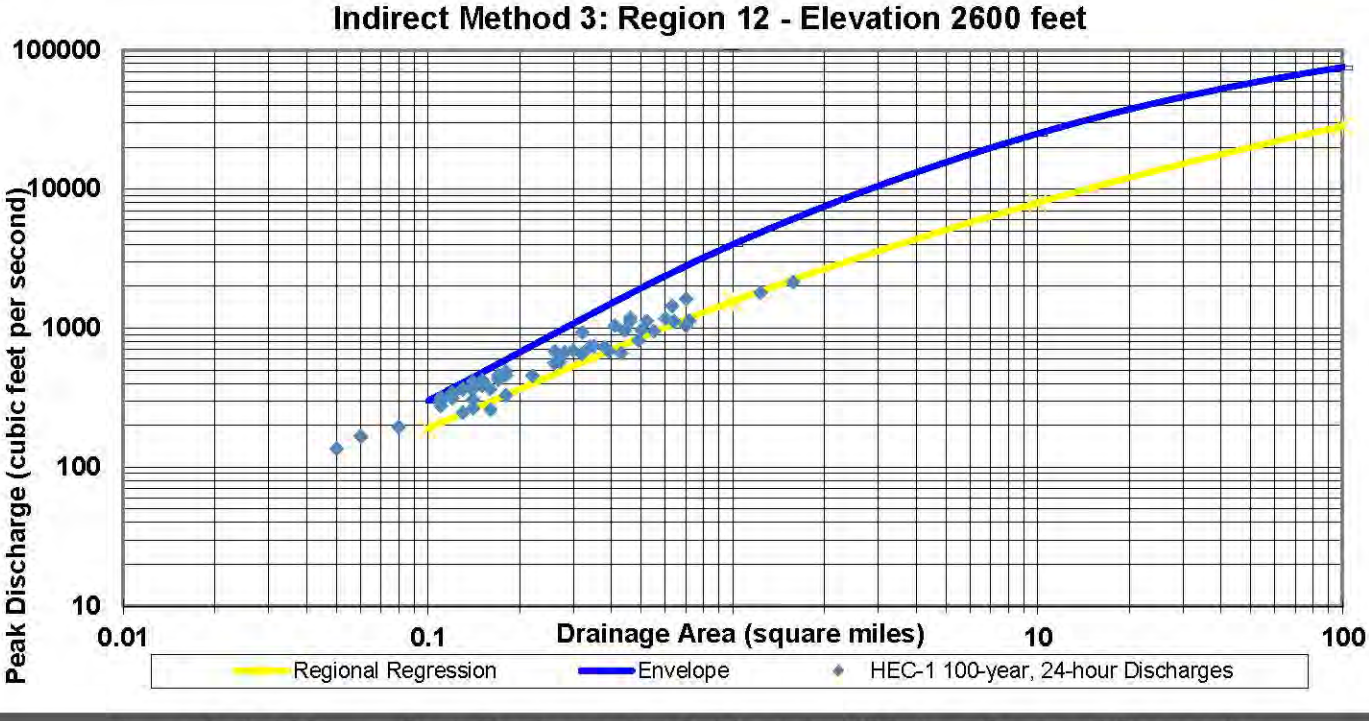

Figure 3–2 100-year Peak Discharge (by Subbasin): HEC-1 vs. Regional Regression

4. Conclusion

Based on the findings presented in the Hydrologic Review Memorandum, a project specific hydrologic model was developed for the Reata Wash Flood Control Improvement Study. The Draft PPS ADMS H&H Report (hydrologic modeling) was advanced as the most appropriate model to meet study objectives.

The following adjustments were made to the Draft PPS ADMS HEC-1 model for use in the Reata Wash Flood Control Improvement Study;

- As stated in the Draft PPS ADMS H&H Report, the hydrologic model was developed for future land use conditions and included future flood control facilities such as retention/detention basins utilized to attenuate the peak discharge and reduce the storm water runoff volume. Land use categories and boundaries within the model limits will be checked against project aerials (2014) and flood control facilities not currently existing or under construction will be removed from the hydrologic model.
- The watershed boundaries were extended to include the Reata Wash Corridor from Pinnacle Peak Road south to Bell Road. This area is approximately 1.6 square miles.

- A full review of the input parameters was conducted as part of the Reata Wash Flood Control Improvement Study Quality Control program.

Based on the modifications listed above, a FEMA compliant hydrologic model was prepared for the Reata Wash Flood Control Improvement Study that is consistent with recent hydrologic models with in the watershed and updated with current FCDMC hydrologic modeling standards.

Appendix A DDMSW Tables

City of Scottsdale
Drainage Design Management System
HEC-1 STORAGE FACILITIES

Storage Basin ID: DET20

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**			0.6	3.2	7.1	7.1				
Spillway Length:	-NA-	**Discharge (cfs)**	0	220	443	664	886	10,000	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	2,552.0	2,554.0	2,556.0	2,558.0	2,560.0	2,560.1	-	-	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	3.89	7.14	7.14	7.14	7.14	7.14	
Length of Dam:	-NA-	**Peak Stage (ft)**	2,558.35	2,560.01	2,560.01	2,560.02	2,560.02	2,560.03	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	703.00	1,404.00	1,805.00	2,363.00	2,805.00	3,262.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET1

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		-	-	0.1	0.3	0.3				
Spillway Length:	-NA-	**Discharge (cfs)**	0	5	15	30	90	1,000	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.25	0.25	0.25	0.25	0.25	0.25	
Length of Dam:	-NA-	**Peak Stage (ft)**	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	105.00	162.00	206.00	268.00	316.00	366.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET2

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		-	0.1	0.4	1.1	2.5	3.0	3.0		
Spillway Length:	-NA-	**Discharge (cfs)**	0	6	18	30	38	45	51	1,000	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	1,000.0	1,001.0	1,002.0	1,003.0	1,004.0	1,005.0	1,006.0	1,006.1	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	1.93	2.97	2.97	2.97	2.97	2.97	
Length of Dam:	-NA-	**Peak Stage (ft)**	1,004.57	1,006.01	1,006.02	1,006.02	1,006.03	1,006.04	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	42.00	106.00	222.00	284.00	333.00	384.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET3

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		-	0.2	0.6	1.2	1.3	1.4	1.4		
Spillway Length:	-NA-	**Discharge (cfs)**	0	15	48	80	97	113	127	1,000	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	1,000.0	1,001.0	1,002.0	1,003.0	1,004.0	1,005.0	1,006.0	1,006.1	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.93	1.36	1.36	1.36	1.36	1.36	
Length of Dam:	-NA-	**Peak Stage (ft)**	1,003.53	1,006.01	1,006.01	1,006.02	1,006.03	1,006.03	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	89.00	192.00	243.00	312.00	367.00	424.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET4

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		0.2	0.5	0.9	1.3	1.4	1.5	1.5		
Spillway Length:	-NA-	**Discharge (cfs)**	0	13	20	26	31	35	38	1,000	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	1,000.0	1,001.0	1,002.0	1,003.0	1,004.0	1,005.0	1,006.0	1,006.1	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	1.51	1.51	1.51	1.51	1.51	1.51	
Length of Dam:	-NA-	**Peak Stage (ft)**	1,006.00	1,006.01	1,006.02	1,006.02	1,006.03	1,006.03	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	53.00	157.00	198.00	255.00	300.00	347.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET5

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		0.4	1.5	1.5						
Spillway Length:	-NA-	**Discharge (cfs)**	0	0	185	1,000	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	1,000.0	1,001.0	1,002.0	1,002.1	-	-	-	-	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	1.17	1.47	1.48	1.48	1.48	1.48	
Length of Dam:	-NA-	**Peak Stage (ft)**	1,001.70	1,001.99	1,002.01	1,002.02	1,002.02	1,002.03	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	129.00	184.00	246.00	311.00	362.00	416.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET6

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		0.2	0.7	1.4	2.3	2.3				
Spillway Length:	-NA-	**Discharge (cfs)**	0	0	0	56	230	1,000	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	1,000.0	1,001.0	1,002.0	1,003.0	1,004.0	1,004.1	-	-	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	1.44	1.67	1.89	2.27	2.28	2.28	
Length of Dam:	-NA-	**Peak Stage (ft)**	1,003.10	1,003.34	1,003.58	1,003.99	1,004.01	1,004.02	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	73.00	115.00	157.00	228.00	305.00	367.00	
Weir Coefficient:	-NA-								

Storage Basin ID: RET7

Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**			-	0.1	0.3	0.3				
Spillway Length:	-NA-	**Discharge (cfs)**	0	11	22	46	63	1,000	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	1,000.0	1,001.0	1,002.0	1,003.0	1,004.0	1,004.1	-	-	-	-
Weir Coefficient:	-NA-											

Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											

Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	Data imported from HEC-1 file: ALL.DAT 02/25/2015
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.34	0.34	0.34	0.34	0.34	0.34	
Length of Dam:	-NA-	**Peak Stage (ft)**	1,004.00	1,004.01	1,004.01	1,004.02	1,004.02	1,004.03	
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	108.00	156.00	194.00	247.00	289.00	333.00	
Weir Coefficient:	-NA-								

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
RT1	0.055	0.040	0.055	1,133.00	0.0228	-	X:	-	24.00	37.00	134.00	193.00	240.00	276.00	303.00
							Y:	2,670.00	2,668.00	2,666.00	2,664.00	2,664.00	2,668.00	2,672.00	2,676.00
RT10	0.045	0.030	0.045	2,556.00	0.0248	-	X:	-	13.00	28.00	48.00	57.00	66.00	83.00	97.00
							Y:	2,490.00	2,488.00	2,486.00	2,484.00	2,484.00	2,486.00	2,488.00	2,490.00
RT11	0.045	0.030	0.045	5,219.00	0.0245	-	X:	-	19.00	82.00	107.00	117.00	144.00	160.00	181.00
							Y:	2,560.00	2,558.00	2,558.00	2,556.00	2,556.00	2,558.00	2,560.00	2,562.00
RT12A	0.050	0.035	0.050	2,242.00	0.0395	-	X:	-	10.00	19.00	37.00	62.00	69.00	83.00	97.00
							Y:	2,538.00	2,536.00	2,534.00	2,530.00	2,530.00	2,532.00	2,534.00	2,536.00
RT12B	0.045	0.030	0.045	2,457.00	0.0241	-	X:	-	13.00	28.00	48.00	57.00	66.00	83.00	97.00
							Y:	2,490.00	2,488.00	2,486.00	2,484.00	2,484.00	2,486.00	2,488.00	2,490.00
RT13	0.045	0.030	0.045	3,505.00	0.0273	-	X:	-	4.00	9.00	52.00	108.00	116.00	129.00	175.00
							Y:	2,440.00	2,438.00	2,436.00	2,434.00	2,434.00	2,436.00	2,438.00	2,440.00
RT15	0.045	0.030	0.045	2,462.00	0.0285	-	X:	-	4.00	8.00	12.00	57.00	65.00	69.00	117.00
							Y:	2,600.00	2,598.00	2,596.00	2,594.00	2,594.00	2,596.00	2,598.00	2,600.00
RT16	0.050	0.035	0.050	6,229.00	0.0295	-	X:	-	53.00	192.00	205.00	214.00	229.00	353.00	491.00
							Y:	2,260.00	2,258.00	2,256.00	2,254.00	2,254.00	2,256.00	2,258.00	2,260.00
RT17	0.050	0.040	0.050	5,785.00	0.0365	-	X:	-	4.00	22.00	43.00	50.00	64.00	80.00	93.00
							Y:	2,350.00	2,346.00	2,342.00	2,339.00	2,339.00	2,342.00	2,346.00	2,350.00
RT19	0.055	0.035	0.055	3,337.00	0.0347	-	X:	-	13.00	31.00	46.00	82.00	100.00	123.00	155.00
							Y:	2,508.00	2,504.00	2,498.00	2,496.00	2,496.00	2,500.00	2,504.00	2,508.00
RT2	0.045	0.035	0.045	2,221.00	0.0218	-	X:	-	39.00	53.00	61.00	71.00	74.00	84.00	106.00
							Y:	2,634.00	2,633.00	2,632.00	2,629.80	2,629.80	2,632.00	2,636.00	2,636.40

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RT21	0.045	0.030	0.045	2,993.00	0.0349	-	X:	-	5.00	67.00	74.00	90.00	96.00	162.00	170.00
							Y:	2,618.40	2,618.00	2,616.00	2,614.00	2,614.00	2,616.00	2,618.00	2,620.00
RT22A	0.055	0.040	0.055	1,543.40	0.0246	-	X:	-	10.00	40.00	90.00	150.00	400.00	1,000.00	1,020.00
							Y:	2,122.00	2,122.00	2,122.00	2,107.00	2,114.00	2,121.00	2,121.00	2,124.00
RT22B	0.055	0.040	0.055	1,802.90	0.0329	-	X:	-	10.00	40.00	90.00	150.00	400.00	1,000.00	1,020.00
							Y:	2,122.00	2,122.00	2,122.00	2,107.00	2,114.00	2,121.00	2,121.00	2,124.00
RT24A	0.050	0.030	0.050	1,545.00	0.0306	-	X:	-	99.00	276.00	292.00	321.00	337.00	650.00	816.00
							Y:	2,224.00	2,202.00	2,200.50	2,199.80	2,200.00	2,201.00	2,202.00	2,212.00
RT25	0.050	0.030	0.050	6,726.00	0.0267	-	X:	-	74.00	105.00	368.00	415.00	422.00	428.00	520.00
							Y:	2,330.00	2,308.00	2,306.00	2,304.00	2,304.00	2,306.00	2,308.00	2,340.00
RT26	0.050	0.035	0.050	1,139.00	0.0308	-	X:	-	25.00	40.00	54.00	90.00	102.00	130.00	165.00
							Y:	2,545.00	2,544.00	2,542.00	2,540.00	2,540.00	2,542.00	2,544.00	2,550.00
RT28	0.045	0.030	0.045	2,234.00	0.0368	-	X:	-	11.00	27.00	49.00	81.00	98.00	188.00	197.00
							Y:	2,580.00	2,578.00	2,576.00	2,574.00	2,574.00	2,576.00	2,576.00	2,578.00
RT29	0.050	0.035	0.050	1,372.00	0.0345	-	X:	-	2.00	41.00	48.00	56.00	58.00	75.00	101.00
							Y:	2,688.00	2,686.00	2,684.00	2,683.20	2,683.20	2,684.00	2,686.00	2,690.00
RT3	0.050	0.035	0.050	3,622.00	0.0228	-	X:	-	22.00	94.00	97.00	104.00	110.00	124.00	136.00
							Y:	2,642.00	2,640.00	2,638.00	2,636.00	2,636.00	2,638.00	2,640.00	2,642.00
RT31	0.055	0.035	0.055	599.00	0.0256	-	X:	-	12.00	22.00	45.00	110.00	147.00	206.00	252.00
							Y:	2,420.00	2,414.00	2,410.00	2,408.00	2,408.00	2,410.00	2,414.00	2,420.00
RT32	0.055	0.040	0.055	5,296.00	0.0517	-	X:	-	25.00	69.00	77.00	89.00	94.00	112.00	127.00
							Y:	2,460.00	2,444.00	2,442.00	2,438.00	2,438.00	2,440.00	2,450.00	2,460.00
RT33	0.050	0.035	0.050	3,766.00	0.0472	-	X:	-	33.00	72.00	109.00	130.00	260.00	290.00	313.00
							Y:	2,760.00	2,759.00	2,758.00	2,756.00	2,756.00	2,758.00	2,758.00	2,760.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RT34	0.055	0.040	0.055	3,084.00	0.0213	-	X:	160.00	180.00	200.00	340.00	490.00	540.00	1,000.00	1,100.00
							Y:	2,100.00	2,100.00	2,100.00	2,030.00	2,030.00	2,045.00	2,045.00	2,056.00
RT35	0.055	0.040	0.055	2,848.00	0.0211	-	X:	-	35.00	58.00	69.00	78.00	89.00	129.00	157.00
							Y:	2,087.00	2,085.00	2,085.00	2,082.00	2,082.00	2,085.00	2,086.00	2,087.00
RT37	0.050	0.040	0.050	4,195.00	0.0340	-	X:	-	33.00	37.00	42.00	49.00	65.00	169.00	205.00
							Y:	2,063.00	2,045.00	2,044.00	2,042.00	2,041.00	2,045.00	2,047.00	2,064.00
RT4	0.055	0.040	0.055	2,467.00	0.0235	-	X:	-	2.00	16.00	28.00	65.00	80.00	99.00	114.00
							Y:	2,672.00	2,670.00	2,668.00	2,666.00	2,666.00	2,668.00	2,668.50	2,669.00
RT41	0.050	0.035	0.050	2,454.00	0.0252	-	X:	200.00	260.00	330.00	380.00	450.00	455.00	470.00	480.00
							Y:	1,829.00	1,827.00	1,826.00	1,823.00	1,823.00	1,825.00	1,825.00	1,826.00
RT42	0.050	0.035	0.050	4,042.00	0.0304	-	X:	-	15.00	29.00	41.00	60.00	73.00	81.00	87.00
							Y:	1,945.00	1,944.00	1,943.00	1,940.00	1,940.00	1,943.00	1,944.00	1,945.00
RT45	0.050	0.035	0.050	2,935.00	0.0331	-	X:	-	10.00	39.00	49.00	50.00	53.00	60.00	65.00
							Y:	1,924.00	1,920.00	1,919.00	1,918.00	1,918.00	1,920.00	1,923.00	1,924.00
RT46	0.050	0.035	0.050	2,771.00	0.0424	-	X:	-	7.00	49.00	60.00	62.00	75.00	83.00	147.00
							Y:	2,060.00	2,057.00	2,055.00	2,052.00	2,052.00	2,055.00	2,057.00	2,058.00
RT48A	0.055	0.040	0.055	2,993.70	0.0470	-	X:	-	73.00	78.00	82.00	91.00	114.00	125.00	133.00
							Y:	1,972.00	1,970.00	1,967.00	1,962.00	1,961.00	1,965.00	1,971.00	1,972.00
RT48B	0.055	0.040	0.055	5,668.00	0.0422	-	X:	-	73.00	78.00	82.00	91.00	114.00	125.00	133.00
							Y:	1,972.00	1,970.00	1,967.00	1,962.00	1,961.00	1,965.00	1,971.00	1,972.00
RT49	0.045	0.035	0.045	3,915.00	0.0318	-	X:	-	30.00	39.00	45.00	60.00	71.00	134.00	177.00
							Y:	1,750.00	1,749.00	1,744.00	1,742.00	1,742.00	1,745.00	1,747.00	1,751.00
RT5	0.045	0.035	0.045	1,481.00	0.0187	-	X:	-	10.00	20.00	28.00	52.00	64.00	88.00	96.00
							Y:	2,616.00	2,614.00	2,612.00	2,610.00	2,610.00	2,612.00	2,612.00	2,614.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RT50	0.050	0.040	0.050	5,454.00	0.0168	-	X:	100.00	140.00	195.00	220.00	330.00	360.00	370.00	380.00
							Y:	1,609.00	1,608.50	1,608.50	1,602.50	1,602.50	1,608.00	1,608.00	1,609.00
RT52	0.055	0.040	0.055	8,331.00	0.0383	-	X:	-	37.00	65.00	71.00	81.00	91.00	237.00	270.00
							Y:	1,885.00	1,882.00	1,868.00	1,865.00	1,866.00	1,869.00	1,872.00	1,883.00
RT54	0.050	0.040	0.050	3,822.00	0.0200	-	X:	120.00	126.00	130.00	150.00	480.00	510.00	520.00	530.00
							Y:	1,622.00	1,621.00	1,621.00	1,615.00	1,613.00	1,618.00	1,618.00	1,619.00
RT56	0.050	0.040	0.050	7,162.00	0.0422	-	X:	-	13.00	71.00	114.00	132.00	154.00	189.00	224.00
							Y:	1,807.00	1,804.00	1,803.00	1,800.00	1,799.00	1,804.00	1,806.00	1,808.00
RT58	0.055	0.040	0.055	3,099.00	0.0276	-	X:	160.00	180.00	200.00	340.00	490.00	540.00	1,000.00	1,100.00
							Y:	2,100.00	2,100.00	2,100.00	2,030.00	2,030.00	2,045.00	2,045.00	2,056.00
RT59A	0.055	0.040	0.055	1,049.00	0.0454	-	X:	20.00	70.00	110.00	160.00	220.00	380.00	500.00	540.00
							Y:	1,970.00	1,965.00	1,964.00	1,961.00	1,961.00	1,966.00	1,968.00	1,969.00
RT59B	0.055	0.040	0.055	4,061.00	0.0267	-	X:	150.00	180.00	205.00	250.00	490.00	510.00	560.00	600.00
							Y:	1,924.00	1,921.00	1,918.00	1,904.00	1,904.00	1,910.00	1,913.00	1,915.00
RT6	0.050	0.035	0.050	3,706.00	0.0207	-	X:	-	19.00	82.00	107.00	117.00	144.00	160.00	181.00
							Y:	2,560.00	2,558.00	2,558.00	2,556.00	2,556.00	2,558.00	2,560.00	2,562.00
RT60	0.055	0.040	0.055	2,351.00	0.0243	-	X:	200.00	250.00	260.00	360.00	520.00	620.00	830.00	880.00
							Y:	1,835.00	1,833.00	1,830.00	1,825.00	1,825.00	1,830.00	1,830.00	1,835.00
RT61	0.050	0.035	0.050	2,458.00	0.0318	-	X:	240.00	270.00	300.00	310.00	325.00	335.00	380.00	390.00
							Y:	1,793.00	1,791.00	1,791.00	1,789.00	1,789.00	1,790.00	1,790.00	1,791.00
RT62	0.050	0.035	0.050	4,669.00	0.0240	-	X:	400.00	420.00	430.00	540.00	950.00	970.00	990.00	1,000.00
							Y:	1,727.00	1,725.00	1,723.00	1,720.00	1,722.00	1,726.00	1,726.00	1,727.00
RT63	0.050	0.035	0.050	5,520.00	0.0185	-	X:	130.00	210.00	500.00	540.00	630.00	660.00	670.00	680.00
							Y:	1,627.00	1,623.00	1,622.00	1,617.00	1,618.00	1,626.00	1,626.00	1,627.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RT7	0.045	0.030	0.045	2,096.00	0.0191	-	X:	-	3.00	5.00	8.00	27.00	30.00	32.00	34.00
							Y:	2,630.00	2,628.00	2,626.00	2,624.00	2,624.00	2,626.00	2,628.00	2,630.00
RT8	0.050	0.035	0.050	3,543.00	0.0233	-	X:	-	18.00	28.00	48.00	57.00	66.00	83.00	97.00
							Y:	2,598.50	2,598.00	2,597.00	2,596.00	2,596.00	2,598.00	2,600.00	2,602.00
RTD48A	0.055	0.040	0.055	1,976.80	0.0415	-	X:	-	73.00	78.00	82.00	91.00	114.00	125.00	133.00
							Y:	1,972.00	1,970.00	1,967.00	1,962.00	1,961.00	1,965.00	1,971.00	1,972.00

Diversion ID/ DT Card ID	Maximum Volume (ac-ft)	Maximum Diversion (cfs)		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
D22A		2,000	**Inflow (cfs)**		500	1,000	2,000	4,000	8,000	16,000			
DT22A			**Diversion (cfs)**		96	192	384	768	1,537	3,200			
D48A			**Inflow (cfs)**		1,000	2,000	3,000	3,500	4,083	4,500	5,000		
DT48A			**Diversion (cfs)**		1,000	1,880	2,530	2,870	3,373	3,440	3,600		

City of Scottsdale
Drainage Design Management System
SUB BASINS
Project Reference: REATA WITH DIVERT

Area ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
01	0.159	1.04	130.6	Mountain	0.58	14.10	6.46	0.030	0.29	0.25	6.00	0.192	10
02	0.140	0.76	136.6	Mountain	0.28	9.40	7.09	0.030	0.26	0.25	6.00	0.212	26
03	0.149	0.71	169.0	Mountain	0.21	7.90	7.87	0.030	0.27	0.25	6.00	0.207	19
04	0.124	0.61	167.5	Mountain	0.27	8.20	6.54	0.030	0.29	0.25	6.00	0.195	13
05	0.145	0.57	118.9	Mountain	0.25	8.30	6.02	0.030	0.19	0.23	6.16	0.219	41
06	0.180	0.72	118.1	Mountain	0.30	10.10	6.30	0.031	0.22	0.24	6.16	0.211	33
07	0.124	0.69	125.0	Mountain	0.38	10.40	5.87	0.030	0.26	0.25	6.00	0.213	32
08	0.134	0.83	367.0	Mountain	0.42	10.00	7.25	0.032	0.23	0.27	6.00	0.213	26
09	0.114	0.79	219.0	Mountain	0.44	10.40	6.67	0.030	0.30	0.25	6.00	0.185	6
10	0.462	1.14	203.6	Mountain	0.48	12.90	7.75	0.031	0.25	0.26	5.85	0.217	26
11	0.174	0.75	139.3	Mountain	0.35	10.20	6.49	0.030	0.30	0.25	6.00	0.185	5
12	0.303	1.01	147.7	Mountain	0.63	14.10	6.30	0.030	0.27	0.26	6.00	0.205	16
13	0.259	1.45	636.1	Mountain	0.73	14.70	8.70	0.034	0.23	0.27	4.96	0.351	17
14	0.154	1.03	747.9	Mountain	0.48	11.00	8.27	0.035	0.26	0.29	5.85	0.200	15
15	0.700	1.11	118.4	Mountain	0.44	13.70	7.11	0.031	0.29	0.26	6.00	0.186	9
16	0.521	1.38	728.3	Mountain	0.83	16.10	7.59	0.037	0.23	0.30	6.00	0.200	15
17	0.324	0.81	1016.0	Mountain	0.25	8.00	8.93	0.038	0.25	0.28	6.34	0.160	21
18	0.141	1.04	670.3	Mountain	0.54	11.40	8.03	0.034	0.25	0.30	6.00	0.189	20
19	0.151	0.80	731.1	Mountain	0.32	8.80	7.97	0.036	0.25	0.30	5.85	0.204	19
20	0.264	0.76	257.8	Mountain	0.42	10.70	6.23	0.033	0.27	0.29	5.46	0.231	16
21	0.129	0.56	198.7	Mountain	0.26	7.60	6.48	0.030	0.30	0.25	6.00	0.185	6

* Non default value

Area ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
22	0.222	1.51	165.0	Mountain	0.79	17.50	7.60	0.030	0.29	0.27	5.71	0.212	8
23	0.279	1.20	184.2	Mountain	0.62	14.30	7.35	0.030	0.24	0.16	7.27	0.124	16
24	0.380	1.70	393.3	Mountain	1.01	18.20	8.21	0.032	0.27	0.29	4.87	0.316	15
25	0.274	1.24	438.9	Mountain	0.59	16.10	6.78	0.040	0.25	0.31	5.05	0.274	14
26	0.063	0.73	745.1	Mountain	0.33	9.10	7.09	0.038	0.27	0.32	5.24	0.238	12
27	0.108	0.86	334.6	Mountain	0.41	10.90	6.94	0.034	0.28	0.28	5.58	0.228	9
28	0.167	1.02	282.3	Mountain	0.54	11.80	7.62	0.030	0.30	0.23	6.16	0.180	8
29	0.151	0.88	261.2	Mountain	0.38	9.90	7.81	0.030	0.30	0.26	6.00	0.180	5
30	0.392	1.48	314.9	Mountain	0.75	20.60	6.32	0.041	0.26	0.32	4.72	0.285	2
31	0.496	1.58	838.1	Mountain	0.61	16.60	8.37	0.042	0.26	0.32	4.33	0.373	6
32	0.441	1.30	859.7	Mountain	0.43	13.80	8.33	0.043	0.24	0.33	4.65	0.301	6
33	0.176	0.98	969.8	Mountain	0.46	10.40	8.32	0.036	0.25	0.33	5.85	0.167	2
34	0.456	0.92	902.2	Mountain	0.29	8.90	9.15	0.037	0.28	0.29	4.72	0.310	3
35	0.410	0.78	986.4	Mountain	0.40	9.00	7.65	0.036	0.28	0.28	4.33	0.376	4
37	0.629	1.12	1368.8	Mountain	0.51	12.10	8.13	0.041	0.23	0.33	4.22	0.350	1
38	0.057	0.22	1843.7	Mountain	0.22	5.20	3.64	0.048	0.26	0.34	4.28	0.341	1
39	0.153	0.63	1476.2	Mountain	0.26	7.60	7.29	0.042	0.23	0.31	4.28	0.405	2
40	0.152	0.73	873.2	Mountain	0.45	8.30	7.69	0.032	0.28	0.27	3.90	0.519	13
41	0.349	1.21	688.8	Mountain	0.54	11.70	9.11	0.033	0.25	0.27	3.53	0.714	12
42	0.318	1.47	736.9	Mountain	0.47	12.80	10.06	0.036	0.28	0.29	3.56	0.599	4

* Non default value

Area ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
43	0.142	0.93	495.7	Mountain	0.41	9.50	8.62	0.031	0.31	0.34	3.18	0.760	1
44	0.126	0.81	372.4	Mountain	0.38	9.00	7.93	0.030	0.29	0.29	2.74	1.184	5
45	0.161	1.10	263.2	Mountain	0.46	11.60	8.38	0.030	0.21	0.29	2.75	1.418	5
46	0.175	0.83	1281.0	Mountain	0.39	8.90	8.20	0.037	0.28	0.28	4.08	0.450	4
47	0.547	1.74	1033.6	Mountain	1.04	19.80	7.73	0.041	0.27	0.30	4.17	0.392	3
48	1.570	2.55	653.5	Mountain	1.13	27.60	8.11	0.044	0.23	0.35	4.28	0.367	
49	0.433	1.93	282.4	Mountain	0.77	18.90	9.00	0.033	0.25	0.31	3.18	0.871	12
50	0.137	0.73	165.3	Mountain	0.44	10.30	6.25	0.029	0.30	0.31	2.75	1.256	17
51	0.721	1.90	416.5	Mountain	1.11	20.00	8.32	0.033	0.25	0.27	3.62	0.685	9
52	0.598	1.57	1216.7	Mountain	0.67	16.00	8.65	0.042	0.21	0.35	4.33	0.360	
53	0.700	2.29	536.7	Mountain	1.09	22.20	9.07	0.036	0.27	0.35	3.65	0.532	
54	0.488	1.50	754.7	Mountain	1.06	18.50	7.13	0.038	0.25	0.35	3.75	0.501	
55	0.341	1.16	1286.8	Mountain	0.46	13.10	7.77	0.045	0.22	0.35	4.33	0.363	
56	1.226	2.01	1011.2	Mountain	1.11	24.10	7.32	0.046	0.23	0.35	4.12	0.405	
57	0.084	0.54	208.0	Mountain	0.18	5.40	8.82	0.025	0.35	0.35	2.75	1.014	
58	0.112	0.63	165.3	Mountain	0.25	7.60	7.31	0.028	0.32	0.30	5.85	0.183	3
59	0.055	0.64	140.6	Mountain	0.37	8.80	6.38	0.027	0.33	0.30	4.03	0.449	2
60	0.182	0.97	163.3	Mountain	0.52	11.80	7.23	0.028	0.27	0.31	2.79	1.238	15
61	0.116	0.91	170.7	Mountain	0.33	10.30	7.77	0.030	0.23	0.21	6.34	0.202	26
62	0.122	0.47	168.3	Mountain	0.21	6.10	6.76	0.027	0.31	0.31	4.03	0.471	12
63	0.386	1.28	142.2	Mountain	0.58	14.50	7.74	0.029	0.26	0.31	2.79	1.243	30

* Non default value

Area ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
64	0.638	1.38	102.2	Mountain	0.63	16.50	7.40	0.029	0.28	0.29	3.22	0.870	22

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
01	120	0.1207	76.0	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0101	6.4	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0280	17.6	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
		0.1588	**100.0**						
02	120	0.0109	7.8	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0181	12.9	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.1109	79.2	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	200	0.0001	0.1	0.10	80	60.0	NORMAL	0.030	General Commercial (Commercial where no detail available)
		0.1400	**100.0**						
03	120	0.0460	31.0	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0280	18.8	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0742	49.9	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	170	0.0004	0.3	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
		0.1486	**100.0**						
04	120	0.0789	63.8	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0110	8.9	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0331	26.8	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0004	0.3	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0003	0.2	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
		0.1237	**100.0**						
05	130	0.0001	0.1	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
05	140	0.0349	24.0	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0163	11.2	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0333	22.9	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	200	0.0347	23.8	0.10	80	60.0	NORMAL	0.030	General Commercial (Commercial where no detail available)
	720	0.0262	18.0	0.10	5	90.0	NORMAL	0.030	Golf courses
		0.1455	**100.0**						
06	120	0.0053	2.9	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	150	0.0022	1.2	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.1272	70.5	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	710	0.0396	22.0	0.10	5	90.0	NORMAL	0.030	Active Open Space (Includes parks)
	780	0.0060	3.3	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1803	**99.9**						
07	120	0.0118	9.5	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0197	15.9	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	150	0.0377	30.5	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0546	44.1	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
		0.1238	**100.0**						
08	130	0.0023	1.7	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0719	53.7	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0001	0.1	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0259	19.3	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
08	720	0.0180	13.4	0.10	5	90.0	NORMAL	0.030	Golf courses
	780	0.0158	11.8	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1340	**100.0**						
09	120	0.1089	95.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0048	4.2	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	150	0.0001	0.1	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0003	0.3	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
		0.1141	**100.0**						
10	120	0.2435	52.7	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0021	0.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0004	0.1	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0183	4.0	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0817	17.7	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	200	0.0781	16.9	0.10	80	60.0	NORMAL	0.030	General Commercial (Commercial where no detail available)
	710	0.0130	2.8	0.10	5	90.0	NORMAL	0.030	Active Open Space (Includes parks)
	720	0.0003	0.1	0.10	5	90.0	NORMAL	0.030	Golf courses
	780	0.0243	5.3	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.4617	**100.1**						
11	120	0.1666	95.5	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0078	4.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
		0.1744	**100.0**						

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
12	120	0.0852	28.1	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.1049	34.6	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0193	6.4	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0723	23.9	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	770	0.0213	7.0	0.15	0	3.5 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
		0.3030	**100.0**						
13	130	0.0423	16.3	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.1148	44.3	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	720	0.0533	20.6	0.10	5	90.0	NORMAL	0.030	Golf courses
	780	0.0488	18.8	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.2592	**100.0**						
14	130	0.0593	38.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0457	29.7	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0015	1.0	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	770	0.0093	6.0	0.15	0	3.5 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0381	24.8	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1539	**100.0**						
15	120	0.5485	78.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	140	0.0429	6.1	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0313	4.5	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0284	4.1	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
15	760	0.0032	0.5	0.35	0	3.5 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.0179	2.6	0.15	0	3.5 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0275	3.9	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.6997	**100.1**						
16	130	0.0456	8.8	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.1684	32.3	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0122	2.3	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0240	4.6	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0931	17.9	0.10	5	90.0	NORMAL	0.030	Golf courses
	770	0.0050	1.0	0.15	0	3.5 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.1723	33.1	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.5206	**100.0**						
17	130	0.0106	3.3	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0448	13.8	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0483	14.9	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0831	25.7	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0105	3.2	0.10	5	90.0	NORMAL	0.030	Golf courses
	780	0.1263	39.0	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.3236	**99.9**						
18	140	0.0271	19.2	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0652	46.3	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
18	170	0.0020	1.4	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	760	0.0047	3.3	0.35	0	3.5 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.0094	6.7	0.15	0	3.5 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0324	23.0	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1408	**99.9**						
19	130	0.0002	0.1	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0625	41.3	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0350	23.1	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	760	0.0069	4.6	0.35	0	3.5 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.0011	0.7	0.15	0	3.5 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0457	30.2	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1514	**100.0**						
20	120	0.0480	18.2	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0080	3.0	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.1020	38.7	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0243	9.2	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	760	0.0316	12.0	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.0002	0.1	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0497	18.8	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.2638	**100.0**						
21	120	0.1222	95.0	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
21	130	0.0059	4.6	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0004	0.3	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	780	0.0001	0.1	0.25	0	3.5 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1286	**100.0**						
22	120	0.1106	49.7	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0425	19.1	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0140	6.3	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	720	0.0157	7.1	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0360	16.2	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.0036	1.6	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.2224	**100.0**						
23	120	0.0789	28.3	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0078	2.8	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.1248	44.8	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	720	0.0577	20.7	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0096	3.4	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.2788	**100.0**						
24	120	0.0466	12.2	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	140	0.1045	27.5	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	170	0.0440	11.6	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0323	8.5	0.10	5	90.0	NORMAL	0.030	Golf courses

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
24	760	0.0862	22.7	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.0669	17.6	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.3805	**100.1**						
25	140	0.1191	43.5	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	170	0.0015	0.5	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0062	2.3	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0070	2.6	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.1399	51.1	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.2737	**100.0**						
26	130	0.0002	0.3	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0252	40.0	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	760	0.0108	17.1	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.0268	42.5	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.0630	**99.9**						
27	120	0.0469	43.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0243	22.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0133	12.3	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	770	0.0008	0.7	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0228	21.1	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1081	**100.0**						
28	120	0.1440	86.3	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
28	130	0.0099	5.9	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0130	7.8	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
		0.1669	**100.0**						
29	120	0.1367	90.5	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	760	0.0144	9.5	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1511	**100.0**						
30	120	0.1176	30.0	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	760	0.0101	2.6	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.0431	11.0	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.2207	56.4	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.3915	**100.0**						
31	130	0.1570	31.6	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0123	2.5	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	770	0.0308	6.2	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.2964	59.7	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.4965	**100.0**						
32	120	0.0115	2.6	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0008	0.2	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0816	18.5	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	770	0.0707	16.0	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.2767	62.7	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%

* Non default value

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
		0.4413	**100.0**						
33	120	0.0777	44.3	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	140	0.0009	0.5	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	770	0.0463	26.4	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0506	28.8	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1755	**100.0**						
34	120	0.2846	62.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	760	0.0003	0.1	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.1713	37.5	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.4562	**100.0**						
35	120	0.2850	69.5	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	780	0.1249	30.5	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.4099	**100.0**						
37	120	0.0931	14.8	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0130	2.1	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	760	0.0116	1.8	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.1775	28.2	0.15	0	7.0	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.3340	53.1	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.6292	**100.0**						
38	120	0.0065	11.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	780	0.0507	88.6	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
		0.0572	**100.0**						
39	120	0.0244	15.9	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	720	0.0334	21.8	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0023	1.5	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.0931	60.8	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1532	**100.0**						
40	120	0.0910	59.8	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	170	0.0337	22.1	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	760	0.0081	5.3	0.35	0	7.0	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.0194	12.7	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1522	**99.9**						
41	120	0.1689	48.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0132	3.8	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	170	0.0604	17.3	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0604	17.3	0.10	5	90.0	NORMAL	0.030	Golf courses
	780	0.0463	13.3	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.3492	**100.1**						
42	120	0.2192	68.8	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	720	0.0051	1.6	0.10	5	90.0	NORMAL	0.030	Golf courses
	780	0.0941	29.6	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.3184	**100.0**						

* Non default value

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
43	170	0.0019	1.3	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0072	5.1	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0987	69.7	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.0339	23.9	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1417	**100.0**						
44	120	0.1188	94.5	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	720	0.0069	5.5	0.10	5	90.0	NORMAL	0.030	Golf courses
		0.1257	**100.0**						
45	120	0.0880	54.6	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	720	0.0724	44.9	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0008	0.5	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1612	**100.0**						
46	120	0.1161	66.3	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	780	0.0591	33.7	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.1752	**100.0**						
47	120	0.2479	45.3	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	780	0.2996	54.7	0.25	0	7.0	DRY	0.050	Mountain Terrain Slopes > 10%
		0.5475	**100.0**						
48	120	0.0042	0.3	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	760	0.0710	4.5	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.3975	25.3	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%

* Non default value

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
48	780	1.0975	69.9	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		1.5702	**100.0**						
49	120	0.0147	3.4	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0066	1.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	150	0.0082	1.9	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0988	22.8	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0620	14.3	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.1105	25.5	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.0330	7.6	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.0990	22.9	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.4328	**99.9**						
50	130	0.0734	53.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	170	0.0265	19.3	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	760	0.0372	27.1	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1371	**99.9**						
51	120	0.3433	47.6	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0495	6.9	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	170	0.0674	9.4	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.1468	20.4	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0109	1.5	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	780	0.1028	14.3	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%

* Non default value

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
		0.7207	**100.1**						
52	770	0.2248	37.6	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.3735	62.4	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.5983	**100.0**						
53	710	0.0170	2.4	0.10	5	12.0 *	NORMAL	0.030	Active Open Space (Includes parks)
	760	0.2789	39.8	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.1261	18.0	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.2780	39.7	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.7000	**99.9**						
54	760	0.1225	25.1	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
	770	0.1473	30.2	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.2186	44.8	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.4884	**100.1**						
55	770	0.0912	26.8	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.2493	73.2	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		0.3405	**100.0**						
56	130	0.0012	0.1	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	770	0.2357	19.2	0.15	0	18.0 *	DRY	0.030	Hillslopes, Sonoran Desert, Moderate Slopes 5% slope< 10%
	780	0.9891	80.7	0.25	0	18.0 *	DRY	0.050	Mountain Terrain Slopes > 10%
		1.2260	**100.0**						
57	760	0.0838	100.0	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
		0.0838	**100.0**						
58	120	0.0692	61.6	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	760	0.0431	38.4	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1123	**100.0**						
59	120	0.0259	46.8	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0005	0.9	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	760	0.0289	52.3	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.0553	**100.0**						
60	120	0.0031	1.7	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0019	1.0	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0002	0.1	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0674	37.0	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0137	7.5	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	720	0.0274	15.0	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0687	37.7	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1824	**100.0**						
61	120	0.0014	1.2	0.30	5	30.0	NORMAL	0.030	Estate Residential (1/5 du per acre to 1 du per acre)
	130	0.0093	8.1	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	140	0.0334	28.9	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	150	0.0398	34.5	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0116	10.0	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)

* Non default value

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: REATA WITH DIVERT

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Major Basin ID: 01									
61	720	0.0199	17.2	0.10	5	90.0	NORMAL	0.030	Golf courses
	760	0.0001	0.1	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1155	**100.0**						
62	140	0.0402	32.9	0.25	30	50.0	NORMAL	0.030	Medium Lot Residential - Single Family (2-4 du per acre)
	170	0.0019	1.6	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	200	0.0015	1.2	0.10	80	60.0	NORMAL	0.030	General Commercial (Commercial where no detail available)
	760	0.0785	64.3	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.1221	**100.0**						
63	130	0.1565	40.5	0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	150	0.0114	3.0	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0030	0.8	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	200	0.1080	28.0	0.10	80	60.0	NORMAL	0.030	General Commercial (Commercial where no detail available)
	760	0.1074	27.8	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.3863	**100.1**						
64	130	0.0002		0.30	15	50.0	NORMAL	0.030	Large Lot Residential - Single Family (1 du per acre to 2 du
	150	0.4275	67.0	0.25	30	50.0	NORMAL	0.030	Small Lot Residential - Single Family (4-6 du per acre)
	170	0.0253	4.0	0.25	45	50.0	NORMAL	0.030	Medium Density Residential - Muli Family (5-10 du per acre)
	760	0.1848	29.0	0.35	0	18.0 *	DRY	0.025	Undeveloped Desert Rangeland, Slopes <5%
		0.6378	**100.0**						

* Non default value

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
01	645	61	64561	0.159	100.00	0.150	-	100	
02	645	61	64561	0.137	97.70	0.150	-	100	
	645	96	64596	0.003	2.30	0.070	-	100	
03	645	61	64561	0.148	99.80	0.150	-	100	
	645	96	64596	0.000	0.20	0.070	-	100	
04	645	61	64561	0.124	100.00	0.150	-	100	
05	645	61	64561	0.133	91.40	0.150	-	100	
	645	96	64596	0.013	8.60	0.070	-	100	
06	645	61	64561	0.167	92.80	0.150	-	100	
	645	63	64563	0.006	3.30	0.140	25.00	1	
	645	96	64596	0.002	1.30	0.070	-	100	
	645	126	645126	0.005	2.50	0.000	-	100	
07	645	61	64561	0.124	100.00	0.150	-	100	
08	645	61	64561	0.100	74.80	0.150	-	100	
	645	63	64563	0.034	25.20	0.140	25.00	1	
09	645	61	64561	0.112	98.20	0.150	-	100	
	645	63	64563	0.002	1.80	0.140	25.00	1	
10	645	6	6456	0.038	8.30	0.620	-	100	
	645	33	64533	0.037	8.10	0.230	-	100	
	645	61	64561	0.249	53.90	0.150	-	100	
	645	63	64563	0.102	22.00	0.140	25.00	1	
	645	96	64596	0.036	7.70	0.070	-	100	
11	645	61	64561	0.168	96.20	0.150	-	100	
	645	63	64563	0.007	3.80	0.140	25.00	1	
12	645	6	6456	0.003	1.10	0.620	-	100	
	645	61	64561	0.279	91.90	0.150	-	100	
	645	63	64563	0.021	7.00	0.140	25.00	1	
13	645	6	6456	0.103	39.90	0.620	-	100	
	645	61	64561	0.022	8.60	0.150	-	100	
	645	63	64563	0.058	22.40	0.140	25.00	1	
	645	121	645121	0.076	29.10	0.120	-	100	
14	645	6	6456	0.006	3.60	0.620	-	100	
	645	61	64561	0.101	65.90	0.150	-	100	
	645	63	64563	0.047	30.50	0.140	25.00	1	
15	645	6	6456	0.004	0.60	0.620	-	100	
	645	61	64561	0.667	95.30	0.150	-	100	
	645	63	64563	0.029	4.10	0.140	25.00	1	
16	645	6	6456	0.060	11.40	0.620	-	100	
	645	33	64533	0.001	0.30	0.230	-	100	
	645	61	64561	0.009	1.80	0.150	-	100	
	645	63	64563	0.186	35.70	0.140	25.00	1	
	645	96	64596	0.039	7.50	0.070	-	100	
	645	121	645121	0.226	43.40	0.120	-	100	
17	645	61	64561	0.116	35.90	0.150	-	100	
	645	63	64563	0.113	34.90	0.140	25.00	1	
	645	96	64596	0.052	16.10	0.070	-	100	
	645	121	645121	0.042	13.00	0.120	-	100	
18	645	6	6456	0.000	0.10	0.620	-	100	
	645	61	64561	0.109	77.30	0.150	-	100	
	645	63	64563	0.032	22.50	0.140	25.00	1	
19	645	6	6456	0.015	9.80	0.620	-	100	
	645	61	64561	0.055	36.50	0.150	-	100	
	645	63	64563	0.055	36.60	0.140	25.00	1	
	645	121	645121	0.026	17.10	0.120	-	100	
20	645	6	6456	0.039	14.90	0.620	-	100	
	645	61	64561	0.198	74.90	0.150	-	100	
	645	63	64563	0.027	10.20	0.140	25.00	1	
21	645	61	64561	0.129	100.00	0.150	-	100	

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
22	645	6	6456	0.050	22.40	0.620	-	100	
	645	8	6458	0.019	8.40	0.960	-	100	
	645	31	64531	0.005	2.20	0.330	35.00	1	
	645	40	64540	0.013	5.70	0.170	-	100	
	645	93	64593	0.008	3.70	0.330	-	100	
	645	96	64596	0.125	56.30	0.070	-	100	
	645	121	645121	0.003	1.30	0.120	-	100	
23	645	6	6456	0.007	2.40	0.620	-	100	
	645	8	6458	0.001	0.50	0.960	-	100	
	645	40	64540	0.038	13.60	0.170	-	100	
	645	96	64596	0.232	83.30	0.070	-	100	
	645	121	645121	0.000	0.10	0.120	-	100	
24	645	8	6458	0.081	21.30	0.960	-	100	
	645	31	64531	0.066	17.20	0.330	35.00	1	
	645	40	64540	0.062	16.30	0.170	-	100	
	645	41	64541	0.016	4.20	0.170	-	100	
	645	61	64561	0.115	30.20	0.150	-	100	
	645	63	64563	0.021	5.60	0.140	25.00	1	
	645	96	64596	0.020	5.20	0.070	-	100	
25	645	6	6456	0.007	2.70	0.620	-	100	
	645	31	64531	0.134	48.80	0.330	35.00	1	
	645	61	64561	0.100	36.50	0.150	-	100	
	645	63	64563	0.033	12.00	0.140	25.00	1	
26	645	6	6456	0.002	3.70	0.620	-	100	
	645	31	64531	0.022	34.60	0.330	35.00	1	
	645	61	64561	0.025	39.80	0.150	-	100	
	645	63	64563	0.014	21.90	0.140	25.00	1	
27	645	31	64531	0.037	33.90	0.330	35.00	1	
	645	61	64561	0.040	36.70	0.150	-	100	
	645	121	645121	0.032	29.40	0.120	-	100	
28	645	61	64561	0.109	65.40	0.150	-	100	
	645	63	64563	0.031	18.60	0.140	25.00	1	
	645	121	645121	0.027	15.90	0.120	-	100	
29	645	61	64561	0.151	100.00	0.150	-	100	
30	645	31	64531	0.281	71.70	0.330	35.00	1	
	645	40	64540	0.111	28.30	0.170	-	100	
31	645	31	64531	0.497	100.00	0.330	35.00	1	
32	645	31	64531	0.360	81.60	0.330	35.00	1	
	645	61	64561	0.035	7.90	0.150	-	100	
	645	63	64563	0.046	10.40	0.140	25.00	1	
33	645	31	64531	0.015	8.40	0.330	35.00	1	
	645	61	64561	0.087	49.30	0.150	-	100	
	645	63	64563	0.068	38.70	0.140	25.00	1	
	645	121	645121	0.006	3.60	0.120	-	100	
34	645	8	6458	0.010	2.30	0.960	-	100	
	645	31	64531	0.297	65.00	0.330	35.00	1	
	645	93	64593	0.086	18.90	0.330	-	100	
	645	96	64596	0.063	13.80	0.070	-	100	
35	645	31	64531	0.388	94.70	0.330	35.00	1	
	645	93	64593	0.022	5.30	0.330	-	100	
37	645	8	6458	0.028	4.50	0.960	-	100	
	645	31	64531	0.601	95.50	0.330	35.00	1	
38	645	8	6458	0.002	2.80	0.960	-	100	
	645	31	64531	0.056	97.20	0.330	35.00	1	
39	645	8	6458	0.002	1.30	0.960	-	100	
	645	31	64531	0.151	98.70	0.330	35.00	1	
40	645	8	6458	0.005	3.10	0.960	-	100	
	645	31	64531	0.116	76.40	0.330	35.00	1	
	645	91	64591	0.031	20.50	0.930	-	100	

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
41	645	8	6458	0.055	15.70	0.960	-	100	
	645	31	64531	0.192	55.00	0.330	35.00	1	
	645	91	64591	0.103	29.40	0.930	-	100	
42	645	8	6458	0.054	17.10	0.960	-	100	
	645	31	64531	0.183	57.40	0.330	35.00	1	
	645	91	64591	0.081	25.50	0.930	-	100	
43	645	31	64531	0.044	31.30	0.330	35.00	1	
	645	91	64591	0.097	68.70	0.930	-	100	
44	645	8	6458	0.039	30.90	0.960	-	100	
	645	91	64591	0.087	69.10	0.930	-	100	
45	645	8	6458	0.013	8.00	0.960	-	100	
	645	91	64591	0.148	92.00	0.930	-	100	
46	645	8	6458	0.001	0.60	0.960	-	100	
	645	31	64531	0.151	86.30	0.330	35.00	1	
	645	91	64591	0.023	13.20	0.930	-	100	
47	645	8	6458	0.048	8.80	0.960	-	100	
	645	31	64531	0.500	91.20	0.330	35.00	1	
48	645	8	6458	0.080	5.10	0.960	-	100	
	645	31	64531	1.426	90.80	0.330	35.00	1	
	645	63	64563	0.064	4.10	0.140	25.00	1	
	645	91	64591	0.001	0.10	0.930	-	100	
49	645	8	6458	0.039	9.00	0.960	-	100	
	645	31	64531	0.139	32.00	0.330	35.00	1	
	645	91	64591	0.255	59.00	0.930	-	100	
50	645	91	64591	0.137	100.00	0.930	-	100	
51	645	31	64531	0.433	60.00	0.330	35.00	1	
	645	91	64591	0.288	40.00	0.930	-	100	
52	645	31	64531	0.598	100.00	0.330	35.00	1	
53	645	31	64531	0.437	62.40	0.330	35.00	1	
	645	91	64591	0.263	37.60	0.930	-	100	
54	645	8	6458	0.031	6.40	0.960	-	100	
	645	31	64531	0.332	67.90	0.330	35.00	1	
	645	91	64591	0.123	25.20	0.930	-	100	
	645	98	64598	0.003	0.50	0.370	-	100	
55	645	8	6458	0.003	0.80	0.960	-	100	
	645	31	64531	0.338	99.20	0.330	35.00	1	
56	645	8	6458	0.134	10.90	0.960	-	100	
	645	31	64531	1.085	88.50	0.330	35.00	1	
	645	98	64598	0.007	0.50	0.370	-	100	
57	645	91	64591	0.084	100.00	0.930	-	100	
58	645	8	6458	0.030	26.50	0.960	-	100	
	645	31	64531	0.002	1.40	0.330	35.00	1	
	645	40	64540	0.003	2.60	0.170	-	100	
	645	96	64596	0.066	58.70	0.070	-	100	
	645	121	645121	0.012	10.80	0.120	-	100	
59	645	8	6458	0.032	58.20	0.960	-	100	
	645	31	64531	0.001	0.90	0.330	35.00	1	
	645	96	64596	0.004	8.00	0.070	-	100	
	645	121	645121	0.018	32.90	0.120	-	100	
60	645	8	6458	0.176	96.40	0.960	-	100	
	645	31	64531	0.002	1.00	0.330	35.00	1	
	645	91	64591	0.000	0.20	0.930	-	100	
	645	121	645121	0.004	2.40	0.120	-	100	
61	645	8	6458	0.006	4.90	0.960	-	100	
	645	121	645121	0.110	95.10	0.120	-	100	
62	645	8	6458	0.059	48.00	0.960	-	100	
	645	91	64591	0.010	8.40	0.930	-	100	

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
62	645	121	645121	0.053	43.70	0.120	-	100	
63	645	8	6458	0.090	23.40	0.960	-	100	
	645	90	64590	0.018	4.60	0.390	-	100	
	645	91	64591	0.278	72.00	0.930	-	100	
64	645	3	6453	0.103	16.20	0.580	-	100	
	645	90	64590	0.208	32.70	0.390	-	100	
	645	91	64591	0.326	51.10	0.930	-	100	

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.300	0.404	0.482	0.585	0.663	0.741
	NOAA14	10 MIN	0.456	0.615	0.734	0.890	1.008	1.127
	NOAA14	15 MIN	0.566	0.762	0.910	1.104	1.250	1.397
	NOAA14	30 MIN	0.762	1.026	1.225	1.487	1.684	1.882
	NOAA14	1 HOUR	0.943	1.270	1.516	1.840	2.084	2.329
	NOAA14	2 HOUR	1.079	1.431	1.700	2.061	2.334	2.614
	NOAA14	3 HOUR	1.149	1.497	1.773	2.156	2.458	2.771
	NOAA14	6 HOUR	1.362	1.730	2.024	2.425	2.737	3.060
	NOAA14	12 HOUR	1.618	2.035	2.365	2.812	3.155	3.508
	NOAA14	24 HOUR	1.986	2.582	3.062	3.740	4.283	4.857

Project

Reference	REATA WITH DIVERT
Title	Reata Wash Flood Control Improvement Study
Location	Scottsdale
Agency	City of Scottsdale

Project Defaults

Model	HEC1
Soils Agency	FCDMC
Land Use Agency	FCDMC
Rainfall	NOAA14
Roads Agency	MCDOT
Inlets Agency	MCDOT

HEC-1 Defaults

Unit Hydrograph	S-Graph
Loss Method	Green-Ampt
Duration	24 Hour
Tabulation Interval	3
No. Ordinates	2000
Output	5

Comments

Appendix B HEC-1 Models

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   23FEB16  TIME  08:47:18   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID        City of Scottsdale
  2           ID        REATA - Reata Wash Flood Control Improvement Study
  3           ID        100 YEAR
  4           ID        24 Hour Storm
  5           ID        Unit Hydrograph: S-Graph
  6           ID        Storm: Multiple
  7           ID        02/23/2016
  8           ID   City of Scottsdale
  9           ID   REATA - Reata Wash Flood Control Improvement Study
 10           ID   100 YEAR
 11           ID   24 Hour Storm
 12           ID   Unit Hydrograph: S-Graph
 13           ID   Storm: Multiple
 14           ID   03/10/2015
 15           ID   Flood Control District of Maricopa County
 16           ID   REATA -
 17           ID   100 YEAR
 18           ID   24 Hour Storm
 19           ID   Unit Hydrograph: S-Graph
 20           ID   Storm: Single
 21           ID   02/13/2015
 22           ID   * CROSSROADS EAST HEC-1 MODEL (BASINS 1-33), OUTFALL REATA PASS
 23           ID
 24           ID   * FILE NAME: 100-24NORTH.IH1    LAV (01/23/12)
 25           ID
 26           ID   * 100-Year, 24-Hour Storm, S-Graph, NOAA 14 Rainfall.
 27           ID   * HC CARDS INCLUDE TOTAL CONTRIBUTING AREA TO EACH CONCENTRATION POINT
 28           ID   * EXISTING RETENTION PROVIDED BY ECHO RIDGE SUBDIVISION INCLUDED IN MODEL
 29           ID   AND TAKEN FROM TROON NORTH PARK DRAINAGE REPORT.
 30           ID   * FUTURE CONDITIONS DETENTION BASIN FOR TROON NORTH PARK. DRAINAGE
 31           ID   REPORT PREPARED BY ARGUS CONSULTING (APRIL 23, 2010). NEW PARK BASIN
 32           ID   AND EXISTING FCD BASIN MODELED TOGETHER AS STAGE-STORAGE-DISCHARGE.
 33           ID   * EXISTING SEDIMENT BASIN AT HAPPY VALLEY ROAD AND ALAMEDA ROAD MODELED
 34           ID   AS STAGE STORAGE DISCHARGE.
 35           ID
              *DIAGRAM
 36           IT       3  1JAN99       0    2000
 37           IO       5
 38           IN      15
              *
 39           JD   4.857  0.0001
 40           PC   0.000   0.002   0.005   0.008   0.011   0.014   0.017   0.020   0.023   0.026
 41           PC   0.029   0.032   0.035   0.038   0.041   0.044   0.048   0.052   0.056   0.060
 42           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 43           PC   0.110   0.115   0.120   0.126   0.133   0.140   0.147   0.155   0.163   0.172
 44           PC   0.181   0.191   0.203   0.218   0.236   0.257   0.283   0.387   0.663   0.707
 45           PC   0.735   0.758   0.776   0.791   0.804   0.815   0.825   0.834   0.842   0.849
 46           PC   0.856   0.863   0.869   0.875   0.881   0.887   0.893   0.898   0.903   0.908
 47           PC   0.913   0.918   0.922   0.926   0.930   0.934   0.938   0.942   0.946   0.950
 48           PC   0.953   0.956   0.959   0.962   0.965   0.968   0.971   0.974   0.977   0.980
 49           PC   0.983   0.986   0.989   0.992   0.995   0.998   1.000
 50           JD   4.833     1.0
 51           JD   4.736     5.0
 52           JD   4.614    10.0
 53           JD   4.459    20.0
              *
              *
              *
              *  24-Hour Storm (S-Graph)
              *
              *
              *
              *
```

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1                                        HEC-1 INPUT                                        PAGE  2

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            54      KK      01   BASIN
            55      BA   0.159
            56      LG    0.29    0.25    6.00    0.19      10
            57      UI       0      38     132     251     360     321     215     174     136      99
            58      UI      82      57      45      35      28      19      19       8       7       7
            59      UI       7       7       0       0       0       0       0       0       0       0
            60      UI       0       0       0       0       0       0       0       0       0       0
            61      UI       0       0       0       0       0       0       0       0       0       0
                    *
                    *
                    *
                    *

            62      KK    RET1 STORAGE
            63      KM   LOCAL RETENTION IN SUBBASIN SUB1. (LP002+LPC001)
            64      KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
            65      KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
            66      KO
            67      RS       1    STOR
            68      SV            0.01    0.03    0.12    0.25    0.25
            69      SQ            5.00   15.00   30.00   90.00 1000.00
            70      SE
                    *
                    *
                    *
                    *

            71      KK     RT1   ROUTE
            72      KM   ROUTE FLOW FROM SUB1 TO CP2
            73      RS       1    FLOW
            74      RC   0.055   0.040   0.055    1133  0.0228    0.00
            75      RX    0.00   24.00   37.00  134.00  193.00  240.00  276.00  303.00
            76      RY  2670.0 2668.00 2666.00 2664.00 2664.00 2668.00 2672.00 2676.00
                    *
                    *
                    *
                    *

            77      KK      02   BASIN
            78      BA   0.140
            79      LG    0.26    0.25    6.00    0.21      26
            80      UI       0      78     292     484     305     218     142     100      62      43
            81      UI      28      20      10      10      10       0       0       0       0       0
            82      UI       0       0       0       0       0       0       0       0       0       0
            83      UI       0       0       0       0       0       0       0       0       0       0
            84      UI       0       0       0       0       0       0       0       0       0       0
                    *
                    *
                    *
                    *
1                                        HEC-1 INPUT                                        PAGE  3

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            85      KK    RET2 STORAGE
            86      KM   LOCAL RETENTION IN SUBBASIN SUB2. (LPC007, LPC005, LPC006, LPC009
            87      KM   LPC012, LPC13I, LPC013 & LPC014)
            88      KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
            89      KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
            90      KO
            91      RS       1    STOR
            92      SV            0.02    0.12    0.42    1.14    2.53    2.97    2.97
            93      SQ            6.00   18.00   30.00   38.00   45.00   51.00 1000.00
            94      SE  1000.0 1001.00 1002.00 1003.00 1004.00 1005.00 1006.00 1006.10
                    *
                    *
                    *
                    *

            95      KK     CP2 COMBINE
            96      KM   CP LOCATED ALONG DYNAMITE ROAD, 440 FEET WEST OF ALMA SCHOOL ROAD.
            97      KM   Combines RT1 and SUB2
            98      HC       2
                    *
                    *
                    *
                    *

            99      KK     RT2   ROUTE
           100      KM   ROUTE FLOW FROM CP2 TO CP5
           101      RS       1    FLOW
           102      RC   0.045   0.035   0.045    2221  0.0218    0.00
           103      RX    0.00   39.00   53.00   61.00   71.00   74.00   84.00  106.00
           104      RY  2634.0 2633.00 2632.00 2629.80 2629.80 2632.00 2636.00 2636.40
                    *
                    *
                    *
                    *

           105      KK      05   BASIN
           106      BA   0.145
           107      LG    0.19    0.23    6.16    0.22      41
           108      UI       0     107     387     531     305     201     129      78      52      31
           109      UI      19      11      11       0       0       0       0       0       0       0
           110      UI       0       0       0       0       0       0       0       0       0       0
```

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111         UI      0      0      0      0      0      0      0      0      0      0
112         UI      0      0      0      0      0      0      0      0      0      0
            *
            *
            *
            *

113         KK    RET5 STORAGE
114         KM   LOCAL RETENTION IN SUBBASIN SUB5. (LP016)
115         KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
116         KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
117         KO
118         RS       1    STOR
1                                      HEC-1 INPUT                                      PAGE  4

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

119         SV            0.44    1.48    1.48
120         SQ                  185.00 1000.00
121         SE  1000.0 1001.00 1002.00 1002.10
            *
            *
            *
            *

122         KK     CP5 COMBINE
123         KM   CP LOCATED AT CULVERT UNDER ALMA SCHOOL ROAD, 1400 FEET NORTHEAST OF
124         KM   PINNACLE VISTA DRIVE. DISCHARGES TO TROON NORTH PARK.
125         KM   Combines RT2 and SUB5
126         HC       2
            *
            *
            *
            *

127         KK     RT5   ROUTE
128         KM   ROUTE FLOW FROM CP5 TO CP6
129         RS       1    FLOW
130         RC   0.045   0.035   0.045    1481  0.0187    0.00
131         RX    0.00   10.00   20.00   28.00   52.00   64.00   88.00   96.00
132         RY  2616.0 2614.00 2612.00 2610.00 2610.00 2612.00 2612.00 2614.00
            *
            *
            *
            *

133         KK      04   BASIN
134         KM   CP LOCATED ALONG DYNAMITE ROAD, 410 FEET EAST OF 114TH STREET.
135         BA   0.124
136         LG    0.29    0.25    6.00    0.20      13
137         UI       0      94     339     454     260     169     109      65      43      26
138         UI      15      10      10       0       0       0       0       0       0       0
139         UI       0       0       0       0       0       0       0       0       0       0
140         UI       0       0       0       0       0       0       0       0       0       0
141         UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *
            *

142         KK    RET4 STORAGE
143         KM   LOCAL RETENTION IN SUBBASIN SUB4. (LP026, LP028, LP030 & LPC029)
144         KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
145         KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
146         KO
147         RS       1    STOR
148         SV            0.21    0.52    0.93    1.25    1.39    1.51    1.51
149         SQ           13.00   20.00   26.00   31.00   35.00   38.00 1000.00
150         SE  1000.0 1001.00 1002.00 1003.00 1004.00 1005.00 1006.00 1006.10
            *
            *
            *
            *
1                                      HEC-1 INPUT                                      PAGE  5

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

151         KK     RT4   ROUTE
152         KM   ROUTE FLOW FROM SUB4 TO CP7
153         RS       2    FLOW
154         RC   0.055   0.040   0.055    2467  0.0235    0.00
155         RX    0.00    2.00   16.00   28.00   65.00   80.00   99.00  114.00
156         RY  2672.0 2670.00 2668.00 2666.00 2666.00 2668.00 2668.50 2669.00
            *
            *
            *
            *

157         KK      09   BASIN
158         BA   0.114
159         LG    0.30    0.25    6.00    0.19       6
160         UI       0      51     193     340     274     185     134      90      64      44
161         UI      31      20      16       7       7       7       7       0       0       0
162         UI       0       0       0       0       0       0       0       0       0       0
163         UI       0       0       0       0       0       0       0       0       0       0
164         UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *
            *
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165          KK      07   BASIN
166          BA   0.124
167          LG    0.26    0.25    6.00    0.21      32
168          UI       0      55     210     370     298     202     146      98      70      47
169          UI      33      22      18       8       8       8       8       0       0       0
170          UI       0       0       0       0       0       0       0       0       0       0
171          UI       0       0       0       0       0       0       0       0       0       0
172          UI       0       0       0       0       0       0       0       0       0       0
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             *

173          KK    RET7 STORAGE
174          KM   LOCAL RETENTION IN SUBBASIN SUB7. (LPC032)
175          KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
176          KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
177          KO
178          RS       1    STOR
179          SV                 0.04    0.14    0.34    0.34
180          SQ           11.00   22.00   46.00   63.00 1000.00
181          SE  1000.0 1001.00 1002.00 1003.00 1004.00 1004.10
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             *
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1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

182          KK     CP7 COMBINE
183          KM   DISCHARGES COMBINED FLOW INTO TROON NORTH PARK.
184          KM   Combines RT4, SUB9 & SUB7
185          HC       3
             *
             *
             *
             *

186          KK     RT7   ROUTE
187          KM   ROUTE FLOW FROM CP7 TO CP6
188          RS       1    FLOW
189          RC   0.045   0.030   0.045    2096  0.0191    0.00
190          RX    0.00    3.00    5.00    8.00   27.00   30.00   32.00   34.00
191          RY  2630.0 2628.00 2626.00 2624.00 2624.00 2626.00 2628.00 2630.00
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192          KK      03   BASIN
193          KM   CP LOCATED ALONG DYNAMITE ROAD, 1600 FEET EAST OF ALMA SCHOOL ROAD.
194          BA   0.149
195          LG    0.27    0.25    6.00    0.21      19
196          UI       0     123     440     544     309     194     124      74      45      31
197          UI      12      12      12       0       0       0       0       0       0       0
198          UI       0       0       0       0       0       0       0       0       0       0
199          UI       0       0       0       0       0       0       0       0       0       0
200          UI       0       0       0       0       0       0       0       0       0       0
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             *

201          KK    RET3 STORAGE
202          KM   LOCAL RETENTION IN SUBBASIN SUB3. (LP022 & LP023)
203          KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
204          KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
205          KO
206          RS       1    STOR
207          SV            0.02    0.18    0.59    1.23    1.27    1.36    1.36
208          SQ           15.00   48.00   80.00   97.00  113.00  127.00 1000.00
209          SE  1000.0 1001.00 1002.00 1003.00 1004.00 1005.00 1006.00 1006.10
             *
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             *

210          KK     RT3   ROUTE
211          KM   ROUTE FLOW FROM SUB3 TO CP6
212          RS       2    FLOW
213          RC   0.050   0.035   0.050    3622  0.0228    0.00
214          RX    0.00   22.00   94.00   97.00  104.00  110.00  124.00  136.00
215          RY  2642.0 2640.00 2638.00 2636.00 2636.00 2638.00 2640.00 2642.00
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1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

216          KK    RET6 STORAGE
217          KM   LOCAL RETENTION IN SUBBASIN SUB6. (LPC024)
218          KM      SV,SE & SQ DERIVED FROM INFORMATION PROVIDED WITHIN TROON NORTH PARK
219          KM   DRAINAGE REPORT PREPARED BY ARGUS CONSULTING (4/23/10).
220          KO
221          RS       1    STOR
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          SV           0.22    0.67    1.35    2.28    2.28
          SQ                                56.00  230.00 1000.00
          SE  1000.0 1001.00 1002.00 1003.00 1004.00 1004.10
              *
              *
              *
              *

          KK      06   BASIN
          BA   0.180
          LG    0.22    0.24    6.16    0.21      33
          UI       0      85     324     573     413     289     203     140      94      67
          UI      45      29      21      12      12      12       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
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              *
              *

          KK     CP6 COMBINE
          KM   Combines RT5, RT7, RT3 & SUB6
          HC       4
              *
              *
              *
              *
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              *

          KK     RT6   ROUTE
          KM   ROUTE FLOW FROM CP6 TO CP10
          RS       1    FLOW
          RC   0.050   0.035   0.050    3706  0.0207    0.00
          RX    0.00   19.00   82.00  107.00  117.00  144.00  160.00  181.00
          RY  2560.0 2558.00 2558.00 2556.00 2556.00 2558.00 2560.00 2562.00
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              *
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              *

          KK      11   BASIN
          BA   0.174
          LG    0.30    0.25    6.00    0.19       5
          UI       0      81     307     543     405     281     198     136      93      66
          UI      44      29      22      11      11      11       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
1                                      HEC-1 INPUT                                        PAGE  8

     LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
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          KK    RT11   ROUTE
          KM   ROUTE FLOW FROM SUB11 TO CP10
          RS       2    FLOW
          RC   0.045   0.030   0.045    5219  0.0245    0.00
          RX    0.00   19.00   82.00  107.00  117.00  144.00  160.00  181.00
          RY  2560.0 2558.00 2558.00 2556.00 2556.00 2558.00 2560.00 2562.00
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          KK      08   BASIN
          KM   CP LOCATED ALONG ALMA SCHOOL ROAD, 450 FEET NORTHEAST OF
          KM   PINNACLE VISTA DRIVE.
          BA   0.134
          LG    0.23    0.27    6.00    0.21      26
          UI       0      65     246     434     303     214     149     104      68      48
          UI      33      22      14       9       9       9       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
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          KK     RT8   ROUTE
          KM   ROUTE FLOW FROM SUB8 TO CP10
          RS       1    FLOW
          RC   0.050   0.035   0.050    3543  0.0233    0.00
          RX    0.00   18.00   28.00   48.00   57.00   66.00   83.00   97.00
          RY  2598.5 2598.00 2597.00 2596.00 2596.00 2598.00 2600.00 2602.00
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              *
              *

          KK      10   BASIN
          BA   0.462
          LG    0.25    0.26    5.85    0.22      26
          UI       0     123     489     851    1246     796     617     480     343     272
          UI     192     143     108      82      59      48      23      23      23      23
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          277         UI      0      0      0      0      0      0      0      0      0      0
          278         UI      0      0      0      0      0      0      0      0      0      0
          279         UI      0      0      0      0      0      0      0      0      0      0
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1                                          HEC-1 INPUT                                          PAGE  9

         LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          280         KK    CP10 COMBINE
          281         KM   CP LOCATED ALONG JOMAX ROAD 670 FEET EAST OF ALMA SCHOOL ROAD.
          282         KM   Combines RT6, RT8, RT11 & SUB10
          283         HC       4
                      *
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                      *

          284         KK    RT10   ROUTE
          285         KM   ROUTE FLOW FROM CP10 TO CP13
          286         RS       1    FLOW
          287         RC   0.045   0.030   0.045    2556  0.0248    0.00
          288         RX    0.00   13.00   28.00   48.00   57.00   66.00   83.00   97.00
          289         RY  2490.0 2488.00 2486.00 2484.00 2484.00 2486.00 2488.00 2490.00
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          290         KK      14   BASIN
          291         BA   0.154
          292         LG    0.26    0.29    5.85    0.20      15
          293         UI       0      61     231     396     407     254     190     130      97      65
          294         UI      47      34      23      17       9       9       9       0       0       0
          295         UI       0       0       0       0       0       0       0       0       0       0
          296         UI       0       0       0       0       0       0       0       0       0       0
          297         UI       0       0       0       0       0       0       0       0       0       0
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          298         KK      12   BASIN
          299         BA   0.303
          300         LG    0.27    0.26    6.00    0.21      16
          301         UI       0      72     251     477     685     612     411     332     259     189
          302         UI     157     109      85      66      53      35      35      15      14      14
          303         UI      14      14       0       0       0       0       0       0       0       0
          304         UI       0       0       0       0       0       0       0       0       0       0
          305         UI       0       0       0       0       0       0       0       0       0       0
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          306         KK    CP12 COMBINE
          307         HC       2
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1                                          HEC-1 INPUT                                          PAGE 10

         LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          308         KK   RT12A   ROUTE
          309         KM   ROUTE FLOW FROM CP12 TO CP13
          310         RS       1    FLOW
          311         RC   0.050   0.035   0.050    2242  0.0395    0.00
          312         RX    0.00   10.00   19.00   37.00   62.00   69.00   83.00   97.00
          313         RY  2538.0 2536.00 2534.00 2530.00 2530.00 2532.00 2534.00 2536.00
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          314         KK   RT12B   ROUTE
          315         KM   ROUTE FLOW FROM CP12 TO CP13
          316         RS       1    FLOW
          317         RC   0.045   0.030   0.045    2457  0.0241    0.00
          318         RX    0.00   13.00   28.00   48.00   57.00   66.00   83.00   97.00
          319         RY  2490.0 2488.00 2486.00 2484.00 2484.00 2486.00 2488.00 2490.00
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          320         KK      13   BASIN
          321         BA   0.259
          322         LG    0.23    0.27    4.96    0.35      17
          323         UI       0      59     192     377     523     561     354     289     231     171
          324         UI     138     108      77      65      45      37      29      25      11      11
          325         UI      11      11      11       0       0       0       0       0       0       0
          326         UI       0       0       0       0       0       0       0       0       0       0
          327         UI       0       0       0       0       0       0       0       0       0       0
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      328       KK    CP13 COMBINE
      329       KM   CP LOCATED EAST OF ALMA SCHOOL ROAD IN NATURAL WASH ADJACENT TO
      330       KM   GOLF COURSE.
      331       KM   Combines RT10, RT12 & SUB13
      332       HC       3
                *
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      333       KK    RT13   ROUTE
      334       KM   ROUTE FLOW FROM CP13 TO CP16
      335       RS       1    FLOW
      336       RC   0.045   0.030   0.045    3505  0.0273    0.00
      337       RX    0.00    4.00    9.00   52.00  108.00  116.00  129.00  175.00
      338       RY  2440.0 2438.00 2436.00 2434.00 2434.00 2436.00 2438.00 2440.00
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1                                        HEC-1 INPUT                                        PAGE 11

     LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

      339       KK      16   BASIN
      340       BA   0.521
      341       LG    0.23    0.30    6.00    0.20      15
      342       UI       0     109     302     630     850    1172     737     595     493     397
      343       UI     297     250     197     144     121      91      78      53      53      32
      344       UI      21      21      21      21      21       0       0       0       0       0
      345       UI       0       0       0       0       0       0       0       0       0       0
      346       UI       0       0       0       0       0       0       0       0       0       0
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      347       KK    CP16 COMBINE
      348       KM   CP LOCATED AT HAPPY VALLEY ROAD, 650 FEET EAST OF ALMA SCHOOL ROAD.
      349       KM   Combines RT13 & SUB16
      350       HC       2
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                *
                *

      351       KK    RT16   ROUTE
      352       KM   ROUTE FLOW FROM CP16 TO CP22
      353       RS       3    FLOW
      354       RC   0.050   0.035   0.050    6229  0.0295    0.00
      355       RX    0.00   53.00  192.00  205.00  214.00  229.00  353.00  491.00
      356       RY  2260.0 2258.00 2256.00 2254.00 2254.00 2256.00 2258.00 2260.00
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      357       KK      29   BASIN
      358       KM   CP LOCATED ALONG ALAMEDA ROAD AT 121ST PLACE.
      359       BA   0.151
      360       LG    0.30    0.26    6.00    0.18       5
      361       UI       0      75     284     497     337     241     166     116      74      52
      362       UI      36      25      14      10      10      10       0       0       0       0
      363       UI       0       0       0       0       0       0       0       0       0       0
      364       UI       0       0       0       0       0       0       0       0       0       0
      365       UI       0       0       0       0       0       0       0       0       0       0
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      366       KK    RT29   ROUTE
      367       KM   ROUTE FLOW FROM SUB29 TO CP21
      368       RS       1    FLOW
      369       RC   0.050   0.035   0.050    1372  0.0345    0.00
      370       RX    0.00    2.00   41.00   48.00   56.00   58.00   75.00  101.00
      371       RY  2688.0 2686.00 2684.00 2683.20 2683.20 2684.00 2686.00 2690.00
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1                                        HEC-1 INPUT                                        PAGE 12

     LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

      372       KK      21   BASIN
      373       BA   0.129
      374       LG    0.30    0.25    6.00    0.19       6
      375       UI       0     116     414     466     264     159      99      59      35      22
      376       UI      11      11       0       0       0       0       0       0       0       0
      377       UI       0       0       0       0       0       0       0       0       0       0
      378       UI       0       0       0       0       0       0       0       0       0       0
      379       UI       0       0       0       0       0       0       0       0       0       0
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          380   KK    CP21 COMBINE
          381   KM   CP LOCATED ADJACENT TO PARKVIEW LANE, 650 FEET NORTH OF ALAMEDA ROAD.
          382   KM   Combines RT29 & SUB21
          383   HC       2
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                *
                *

          384   KK    RT21   ROUTE
          385   KM   ROUTE FLOW FROM SUB21 TO CP20
          386   RS       1    FLOW
          387   RC  0.045   0.030   0.045    2993  0.0349    0.00
          388   RX   0.00    5.00   67.00   74.00   90.00   96.00  162.00  170.00
          389   RY 2618.4 2618.00 2616.00 2614.00 2614.00 2616.00 2618.00 2620.00
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          390   KK      15   BASIN
          391   KM   CONCENTRATES IN NATURAL WASH ADJACENT TO HAPPY VALLEY ROAD, 2400 FEET
          392   KM   NORTHEAST OF ALAMEDA ROAD.
          393   BA   0.700
          394   LG   0.29    0.26    6.00    0.19       9
          395   UI      0     172     632    1159    1722    1312     946     758     575     424
          396   UI    342     240     193     138     107      84      65      33      33      33
          397   UI     33      33       0       0       0       0       0       0       0       0
          398   UI      0       0       0       0       0       0       0       0       0       0
          399   UI      0       0       0       0       0       0       0       0       0       0
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          400   KK    RT15   ROUTE
          401   KM   ROUTE FLOW FROM SUB15 TO CP20
          402   RS       1    FLOW
          403   RC   0.045   0.030   0.045    2462  0.0285    0.00
          404   RX    0.00    4.00    8.00   12.00   57.00   65.00   69.00  117.00
          405   RY  2600.0 2598.00 2596.00 2594.00 2594.00 2596.00 2598.00 2600.00
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1                                        HEC-1 INPUT                                        PAGE 13

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          406   KK      18   BASIN
          407   KM   CONCENTRATES AT HAPPY VALLEY ROAD, ACROSS FROM THE ALAMEDA BASIN.
          408   BA   0.141
          409   LG   0.25    0.30    6.00    0.19      20
          410   UI      0      51     196     333     385     233     179     125      94      63
          411   UI     48      33      23      20       8       8       8       8       0       0
          412   UI      0       0       0       0       0       0       0       0       0       0
          413   UI      0       0       0       0       0       0       0       0       0       0
          414   UI      0       0       0       0       0       0       0       0       0       0
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          415   KK      20   BASIN
          416   BA   0.264
          417   LG   0.27    0.29    5.46    0.23      16
          418   UI      0     111     420     729     672     433     318     215     160     103
          419   UI     76      53      41      21      16      16      16       0       0       0
          420   UI      0       0       0       0       0       0       0       0       0       0
          421   UI      0       0       0       0       0       0       0       0       0       0
          422   UI      0       0       0       0       0       0       0       0       0       0
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          423   KK    CP20 COMBINE
          424   KM   CP AT ALAMEDA BASIN, HAPPY VALLEY ROAD AND ALAMEDA ROAD.
          425   KM   Combines RT21, RT15, SUB18 & SUB20
          426   HC       4
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                *

          427   KK   DET20 STORAGE
          428   KM   EXISTING DETENTION BASIN AT ALAMEDA & HAPPY VALLEY ROAD (2-10'X3' CBCs)
          429   KM   VOLUME DETERMINED FROM CONTOURS. DISCHARGE DETERMINED FROM
          430   KM   CULVERT AND WEIR CALCULATIONS. REFERENCE - EEC REPORT (MARCH 1998)
          431   KO
          432   RS       1    STOR
          433   SV                0.64    3.20    7.14    7.14
          434   SQ          220.00  443.00  664.00  886.0010000.00
          435   SE  2552.0 2554.00 2556.00 2558.00 2560.00 2560.10
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1                                        HEC-1 INPUT                                        PAGE 14

         LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          436      KK      33   BASIN
          437      BA   0.176
          438      LG    0.25    0.33    5.85    0.17       2
          439      UI       0      79     297     526     424     286     207     139      99      67
          440      UI      47      31      25      11      11      11      11       0       0       0
          441      UI       0       0       0       0       0       0       0       0       0       0
          442      UI       0       0       0       0       0       0       0       0       0       0
          443      UI       0       0       0       0       0       0       0       0       0       0
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          444      KK    RT33   ROUTE
          445      KM   ROUTE FLOW FROM SUB33 TO CP28
          446      RS       2    FLOW
          447      RC   0.050   0.035   0.050    3766  0.0472    0.00
          448      RX    0.00   33.00   72.00  109.00  130.00  260.00  290.00  313.00
          449      RY  2760.0 2759.00 2758.00 2756.00 2756.00 2758.00 2758.00 2760.00
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          450      KK      27   BASIN
          451      BA   0.108
          452      LG    0.28    0.28    5.58    0.23       9
          453      UI       0      44     165     284     282     178     133      90      67      44
          454      UI      32      23      16      11       6       6       6       0       0       0
          455      UI       0       0       0       0       0       0       0       0       0       0
          456      UI       0       0       0       0       0       0       0       0       0       0
          457      UI       0       0       0       0       0       0       0       0       0       0
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          458      KK      28   BASIN
          459      BA   0.167
          460      LG    0.30    0.23    6.16    0.18       8
          461      UI       0      56     215     366     462     278     215     156     114      84
          462      UI      57      43      31      23      16       9       9       9       9       0
          463      UI       0       0       0       0       0       0       0       0       0       0
          464      UI       0       0       0       0       0       0       0       0       0       0
          465      UI       0       0       0       0       0       0       0       0       0       0
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1                                        HEC-1 INPUT                                        PAGE 15

         LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          466      KK    CP28 COMBINE
          467      KM   CP IN NATURAL WASH ADJACENT TO ALAMEDA ROAD, 2300 FEET EAST OF HAPPY
          468      KM   VALLEY ROAD.
          469      KM   Combines RT33, SUB27 & SUB28
          470      HC       3
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          471      KK    RT28   ROUTE
          472      KM   ROUTE FLOW FROM CP28 TO CP26
          473      RS       1    FLOW
          474      RC   0.045   0.030   0.045    2234  0.0368    0.00
          475      RX    0.00   11.00   27.00   49.00   81.00   98.00  188.00  197.00
          476      RY  2580.0 2578.00 2576.00 2574.00 2574.00 2576.00 2576.00 2578.00
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          477      KK      26   BASIN
          478      BA   0.063
          479      LG    0.27    0.32    5.24    0.24      12
          480      UI       0      38     140     223     136      96      61      42      27      18
          481      UI      11       7       4       4       4       0       0       0       0       0
          482      UI       0       0       0       0       0       0       0       0       0       0
          483      UI       0       0       0       0       0       0       0       0       0       0
          484      UI       0       0       0       0       0       0       0       0       0       0
                   *
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          485      KK    CP26 COMBINE
          486      KM   CP LOCATED AT HAPPY VALLEY ROAD AND ALAMEDA ROAD, AT OUTLET OF ALAMEDA
          487      KM   BASIN.
          488      KM   Combines DET20, RT28 & SUB26
          489      HC       3
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                *
490             KK    RT26   ROUTE
491             KM   ROUTE FLOW FROM CP26 TO CP19
492             RS       1    FLOW
493             RC   0.050   0.035   0.050    1139  0.0308    0.00
494             RX    0.00   25.00   40.00   54.00   90.00  102.00  130.00  165.00
495             RY  2545.0 2544.00 2542.00 2540.00 2540.00 2542.00 2544.00 2550.00
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1                                       HEC-1 INPUT                                     PAGE 16

           LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

496             KK      19   BASIN
497             BA   0.151
498             LG    0.25    0.30    5.85    0.20      19
499             UI       0      98     359     544     322     224     142      93      61      39
500             UI      28      12      11      11       0       0       0       0       0       0
501             UI       0       0       0       0       0       0       0       0       0       0
502             UI       0       0       0       0       0       0       0       0       0       0
503             UI       0       0       0       0       0       0       0       0       0       0
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504             KK    CP19 COMBINE
505             KM   CP LOCATED ALONG HAPPY VALLEY ROAD, 1100 FEET WEST OF ALAMEDA ROAD.
506             KM   Combines RT26 & SUB19
507             HC       2
                *
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                *

508             KK    RT19   ROUTE
509             KM   ROUTE FLOW FROM CP19 TO CP25
510             RS       1    FLOW
511             RC   0.055   0.035   0.055    3337  0.0347    0.00
512             RX    0.00   13.00   31.00   46.00   82.00  100.00  123.00  155.00
513             RY  2508.0 2504.00 2498.00 2496.00 2496.00 2500.00 2504.00 2508.00
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                *
                *

514             KK      32   BASIN
515             BA   0.441
516             LG    0.24    0.33    4.65    0.30       6
517             UI       0     108     390     721    1067     839     596     479     367     267
518             UI     219     153     122      89      70      53      44      21      21      21
519             UI      21      21       0       0       0       0       0       0       0       0
520             UI       0       0       0       0       0       0       0       0       0       0
521             UI       0       0       0       0       0       0       0       0       0       0
                *
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                *

522             KK    RT32   ROUTE
523             KM   ROUTE FLOW FROM SUB32 TO CP31
524             RS       1    FLOW
525             RC   0.055   0.040   0.055    5296  0.0517    0.00
526             RX    0.00   25.00   69.00   77.00   89.00   94.00  112.00  127.00
527             RY  2460.0 2444.00 2442.00 2438.00 2438.00 2440.00 2450.00 2460.00
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                *
1                                       HEC-1 INPUT                                     PAGE 17

           LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

528             KK      31   BASIN
529             BA   0.496
530             LG    0.26    0.32    4.33    0.37       6
531             UI       0     101     265     561     762    1091     726     569     475     389
532             UI     298     241     201     147     119      99      77      58      49      47
533             UI      19      19      19      19      19      19       0       0       0       0
534             UI       0       0       0       0       0       0       0       0       0       0
535             UI       0       0       0       0       0       0       0       0       0       0
                *
                *
                *
                *

536             KK    CP31 COMBINE
537             KM   Combines RT32 & SUB31
538             HC       2
                *
                *
                *
                *

539             KK    RT31   ROUTE
540             KM   ROUTE FLOW FROM CP31 TO CP25
```

```
541         RS      1    FLOW
542         RC   0.055   0.035   0.055     599  0.0256    0.00
543         RX    0.00   12.00   22.00   45.00  110.00  147.00  206.00  252.00
544         RY  2420.0 2414.00 2410.00 2408.00 2408.00 2410.00 2414.00 2420.00
            *
            *
            *
            *

545         KK      25   BASIN
546         BA   0.274
547         LG    0.25    0.31    5.05    0.27      14
548         UI       0      57     159     331     447     617     388     313     259     209
549         UI     156     131     104      76      64      48      41      28      28      17
550         UI      11      11      11      11      11       0       0       0       0       0
551         UI       0       0       0       0       0       0       0       0       0       0
552         UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *
            *

553         KK    CP25 COMBINE
554         KM   CP IN NATURAL WASH AT BASE OF MOUNTAINS, LOCATED 1230 FEET WEST OF 112TH
555         KM   PLACE AND ABOUT 1600 FEET SOUTH OF HAPPY VALLEY ROAD.
556         KM   Combines RT19, RT31 & SUB25
557         HC       3
            *
            *
            *
            *

1                                      HEC-1 INPUT                                      PAGE 18

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

558         KK    RT25   ROUTE
559         KM   ROUTE FLOW FROM CP25 TO CP24
560         RS       2    FLOW
561         RC   0.050   0.030   0.050    6726  0.0267    0.00
562         RX    0.00   74.00  105.00  368.00  415.00  422.00  428.00  520.00
563         RY  2330.0 2308.00 2306.00 2304.00 2304.00 2306.00 2308.00 2340.00
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            *
            *

564         KK      24   BASIN
565         BA   0.380
566         LG    0.27    0.29    4.87    0.32      15
567         UI       0      70     158     351     494     654     691     443     375     316
568         UI     263     203     168     145     108      87      77      56      52      34
569         UI      34      29      13      13      13      13      13      13      13       0
570         UI       0       0       0       0       0       0       0       0       0       0
571         UI       0       0       0       0       0       0       0       0       0       0
            *
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572         KK    CP24 COMBINE
573         KM   CP LOCATED AT CONFLUENCE OF MULTIPLE WASHES APPROXIMATELY 1500 FEET
574         KM   UPSTREAM OF PINNACLE PEAK ROAD BRIDGE (REATA PASS WASH).
575         KM   Combines RT25 & SUB24
576         HC       2
            *
            *
            *
            *

577         KK      17   BASIN
578         KM   CONCENTRATES FLOWS ALONG HAPPY VALLEY ROAD, BETWEEN WINDY WALK DRIVE AND
579         KM   WHISPERING RIDGE WAY.
580         BA   0.324
581         LG    0.25    0.28    6.34    0.16      21
582         UI       0     259     933    1186     675     428     276     163     102      67
583         UI      31      26      26       0       0       0       0       0       0       0
584         UI       0       0       0       0       0       0       0       0       0       0
585         UI       0       0       0       0       0       0       0       0       0       0
586         UI       0       0       0       0       0       0       0       0       0       0
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            *
            *
            *

1                                      HEC-1 INPUT                                      PAGE 19

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

587         KK    RT17   ROUTE
588         KM   ROUTE FLOW FROM SUB17 TO CP23
589         RS       2    FLOW
590         RC   0.050   0.040   0.050    5785  0.0365    0.00
591         RX    0.00    4.00   22.00   43.00   50.00   64.00   80.00   93.00
592         RY  2350.0 2346.00 2342.00 2339.00 2339.00 2342.00 2346.00 2350.00
            *
            *
            *
            *

593         KK      23   BASIN
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          BA   0.279
          LG    0.24    0.16    7.27    0.12      16
          UI       0      66     222     429     607     579     379     308     242     177
          UI     146     106      80      64      50      33      32      18      13      13
          UI      13      13      13       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          *
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          *
          *

          KK    CP23 COMBINE
          KM   CP LOCATED AT CONFLUENCE OF MULTIPLE WASHES APPROXIMATELY 1500 FEET
          KM   UPSTREAM OF PINNACLE PEAK ROAD BRIDGE (REATA PASS WASH).
          KM   Combines RT17 & SUB23
          HC       2
          *
          *
          *
          *

          KK   CP24A COMBINE
          KM   Combines CP23 & CP24
          HC       2
          *
          *
          *
          *

          KK   RT24A   ROUTE
          KM   ROUTE FLOW FROM CP24A TO CP22
          RS       1    FLOW
          RC   0.050   0.030   0.050    1545  0.0306    0.00
          RX    0.00   99.00  276.00  292.00  321.00  337.00  650.00  816.00
          RY  2224.0 2202.00 2200.50 2199.80 2200.00 2201.00 2202.00 2212.00
          *
          *
          *
          *

1                                        HEC-1 INPUT                                                PAGE 20

     LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          KK      30   BASIN
          KM   CONCENTRATES FLOW ADJACENT TO MOUNTAIN.  DISCHARGES TO REATA PASS WASH
          KM   JUST UPSTREAM OF PINNACLE PEAK ROAD BRIDGE.
          BA   0.392
          LG    0.26    0.32    4.72    0.29       2
          UI       0      64     115     269     408     500     698     534     393     341
          UI     294     251     203     163     146     121      94      79      70      53
          UI      49      36      31      31      22      12      12      12      12      12
          UI      12      12       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          *
          *
          *
          *

          KK      22   BASIN
          BA   0.222
          LG    0.29    0.27    5.71    0.21       8
          UI       0      43     103     224     309     430     371     256     217     181
          UI     146     111      97      77      57      49      39      33      23      21
          UI      20       8       8       8       8       8       8       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          UI       0       0       0       0       0       0       0       0       0       0
          *
          *
          *
          *

          KK    CP22 COMBINE
          KM   CP AT PINNACLE PEAK WASH BRIDGE JUST UPSTREAM OF REATA PASS WASH APEX.
          KM   Combines RT16, RT24A, SUB30 & SUB22
          HC       4
          *
          *
          *
          *

          KK   RT22A   ROUTE
          KM
          RS       1    FLOW
          RC   0.055   0.040   0.055    1543  0.0246    0.00
          RX    0.00   10.00   40.00   90.00  150.00  400.00 1000.00 1020.00
          RY  2122.0 2122.00 2122.00 2107.00 2114.00 2121.00 2121.00 2124.00
          *
          *
          *
          *

          KK    D22A  DIVERT
          KM
          DT   DT22A     0.0  2000.0
          DI     0.0   500.0  1000.0  2000.0  4000.0  8000.0 16000.0     0.0     0.0     0.0
          DQ     0.0    96.0   192.0   384.0   768.0  1537.0  3200.0     0.0     0.0     0.0
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          *
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1                                       HEC-1 INPUT                                                    PAGE 21

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            648     KK   RT22B   ROUTE
            649     KM
            650     RS       1    FLOW
            651     RC   0.055   0.040   0.055    1803  0.0329    0.00
            652     RX    0.00   10.00   40.00   90.00  150.00  400.00 1000.00 1020.00
            653     RY  2122.0 2122.00 2122.00 2107.00 2114.00 2121.00 2121.00 2124.00
                    *
                    *
                    *

            654     KK      58   BASIN
            655     BA   0.112
            656     LG    0.32    0.30    5.85    0.18       3
            657     UI       0     101     360     405     229     138      86      51      31      19
            658     UI      10      10       0       0       0       0       0       0       0       0
            659     UI       0       0       0       0       0       0       0       0       0       0
            660     UI       0       0       0       0       0       0       0       0       0       0
            661     UI       0       0       0       0       0       0       0       0       0       0
                    *
                    *
                    *
                    *

            662     KK    CP58 COMBINE
            663     KM   CP AT PINNACLE PEAK WASH BRIDGE JUST UPSTREAM OF REATA PASS WASH APEX.
            664     KM   Combines RT16, RT24A, SUB30 & SUB22
            665     HC       2
                    *
                    *
                    *
                    *

            666     KK    RT58   ROUTE
            667     KM
            668     RS       1    FLOW
            669     RC   0.055   0.040   0.055    3099  0.0276    0.00
            670     RX  160.00  180.00  200.00  340.00  490.00  540.00 1000.00 1100.00
            671     RY  2100.0 2100.00 2100.00 2030.00 2030.00 2045.00 2045.00 2056.00
                    *
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                    *
                    *

            672     KK      35   BASIN
            673     BA   0.410
            674     LG    0.28    0.28    4.33    0.38       4
            675     UI       0     253     932    1461     878     620     396     265     174     111
            676     UI      75      41      29      29       0       0       0       0       0       0
            677     UI       0       0       0       0       0       0       0       0       0       0
            678     UI       0       0       0       0       0       0       0       0       0       0
            679     UI       0       0       0       0       0       0       0       0       0       0
                    *
                    *
                    *
                    *
1                                       HEC-1 INPUT                                                    PAGE 22

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            680     KK    RT35   ROUTE
            681     KM   ROUTE FLOW FROM SUB35 TO CP34
            682     RS       1    FLOW
            683     RC   0.055   0.040   0.055    2848  0.0211    0.00
            684     RX    0.00   35.00   58.00   69.00   78.00   89.00  129.00  157.00
            685     RY  2087.0 2085.00 2085.00 2082.00 2082.00 2085.00 2086.00 2087.00
                    *
                    *
                    *
                    *

            686     KK      34   BASIN
            687     BA   0.456
            688     LG    0.28    0.29    4.72    0.31       3
            689     UI       0     289    1060    1633     975     683     436     287     189     120
            690     UI      84      41      33      33       0       0       0       0       0       0
            691     UI       0       0       0       0       0       0       0       0       0       0
            692     UI       0       0       0       0       0       0       0       0       0       0
            693     UI       0       0       0       0       0       0       0       0       0       0
                    *
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                    *
                    *

            694     KK    CP34 COMBINE
            695     KM   WESTERN BOUNDARY - DOWNSTREAM OF PINNACLE PEAK ROAD.  DISCHARGE TO
            696     KM   REATA PASS WASH.
            697     KM   Combines RT35 and SUB34
            698     HC       2
                    *
                    *
                    *
                    *

            699     KK    RT34   ROUTE
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          700          KM   ROUTE FLOW FROM SUB35 TO CP34
          701          RS       1    FLOW
          702          RC   0.055   0.040   0.055    3084  0.0213    0.00
          703          RX  160.00  180.00  200.00  340.00  490.00  540.00 1000.00 1100.00
          704          RY  2100.0 2100.00 2100.00 2030.00 2030.00 2045.00 2045.00 2056.00
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                       *

          705          KK      38   BASIN
          706          KM   WESTERN BOUNDARY - UPSTREAM OF TOMPSON PEAK PARKWAY. DISCHARGE TO
          707          KM   REATA PASS WASH.
          708          BA   0.057
          709          LG    0.26    0.34    4.28    0.34       1
          710          UI       0     122     307     160      77      37      18       7       7       0
          711          UI       0       0       0       0       0       0       0       0       0       0
          712          UI       0       0       0       0       0       0       0       0       0       0
          713          UI       0       0       0       0       0       0       0       0       0       0
1                                                HEC-1 INPUT                                                 PAGE 23

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          714          UI       0       0       0       0       0       0       0       0       0       0
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                       *
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          715          KK      59   BASIN
          716          KM
          717          KM
          718          BA   0.055
          719          LG    0.33    0.30    4.03    0.45       2
          720          UI       0      36     131     198     117      81      52      34      22      14
          721          UI      10       4       4       4       0       0       0       0       0       0
          722          UI       0       0       0       0       0       0       0       0       0       0
          723          UI       0       0       0       0       0       0       0       0       0       0
          724          UI       0       0       0       0       0       0       0       0       0       0
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                       *

          725          KK    CP59 COMBINE
          726          KM
          727          HC       4
                       *
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                       *
                       *

          728          KK   RT59A   ROUTE
          729          KM
          730          RS       1    FLOW
          731          RC   0.055   0.040   0.055    1049  0.0454    0.00
          732          RX   20.00   70.00  110.00  160.00  220.00  380.00  500.00  540.00
          733          RY  1970.0 1965.00 1964.00 1961.00 1961.00 1966.00 1968.00 1969.00
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          734          KK      39   BASIN
          735          KM   WESTERN BOUNDARY - UPSTREAM OF TOMPSON PEAK PARKWAY. DISCHARGE TO
          736          KM   REATA PASS WASH.
          737          BA   0.153
          738          LG    0.23    0.31    4.28    0.41       2
          739          UI       0     138     491     553     313     189     117      70      42      26
          740          UI      13      13       0       0       0       0       0       0       0       0
          741          UI       0       0       0       0       0       0       0       0       0       0
          742          UI       0       0       0       0       0       0       0       0       0       0
          743          UI       0       0       0       0       0       0       0       0       0       0
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1                                                HEC-1 INPUT                                                 PAGE 24

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          744          KK   CP59A COMBINE
          745          KM
          746          HC       2
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                       *
                       *

          747          KK   RT59B   ROUTE
          748          KM
          749          RS       2    FLOW
          750          RC   0.055   0.040   0.055    4061  0.0267    0.00
          751          RX  150.00  180.00  205.00  250.00  490.00  510.00  560.00  600.00
          752          RY  1924.0 1921.00 1918.00 1904.00 1904.00 1910.00 1913.00 1915.00
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 753          KK      40   BASIN
 754          KM   WESTERN BOUNDARY - UPSTREAM OF TOMPSON PEAK PARKWAY. DISCHARGE TO
 755          KM   REATA PASS WASH.
 756          BA   0.152
 757          LG    0.28    0.27    3.90    0.52      13
 758          UI       0     112     405     557     320     211     135      82      54      33
 759          UI      20      12      12       0       0       0       0       0       0       0
 760          UI       0       0       0       0       0       0       0       0       0       0
 761          UI       0       0       0       0       0       0       0       0       0       0
 762          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 763          KK      60   BASIN
 764          KM
 765          KM
 766          BA   0.182
 767          LG    0.27    0.31    2.79    1.24      15
 768          UI       0      61     234     399     504     304     235     170     124      91
 769          UI      63      47      34      25      17      10      10      10      10       0
 770          UI       0       0       0       0       0       0       0       0       0       0
 771          UI       0       0       0       0       0       0       0       0       0       0
 772          UI       0       0       0       0       0       0       0       0       0       0
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1                                        HEC-1 INPUT                                    PAGE 25

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 773          KK    CP60 COMBINE
 774          KM
 775          HC       3
              *
              *
              *
              *

 776          KK    RT60   ROUTE
 777          KM
 778          RS       1    FLOW
 779          RC   0.055   0.040   0.055    2351  0.0243    0.00
 780          RX  200.00  250.00  260.00  360.00  520.00  620.00  830.00  880.00
 781          RY 1835.0 1833.00 1830.00 1825.00 1825.00 1830.00 1830.00 1835.00
              *
              *
              *
              *

 782          KK      47   BASIN
 783          BA   0.547
 784          LG    0.27    0.30    4.17    0.39       3
 785          UI       0      93     177     417     612     758    1044     675     545     470
 786          UI     402     336     263     222     199     150     119     104      86      71
 787          UI      58      46      46      34      18      18      18      18      18      18
 788          UI      18       0       0       0       0       0       0       0       0       0
 789          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 790          KK      46   BASIN
 791          BA   0.175
 792          LG    0.28    0.28    4.08    0.45       4
 793          UI       0     111     407     627     374     262     167     110      72      46
 794          UI      32      16      13      13       0       0       0       0       0       0
 795          UI       0       0       0       0       0       0       0       0       0       0
 796          UI       0       0       0       0       0       0       0       0       0       0
 797          UI       0       0       0       0       0       0       0       0       0       0
              *
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              *
              *

 798          KK    CP46 COMBINE
 799          KM   Combines SUB47 and SUB46
 800          HC       2
              *
              *
              *
              *

1                                        HEC-1 INPUT                                    PAGE 26

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 801          KK    RT46   ROUTE
 802          KM   ROUTE FLOW FROM CP46 TO CP42
 803          RS       1    FLOW
 804          RC   0.050   0.035   0.050    2771  0.0424    0.00
 805          RX    0.00    7.00   49.00   60.00   62.00   75.00   83.00  147.00
 806          RY 2060.0 2057.00 2055.00 2052.00 2052.00 2055.00 2057.00 2058.00
              *
              *
              *
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 807          KK      37   BASIN
 808          BA   0.629
 809          LG    0.23    0.33    4.22    0.35       1
 810          UI       0     199     766    1307    1745    1055     820     614     432     335
 811          UI     226     174     129      86      75      34      34      34      34       0
 812          UI       0       0       0       0       0       0       0       0       0       0
 813          UI       0       0       0       0       0       0       0       0       0       0
 814          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 815          KK    RT37   ROUTE
 816          KM   ROUTE FLOW FROM SUB37 TO CP42
 817          RS       2    FLOW
 818          RC   0.050   0.040   0.050    4195  0.0340    0.00
 819          RX    0.00   33.00   37.00   42.00   49.00   65.00  169.00  205.00
 820          RY  2063.0 2045.00 2044.00 2042.00 2041.00 2045.00 2047.00 2064.00
              *
              *
              *
              *

 821          KK      44   BASIN
 822          BA   0.126
 823          LG    0.29    0.29    2.74    1.18       5
 824          UI       0      78     286     449     270     191     122      82      54      34
 825          UI      23      13       9       9       0       0       0       0       0       0
 826          UI       0       0       0       0       0       0       0       0       0       0
 827          UI       0       0       0       0       0       0       0       0       0       0
 828          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 829          KK      42   BASIN
 830          BA   0.318
 831          LG    0.28    0.29    3.56    0.60       4
 832          UI       0      87     343     594     863     545     424     328     233     187
 833          UI     128      98      73      55      41      31      16      16      16      16
 834          UI       0       0       0       0       0       0       0       0       0       0
1                                        HEC-1 INPUT                                    PAGE 27

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 835          UI       0       0       0       0       0       0       0       0       0       0
 836          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 837          KK    CP42 COMBINE
 838          KM   Combines SUB44, RT37, RT46 and SUB42
 839          HC       4
              *
              *
              *
              *

 840          KK    RT42   ROUTE
 841          KM   ROUTE FLOW FROM CP42 TO CP41
 842          RS       1    FLOW
 843          RC   0.050   0.035   0.050    4042  0.0304    0.00
 844          RX    0.00   15.00   29.00   41.00   60.00   73.00   81.00   87.00
 845          RY  1945.0 1944.00 1943.00 1940.00 1940.00 1943.00 1944.00 1945.00
              *
              *
              *
              *

 846          KK      45   BASIN
 847          BA   0.161
 848          LG    0.21    0.29    2.75    1.42       5
 849          UI       0      56     215     366     444     267     206     147     108      76
 850          UI      55      40      28      23      12       9       9       9       0       0
 851          UI       0       0       0       0       0       0       0       0       0       0
 852          UI       0       0       0       0       0       0       0       0       0       0
 853          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 854          KK      48   BASIN
 855          BA   1.570
 856          LG    0.23    0.35    4.28    0.37       0
 857          UI       0     192     192     536     852    1179    1389    1620    2178    1719
 858          UI    1267    1118    1003     908     798     706     601     495     457     420
 859          UI     358     300     245     225     210     171     147     147     101      94
 860          UI      94      94      63      37      37      37      37      37      37      37
 861          UI      37      37      37       0       0       0       0       0       0       0
              *
              *
              *
              *
1                                        HEC-1 INPUT                                    PAGE 28
```

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 862          KK   RT48A   ROUTE
 863          KM
 864          RS       1    FLOW
 865          RC   0.055   0.040   0.055    2994  0.0470    0.00
 866          RX    0.00   73.00   78.00   82.00   91.00  114.00  125.00  133.00
 867          RY  1972.0 1970.00 1967.00 1962.00 1961.00 1965.00 1971.00 1972.00
              *
              *
              *
              *

 868          KK    D48A  DIVERT
 869          KM
 870          DT   DT48A     0.0     0.0
 871          DI     0.0  1000.0  2000.0  3000.0  3500.0  4083.0  4500.0  5000.0     0.0     0.0
 872          DQ     0.0  1000.0  1880.0  2530.0  2870.0  3373.0  3440.0  3600.0     0.0     0.0
              *
              *
              *
              *

 873          KK  RTD48A   ROUTE
 874          KM
 875          RS       1    FLOW
 876          RC   0.055   0.040   0.055    1977  0.0415    0.00
 877          RX    0.00   73.00   78.00   82.00   91.00  114.00  125.00  133.00
 878          RY  1972.0 1970.00 1967.00 1962.00 1961.00 1965.00 1971.00 1972.00
              *
              *
              *

 879          KK    CP45 COMBINE
 880          KM   WESTERN BOUNDARY - THOMPSON PEAK PARKWAY. DISCHARGE TO EXISTING NATURAL
 881          KM   WASH 600 FEET NORTH OF WINDGATE PASS DRIVE.
 882          KM   Combines SUB45, and D48A
 883          HC       2    0.25
              *
              *
              *
              *

 884          KK    RT45   ROUTE
 885          KM   ROUTE FLOW FROM SUB45 TO CP41
 886          RS       2    FLOW
 887          RC   0.050   0.035   0.050    2935  0.0331    0.00
 888          RX    0.00   10.00   39.00   49.00   50.00   53.00   60.00   65.00
 889          RY  1924.0 1920.00 1919.00 1918.00 1918.00 1920.00 1923.00 1924.00
              *
              *
              *
              *
1                                        HEC-1 INPUT                                        PAGE 29

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 890          KK      41   BASIN
 891          BA   0.349
 892          LG    0.25    0.27    3.53    0.71      12
 893          UI       0     120     458     779     964     580     448     323     236     170
 894          UI     119      88      63      49      29      19      19      19      19       0
 895          UI       0       0       0       0       0       0       0       0       0       0
 896          UI       0       0       0       0       0       0       0       0       0       0
 897          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

 898          KK    CP41 COMBINE
 899          KM   WESTERN BOUNDARY - THOMPSON PEAK PARKWAY. DISCHARGE TO EXISTING NATURAL
 900          KM   WASH 600 FEET NORTH OF WINDGATE PASS DRIVE.
 901          KM   Combines RT45, RT42 and SUB41
 902          HC       3
              *
              *
              *
              *

 903          KK    RT41   ROUTE
 904          KM
 905          RS       1    FLOW
 906          RC   0.050   0.035   0.050    2454  0.0252    0.00
 907          RX  200.00  260.00  330.00  380.00  450.00  455.00  470.00  480.00
 908          RY  1829.0 1827.00 1826.00 1823.00 1823.00 1825.00 1825.00 1826.00
              *
              *
              *
              *

 909          KK      61   BASIN
 910          BA   0.116
 911          LG    0.23    0.21    6.34    0.20      26
 912          UI       0      53     200     354     274     188     134      91      64      44
 913          UI      30      20      16       7       7       7       0       0       0       0
 914          UI       0       0       0       0       0       0       0       0       0       0
 915          UI       0       0       0       0       0       0       0       0       0       0
 916          UI       0       0       0       0       0       0       0       0       0       0
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                *
                *

          917   KK    RT61   ROUTE
          918   KM
          919   RS       1    FLOW
          920   RC   0.050   0.035   0.050    2458  0.0318    0.00
          921   RX  240.00  270.00  300.00  310.00  325.00  335.00  380.00  390.00
          922   RY  1793.0 1791.00 1791.00 1789.00 1789.00 1790.00 1790.00 1791.00
                *
                *
                *
                *
1                                        HEC-1 INPUT                                        PAGE 30

        LINE    ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          923   KK      62   BASIN
          924   BA   0.122
          925   LG    0.31    0.31    4.03    0.47      12
          926   UI       0     184     587     365     205     111      60      32      13      13
          927   UI       0       0       0       0       0       0       0       0       0       0
          928   UI       0       0       0       0       0       0       0       0       0       0
          929   UI       0       0       0       0       0       0       0       0       0       0
          930   UI       0       0       0       0       0       0       0       0       0       0
                *
                *
                *
                *

          931   KK    CP62 COMBINE
          932   KM
          933   KM
          934   KM
          935   HC       4
                *
                *
                *
                *

          936   KK    RT62   ROUTE
          937   KM
          938   RS       1    FLOW
          939   RC   0.050   0.035   0.050    4669  0.0240    0.00
          940   RX  400.00  420.00  430.00  540.00  950.00  970.00  990.00 1000.00
          941   RY  1727.0 1725.00 1723.00 1720.00 1722.00 1726.00 1726.00 1727.00
                *
                *
                *
                *

          942   KK      63   BASIN
          943   BA   0.386
          944   LG    0.26    0.31    2.79    1.24      30
          945   UI       0      90     297     577     808     820     525     428     341     248
          946   UI     204     155     111      93      69      50      44      31      17      17
          947   UI      17      17      17       0       0       0       0       0       0       0
          948   UI       0       0       0       0       0       0       0       0       0       0
          949   UI       0       0       0       0       0       0       0       0       0       0
                *
                *
                *
                *

          950   KK    CP63 COMBINE
          951   KM
          952   KM
          953   KM
          954   HC       2
                *
                *
                *
                *
1                                        HEC-1 INPUT                                        PAGE 31

        LINE    ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          955   KK    RT63   ROUTE
          956   KM
          957   RS       3    FLOW
          958   RC   0.050   0.035   0.050    5520  0.0185    0.00
          959   RX  130.00  210.00  500.00  540.00  630.00  660.00  670.00  680.00
          960   RY  1627.0 1623.00 1622.00 1617.00 1618.00 1626.00 1626.00 1627.00
                *
                *
                *
                *

          961   KK    D48ARETRIEVE
          962   KM
          963   DR   DT48A
                *
                *
                *

          964   KK   RT48B   ROUTE
          965   RS       2    FLOW
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 966          RC   0.055   0.040   0.055    5668  0.0422    0.00
 967          RX    0.00   73.00   78.00   82.00   91.00  114.00  125.00  133.00
 968          RY  1972.0 1970.00 1967.00 1962.00 1961.00 1965.00 1971.00 1972.00
                  *
                  *
                  *
                  *
                  *

 969          KK      49   BASIN
 970          BA   0.433
 971          LG    0.25    0.31    3.18    0.87      12
 972          UI       0      77     160     369     526     670     822     514     430     367
 973          UI     310     247     195     172     139     105      90      77      59      50
 974          UI      38      38      27      15      15      15      15      15      15      15
 975          UI       0       0       0       0       0       0       0       0       0       0
 976          UI       0       0       0       0       0       0       0       0       0       0
                  *
                  *
                  *
                  *

 977          KK    CP49 COMBINE
 978          KM   Combines RT48 and SUB49
 979          HC       2    1.91
                  *
                  *
                  *
                  *

1                                        HEC-1 INPUT                                    PAGE 32

     LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 980          KK    RT49   ROUTE
 981          KM   ROUTE FLOW FROM CP49 TO CP50
 982          RS       2    FLOW
 983          RC   0.045   0.035   0.045    3915  0.0318    0.00
 984          RX    0.00   30.00   39.00   45.00   60.00   71.00  134.00  177.00
 985          RY  1750.0 1749.00 1744.00 1742.00 1742.00 1745.00 1747.00 1751.00
                  *
                  *
                  *
                  *

 986          KK      43   BASIN
 987          BA   0.142
 988          LG    0.31    0.34    3.18    0.76       1
 989          UI       0      77     290     487     310     223     146     103      65      45
 990          UI      29      22      10      10      10       0       0       0       0       0
 991          UI       0       0       0       0       0       0       0       0       0       0
 992          UI       0       0       0       0       0       0       0       0       0       0
 993          UI       0       0       0       0       0       0       0       0       0       0
                  *
                  *
                  *
                  *

 994          KK      51   BASIN
 995          BA   0.721
 996          LG    0.25    0.27    3.62    0.69       9
 997          UI       0     121     228     535     791     977    1358     912     719     621
 998          UI     533     450     352     295     264     207     158     139     120      93
 999          UI      82      59      59      52      23      23      23      23      23      23
1000          UI      23       0       0       0       0       0       0       0       0       0
1001          UI       0       0       0       0       0       0       0       0       0       0
                  *
                  *
                  *
                  *

1002          KK      50   BASIN
1003          BA   0.137
1004          LG    0.30    0.31    2.75    1.26      17
1005          UI       0      62     237     419     324     222     159     108      75      52
1006          UI      36      24      18       9       9       9       0       0       0       0
1007          UI       0       0       0       0       0       0       0       0       0       0
1008          UI       0       0       0       0       0       0       0       0       0       0
1009          UI       0       0       0       0       0       0       0       0       0       0
                  *
                  *
                  *
                  *

1                                        HEC-1 INPUT                                    PAGE 33

     LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1010          KK    CP50 COMBINE
1011          KM   WESTERN BOUNDARY - THOMPSON PEAK PARKWAY. DISCHARGE TO EXISTING NATURAL
1012          KM   WASH 1900 FEET SOUTH OF LEGACY BOULEVARD.
1013          KM   Combines RT49, SUB43, SUB51 and SUB50
1014          HC       4
                  *
                  *
                  *
                  *
                  *

1015          KK    RT50   ROUTE
1016          KM
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```
1017          RS       2    FLOW
1018          RC   0.050   0.040   0.050    5454  0.0168    0.00
1019          RX  100.00  140.00  195.00  220.00  330.00  360.00  370.00  380.00
1020          RY  1609.0 1608.50 1608.50 1602.50 1602.50 1608.00 1608.00 1609.00
              *
              *
              *
              *

1021          KK      52   BASIN
1022          BA   0.598
1023          LG    0.21    0.35    4.33    0.36       0
1024          UI       0     126     353     731     990    1348     842     683     563     452
1025          UI     338     286     224     163     138     102      87      62      62      33
1026          UI      24      24      24      24      24       0       0       0       0       0
1027          UI       0       0       0       0       0       0       0       0       0       0
1028          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

1029          KK    RT52   ROUTE
1030          KM   ROUTE FLOW FROM SUB52 TO CP53
1031          RS       3    FLOW
1032          RC   0.055   0.040   0.055    8331  0.0383    0.00
1033          RX    0.00   37.00   65.00   71.00   81.00   91.00  237.00  270.00
1034          RY  1885.0 1882.00 1868.00 1865.00 1866.00 1869.00 1872.00 1883.00
              *
              *
              *
              *

1035          KK      53   BASIN
1036          BA   0.700
1037          LG    0.27    0.35    3.65    0.53       0
1038          UI       0     106     165     398     630     779     982    1142     728     615
1039          UI     538     469     403     328     269     243     207     164     136     117
1040          UI     103      81      76      52      52      52      30      20      20      20
1041          UI      20      20      20      20      20       0       0       0       0       0
1042          UI       0       0       0       0       0       0       0       0       0       0
              *
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              *
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1 HEC-1 INPUT PAGE 34

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1043          KK    CP53 COMBINE
1044          KM   Combines RT52 and SUB53
1045          HC       2
              *
              *
              *
              *

1046          KK      55   BASIN
1047          BA   0.341
1048          LG    0.22    0.35    4.33    0.36       0
1049          UI       0      88     348     611     908     593     457     359     259     202
1050          UI     150     106      84      64      43      41      17      17      17      17
1051          UI      17       0       0       0       0       0       0       0       0       0
1052          UI       0       0       0       0       0       0       0       0       0       0
1053          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

1054          KK      56   BASIN
1055          BA   1.226
1056          LG    0.23    0.35    4.12    0.41       0
1057          UI       0     171     220     580     927    1179    1392    1914    1488    1091
1058          UI     963     850     745     649     540     439     403     363     284     229
1059          UI     206     188     148     131     117      84      84      84      57      33
1060          UI      33      33      33      33      33      33      33      33       0       0
1061          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
              *
              *

1062          KK    CP56 COMBINE
1063          KM   Combines SUB55 and SUB56
1064          HC       2
              *
              *
              *
              *

1065          KK    RT56   ROUTE
1066          KM   ROUTE FLOW FROM CP56 TO CP54
1067          RS       2    FLOW
1068          RC   0.050   0.040   0.050    7162  0.0422    0.00
1069          RX    0.00   13.00   71.00  114.00  132.00  154.00  189.00  224.00
1070          RY  1807.0 1804.00 1803.00 1800.00 1799.00 1804.00 1806.00 1808.00
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              *
              *
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                *
1                                       HEC-1 INPUT                                                    PAGE 35

         LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

         1071          KK      54   BASIN
         1072          BA   0.488
         1073          LG    0.25    0.35    3.75    0.50       0
         1074          UI       0      89     193     436     616     801     908     572     483     410
         1075          UI     342     268     218     193     147     113      98      78      68      48
         1076          UI      43      43      19      17      17      17      17      17      17       0
         1077          UI       0       0       0       0       0       0       0       0       0       0
         1078          UI       0       0       0       0       0       0       0       0       0       0
                       *
                       *
                       *
                       *

         1079          KK      57   BASIN
         1080          KM   WESTERN BOUNDARY - AT BELL ROAD JUST NORTH OF THOMPSON PEAK PARKWAY.
         1081          KM   DISCHARGE TO EXISTING CITY STORM DRAIN SYSTEM.
         1082          BA   0.084
         1083          LG    0.35    0.35    2.75    1.01       0
         1084          UI       0     166     443     240     121      58      30      12      10       0
         1085          UI       0       0       0       0       0       0       0       0       0       0
         1086          UI       0       0       0       0       0       0       0       0       0       0
         1087          UI       0       0       0       0       0       0       0       0       0       0
         1088          UI       0       0       0       0       0       0       0       0       0       0
                       *
                       *
                       *
                       *

         1089          KK    CP54 COMBINE
         1090          KM   Combines RT56 and SUB54
         1091          HC       3
                       *
                       *
                       *
                       *

         1092          KK   CP54A COMBINE
         1093          KM   WESTERN BOUNDARY - THOMPSON PEAK PARKWAY. DISCHARGE TO EXISTING CITY
         1094          KM   DRAINAGE CHANNEL 1300 FEET NORTH OF BELL ROAD.
         1095          KM   Combines CP53 and CP54
         1096          HC       2
                       *
                       *
                       *
                       *

         1097          KK    RT54   ROUTE
         1098          KM
         1099          RS       2    FLOW
         1100          RC   0.050   0.040   0.050    3822  0.0200    0.00
         1101          RX  120.00  126.00  130.00  150.00  480.00  510.00  520.00  530.00
         1102          RY  1622.0 1621.00 1621.00 1615.00 1613.00 1618.00 1618.00 1619.00
                       *
                       *
                       *
                       *
1                                       HEC-1 INPUT                                                    PAGE 36

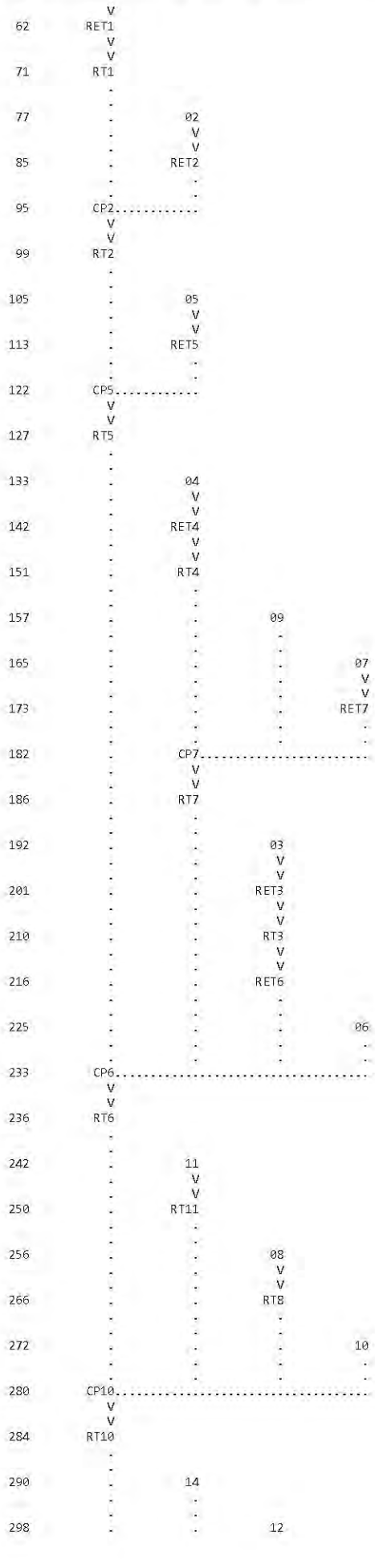
         LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

         1103          KK      64   BASIN
         1104          KM
         1105          KM
         1106          BA   0.638
         1107          LG    0.28    0.29    3.22    0.87      22
         1108          UI       0     130     346     732     991    1417     921     732     610     498
         1109          UI     379     309     254     187     153     124     100      72      64      56
         1110          UI      25      25      25      25      25      25       0       0       0       0
         1111          UI       0       0       0       0       0       0       0       0       0       0
         1112          UI       0       0       0       0       0       0       0       0       0       0
                       *
                       *
                       *
                       *

         1113          KK    CP64 COMBINE
         1114          KM
         1115          HC       4
                       *
                       *
                       *
                       *
                       *
                       *
         1116          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    54          01
                 V
```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V
V
71 RT1
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95 CP2.....
V
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99 RT2
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105 . 05
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113 . RET5
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122 CP5.....
V
V
127 RT5
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133 . 04
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. . . V
173 . . . RET7
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182 . CP7.....
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186 . RT7
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201 . . RET3
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. . V
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225 . . . 06
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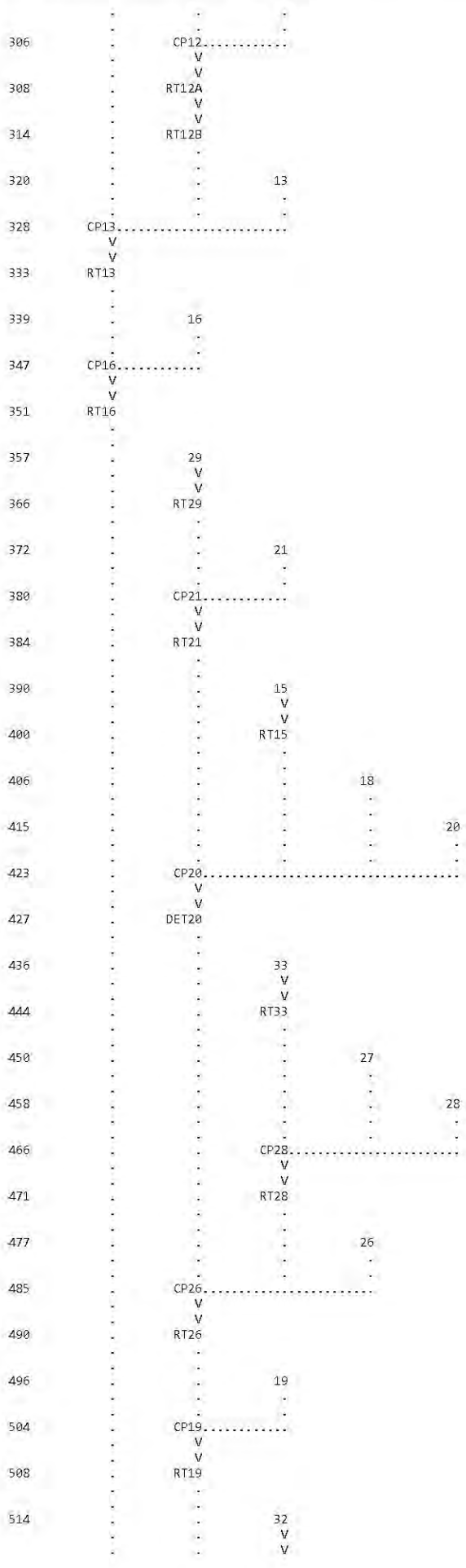
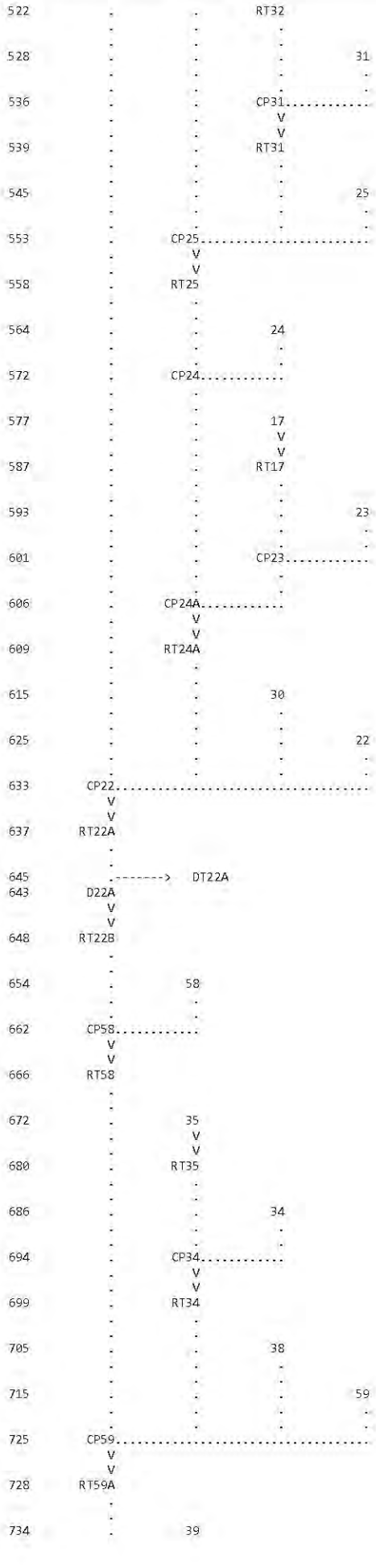
233 CP6.....
V
V
236 RT6
.
.
242 . 11
. V
. V
250 . RT11
. .
. .
256 . . 08
. . V
. . V
266 . . RT8
. . .
. . .
272 . . . 10
. . . .
. . . .
280 CP10.....
V
V
284 RT10
.
.
290 . 14
. .
. .
298 . . 12


306 CP12
308 RT12A
314 RT12B
320 13
328 CP13
333 RT13
339 16
347 CP16
351 RT16
357 29
366 RT29
372 21
380 CP21
384 RT21
390 15
400 RT15
406 18
415 20
423 CP20
427 DET20
436 33
444 RT33
450 27
458 28
466 CP28
471 RT28
477 26
485 CP26
490 RT26
496 19
504 CP19
508 RT19
514 32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CP31
RT31
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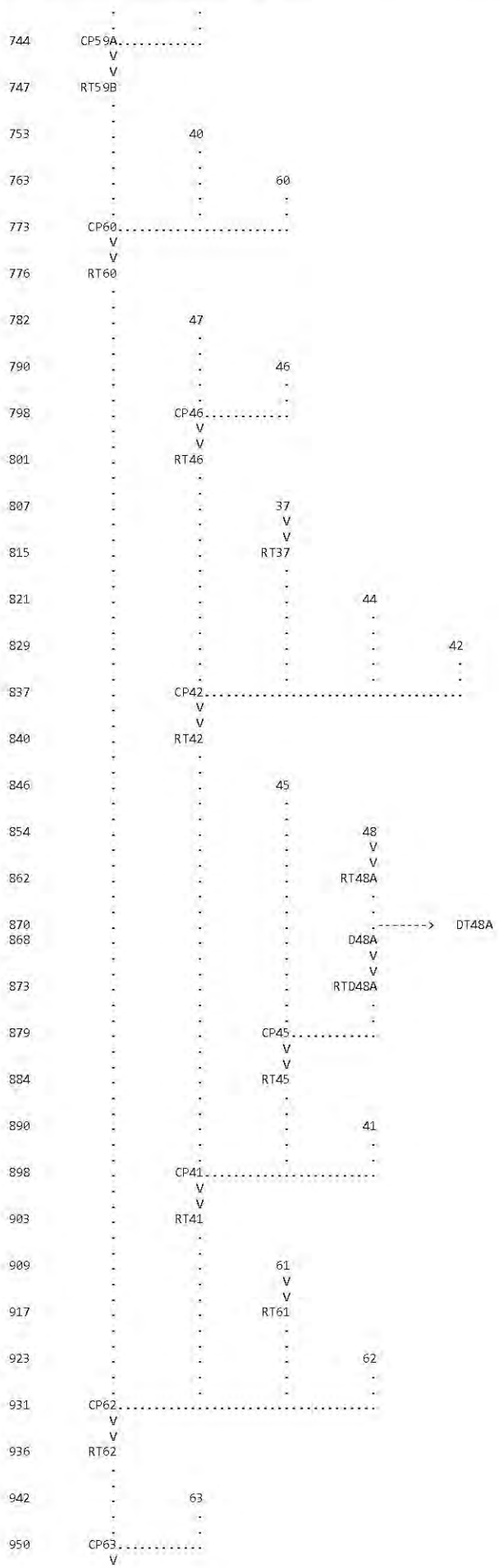
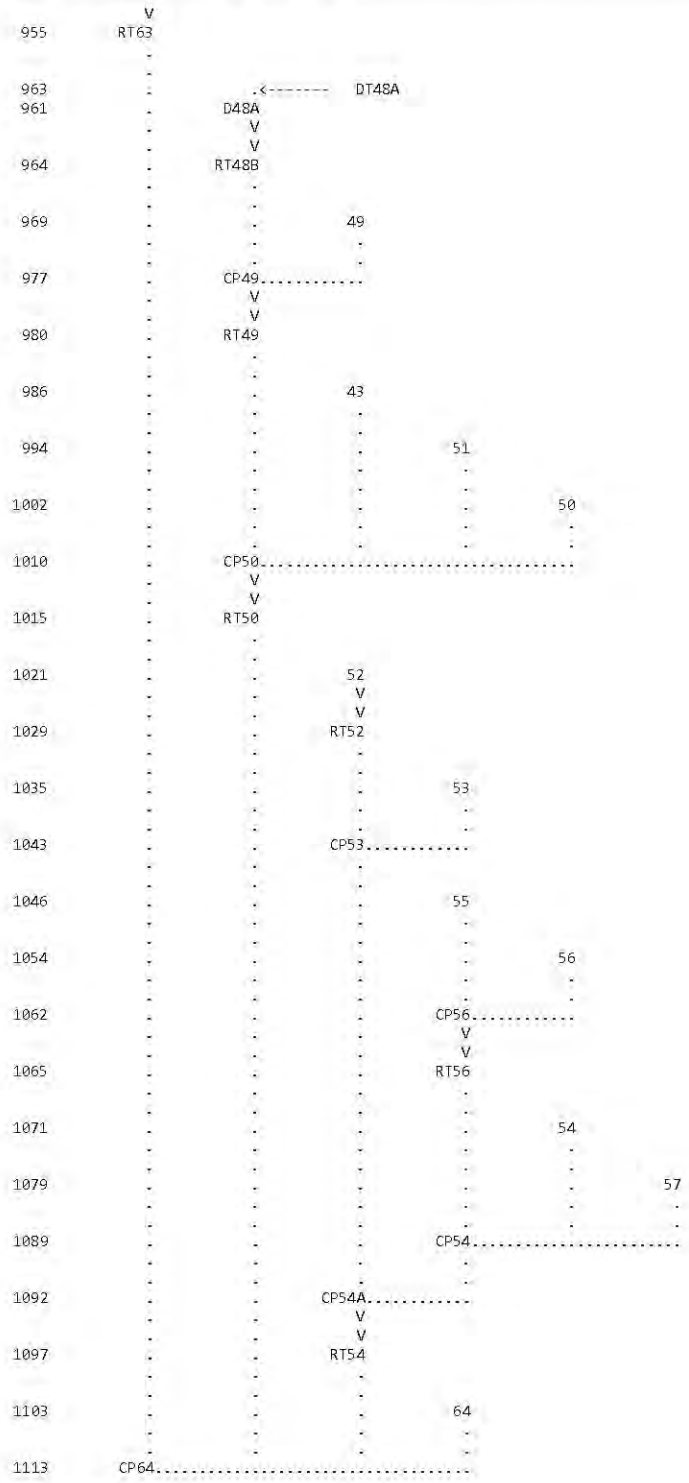
CP25
RT25
24
CP24
17
RT17
23
CP23
CP24A
RT24A
30
22
CP22
RT22A
DT22A
D22A
RT22B
58
CP58
RT58
35
RT35
34
CP34
RT34
38
59
CP59
RT59A
39


744 CP59A
747 RT59B
753 40
763 60
773 CP60
776 RT60
782 47
790 46
798 CP46
801 RT46
807 37
815 RT37
821 44
829 42
837 CP42
840 RT42
846 45
854 48
862 RT48A
870
868 D48A
873 RTD48A
879 CP45
884 RT45
890 41
898 CP41
903 RT41
909 61
917 RT61
923 62
931 CP62
936 RT62
942 63
950 CP63
DT48A



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   23FEB16  TIME  08:47:18   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

City of Scottsdale
REATA - Reata Wash Flood Control Improvement Study
100 YEAR
24 Hour Storm
Unit Hydrograph: S-Graph
Storm: Multiple
02/23/2016

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                    City of Scottsdale
                    REATA - Reata Wash Flood Control Improvement Study
                    100 YEAR
                    24 Hour Storm
                    Unit Hydrograph: S-Graph
                    Storm: Multiple
                    03/10/2015
                    Flood Control District of Maricopa County
                    REATA -
                    100 YEAR
                    24 Hour Storm
                    Unit Hydrograph: S-Graph
                    Storm: Single
                    02/13/2015
                    * CROSSROADS EAST HEC-1 MODEL (BASINS 1-33), OUTFALL REATA PASS

                    * FILE NAME: 100-24NORTH.IH1    LAV (01/23/12)

                    * 100-Year, 24-Hour Storm, S-Graph, NOAA 14 Rainfall.
                    * HC CARDS INCLUDE TOTAL CONTRIBUTING AREA TO EACH CONCENTRATION POINT
                    * EXISTING RETENTION PROVIDED BY ECHO RIDGE SUBDIVISION INCLUDED IN MODEL
                    AND TAKEN FROM TROON NORTH PARK DRAINAGE REPORT.
                    * FUTURE CONDITIONS DETENTION BASIN FOR TROON NORTH PARK. DRAINAGE
                    REPORT PREPARED BY ARGUS CONSULTING (APRIL 23, 2010). NEW PARK BASIN
                    AND EXISTING FCD BASIN MODELED TOGETHER AS STAGE-STORAGE-DISCHARGE.
                    * EXISTING SEDIMENT BASIN AT HAPPY VALLEY ROAD AND ALAMEDA ROAD MODELED
                    AS STAGE STORAGE DISCHARGE.

  37 IO         OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                       NMIN          3  MINUTES IN COMPUTATION INTERVAL
                      IDATE    1JAN99  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE    5JAN99  ENDING DATE
                     NDTIME       0357  ENDING TIME
                      ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL    0.05 HOURS
                       TOTAL TIME BASE   99.95 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

  39 JD         INDEX STORM NO. 1
                       STRM       4.86  PRECIPITATION DEPTH
                       TRDA       0.00  TRANSPOSITION DRAINAGE AREA

  40 PI           PRECIPITATION PATTERN
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
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                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
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                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.01     0.01     0.01     0.01     0.01
                     0.02     0.02     0.02     0.02     0.02     0.06     0.06     0.06     0.06     0.06
                     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
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            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00

 50 JD       INDEX STORM NO. 2
                  STRM       4.83  PRECIPITATION DEPTH
                  TRDA       1.00  TRANSPOSITION DRAINAGE AREA

  0 PI         PRECIPITATION PATTERN
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.01    0.01    0.01    0.01    0.01
            0.02    0.02    0.02    0.02    0.02    0.06    0.06    0.06    0.06    0.06
            0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
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            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00

 51 JD       INDEX STORM NO. 3
                  STRM       4.74  PRECIPITATION DEPTH
                  TRDA       5.00  TRANSPOSITION DRAINAGE AREA

  0 PI         PRECIPITATION PATTERN
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.01    0.01    0.01    0.01    0.01
            0.02    0.02    0.02    0.02    0.02    0.06    0.06    0.06    0.06    0.06
            0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
            0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
```

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               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00

52 JD         INDEX STORM NO. 4
                    STRM        4.61  PRECIPITATION DEPTH
                    TRDA       10.00  TRANSPOSITION DRAINAGE AREA

 0 PI           PRECIPITATION PATTERN
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.01     0.01     0.01     0.01     0.01
               0.02     0.02     0.02     0.02     0.02     0.06     0.06     0.06     0.06     0.06
               0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00

53 JD         INDEX STORM NO. 5
                    STRM        4.46  PRECIPITATION DEPTH
                    TRDA       20.00  TRANSPOSITION DRAINAGE AREA

 0 PI           PRECIPITATION PATTERN
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.01     0.01     0.01     0.01     0.01
               0.02     0.02     0.02     0.02     0.02     0.06     0.06     0.06     0.06     0.06
               0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01     0.01
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
               0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
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                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
                  0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
  62 KK     *    RET1    *     STORAGE
            *            *
            **************

  66 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
  85 KK     *    RET2    *     STORAGE
            *            *
            **************

  90 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
 113 KK     *    RET5    *     STORAGE
            *            *
            **************

 117 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
        WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
 142 KK     *    RET4    *     STORAGE
            *            *
            **************

 146 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
 173 KK     *    RET7    *     STORAGE
            *            *
            **************

 177 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
```

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                    QSCAL         0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 201 KK   *      RET3  *      STORAGE
          *            *
          **************

 205 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 216 KK   *      RET6  *      STORAGE
          *            *
          **************

 220 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 427 KK   *     DET20  *      STORAGE
          *            *
          **************

 431 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
1
                                        RUNOFF SUMMARY
                                    FLOW IN CUBIC FEET PER SECOND
                                  TIME IN HOURS,  AREA IN SQUARE MILES

                                    PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
          OPERATION      STATION     FLOW    PEAK                                           AREA      STAGE     MAX STAGE
+                                                      6-HOUR     24-HOUR     72-HOUR

          HYDROGRAPH AT
+                          01       366.   12.15         33.          9.          3.       0.16
          ROUTED TO
+                         RET1      366.   12.15         33.          9.          3.       0.16
          ROUTED TO
+                         RT1       351.   12.20         33.          9.          3.       0.16
          HYDROGRAPH AT
+                          02       384.   12.10         33.         10.          3.       0.14
          ROUTED TO
+                         RET2      384.   12.10         32.          9.          3.       0.14
          2 COMBINED AT
+                         CP2       703.   12.10         65.         18.          6.       0.30
          ROUTED TO
+                         RT2       664.   12.15         65.         18.          6.       0.30
          HYDROGRAPH AT
+                          05       416.   12.05         38.         12.          4.       0.14
          ROUTED TO
+                         RET5      416.   12.05         38.         11.          4.       0.14
          2 COMBINED AT
+                         CP5      1021.   12.10        104.         30.         10.       0.44
          ROUTED TO
+                         RT5       995.   12.15        104.         30.         10.       0.44
          HYDROGRAPH AT
+                          04       347.   12.05         26.          7.          2.       0.12
          ROUTED TO
+                         RET4      347.   12.05         26.          7.          2.       0.12
          ROUTED TO
+                         RT4       323.   12.15         26.          7.          2.       0.12
          HYDROGRAPH AT
```

+		09	300.	12.10	23.	6.	2.	0.11
+	HYDROGRAPH AT	07	333.	12.10	31.	9.	3.	0.12
+	ROUTED TO	RET7	333.	12.10	31.	9.	3.	0.12
+	3 COMBINED AT	CP7	939.	12.10	80.	22.	7.	0.36
+	ROUTED TO	RT7	917.	12.15	80.	22.	7.	0.36
+	HYDROGRAPH AT	03	424.	12.05	33.	9.	3.	0.15
+	ROUTED TO	RET3	424.	12.05	33.	9.	3.	0.15
+	ROUTED TO	RT3	367.	12.15	33.	9.	3.	0.15
+	ROUTED TO	RET6	367.	12.15	33.	9.	3.	0.15
+	HYDROGRAPH AT	06	489.	12.10	45.	13.	4.	0.18
+	4 COMBINED AT	CP6	2713.	12.15	261.	75.	25.	1.13
+	ROUTED TO	RT6	2301.	12.20	261.	74.	25.	1.13
+	HYDROGRAPH AT	11	460.	12.10	35.	9.	3.	0.17
+	ROUTED TO	RT11	380.	12.20	35.	9.	3.	0.17
+	HYDROGRAPH AT	08	361.	12.10	31.	9.	3.	0.13
+	ROUTED TO	RT8	307.	12.15	31.	9.	3.	0.13
+	HYDROGRAPH AT	10	1120.	12.10	107.	31.	10.	0.46
+	4 COMBINED AT	CP10	3914.	12.20	430.	123.	41.	1.90
+	ROUTED TO	RT10	3779.	12.20	430.	123.	41.	1.90
+	HYDROGRAPH AT	14	397.	12.10	33.	9.	3.	0.15
+	HYDROGRAPH AT	12	695.	12.15	65.	18.	6.	0.30
+	2 COMBINED AT	CP12	1086.	12.10	98.	27.	9.	0.46
+	ROUTED TO	RT12A	1067.	12.15	98.	27.	9.	0.46
+	ROUTED TO	RT12B	1030.	12.20	98.	27.	9.	0.46
+	HYDROGRAPH AT	13	558.	12.15	52.	15.	5.	0.26
+	3 COMBINED AT	CP13	5282.	12.20	575.	163.	54.	2.62
+	ROUTED TO	RT13	5140.	12.25	575.	163.	54.	2.62
+	HYDROGRAPH AT	16	1125.	12.15	111.	31.	10.	0.52
+	2 COMBINED AT	CP16	6071.	12.25	682.	193.	64.	3.14
+	ROUTED TO	RT16	5377.	12.40	682.	193.	64.	3.14
+	HYDROGRAPH AT	29	404.	12.10	31.	8.	3.	0.15
+	ROUTED TO	RT29	388.	12.10	31.	8.	3.	0.15
+	HYDROGRAPH AT	21	369.	12.05	26.	7.	2.	0.13
+	2 COMBINED AT	CP21	748.	12.10	57.	15.	5.	0.28

+	ROUTED TO	RT21	702.	12.15	57.	15.	5.	0.28
+	HYDROGRAPH AT	15	1621.	12.15	145.	39.	13.	0.70
+	ROUTED TO	RT15	1611.	12.15	145.	39.	13.	0.70
+	HYDROGRAPH AT	18	361.	12.10	32.	9.	3.	0.14
+	HYDROGRAPH AT	20	682.	12.10	56.	16.	5.	0.26
+	4 COMBINED AT	CP20	3262.	12.15	288.	77.	26.	1.38
+	ROUTED TO	DET20	3262.	12.15	288.	78.	26.	1.38
+	HYDROGRAPH AT	33	460.	12.10	34.	9.	3.	0.18
+	ROUTED TO	RT33	399.	12.20	34.	9.	3.	0.18
+	HYDROGRAPH AT	27	275.	12.10	21.	6.	2.	0.11
+	HYDROGRAPH AT	28	422.	12.10	35.	9.	3.	0.17
+	3 COMBINED AT	CP28	1038.	12.15	91.	24.	8.	0.45
+	ROUTED TO	RT28	1007.	12.15	91.	24.	8.	0.45
+	HYDROGRAPH AT	26	168.	12.10	13.	3.	1.	0.06
+	3 COMBINED AT	CP26	4387.	12.15	389.	104.	35.	1.90
+	ROUTED TO	RT26	4388.	12.15	389.	104.	35.	1.90
+	HYDROGRAPH AT	19	416.	12.10	33.	9.	3.	0.15
+	2 COMBINED AT	CP19	4731.	12.15	421.	113.	38.	2.05
+	ROUTED TO	RT19	4555.	12.20	421.	113.	38.	2.05
+	HYDROGRAPH AT	32	963.	12.15	80.	21.	7.	0.44
+	ROUTED TO	RT32	894.	12.20	80.	21.	7.	0.44
+	HYDROGRAPH AT	31	968.	12.15	86.	23.	8.	0.50
+	2 COMBINED AT	CP31	1836.	12.15	165.	43.	14.	0.94
+	ROUTED TO	RT31	1836.	12.20	165.	43.	14.	0.94
+	HYDROGRAPH AT	25	576.	12.15	55.	15.	5.	0.27
+	3 COMBINED AT	CP25	6863.	12.20	633.	170.	57.	3.26
+	ROUTED TO	RT25	6266.	12.30	633.	170.	57.	3.26
+	HYDROGRAPH AT	24	730.	12.15	75.	21.	7.	0.38
+	2 COMBINED AT	CP24	6864.	12.25	705.	190.	63.	3.64
+	HYDROGRAPH AT	17	931.	12.05	76.	22.	7.	0.32
+	ROUTED TO	RT17	842.	12.15	76.	22.	7.	0.32
+	HYDROGRAPH AT	23	671.	12.15	71.	19.	6.	0.28
+	2 COMBINED AT	CP23	1513.	12.15	147.	41.	14.	0.60
+	2 COMBINED AT	CP24A	8015.	12.25	847.	229.	76.	4.24

+		ROUTED TO	RT24A	7839.	12.30	847.	229.	76.	4.24
+		HYDROGRAPH AT	30	692.	12.20	68.	17.	6.	0.39
+		HYDROGRAPH AT	22	453.	12.15	45.	12.	4.	0.22
+		4 COMBINED AT	CP22	13015.	12.35	1588.	437.	146.	8.00
+		ROUTED TO	RT22A	13016.	12.35	1588.	437.	146.	8.00
+		DIVERSION TO	DT22A	2000.	12.25	291.	80.	27.	8.00
+		HYDROGRAPH AT	D22A	11016.	12.35	1297.	356.	119.	8.00
+		ROUTED TO	RT22B	10831.	12.40	1297.	356.	119.	8.00
+		HYDROGRAPH AT	58	319.	12.05	22.	6.	2.	0.11
+		2 COMBINED AT	CP58	10859.	12.40	1316.	361.	121.	8.11
+		ROUTED TO	RT58	10627.	12.40	1316.	361.	121.	8.11
+		HYDROGRAPH AT	35	1043.	12.10	70.	18.	6.	0.41
+		ROUTED TO	RT35	908.	12.15	70.	18.	6.	0.41
+		HYDROGRAPH AT	34	1186.	12.10	80.	20.	7.	0.46
+		2 COMBINED AT	CP34	2057.	12.10	149.	38.	13.	0.87
+		ROUTED TO	RT34	1887.	12.15	149.	38.	13.	0.87
+		HYDROGRAPH AT	38	166.	12.05	9.	2.	1.	0.06
+		HYDROGRAPH AT	59	136.	12.10	9.	2.	1.	0.05
+		4 COMBINED AT	CP59	11274.	12.40	1464.	399.	133.	9.09
+		ROUTED TO	RT59A	11210.	12.45	1464.	399.	133.	9.09
+		HYDROGRAPH AT	39	401.	12.05	25.	6.	2.	0.15
+		2 COMBINED AT	CP59A	11214.	12.45	1486.	405.	135.	9.24
+		ROUTED TO	RT59B	10956.	12.50	1486.	405.	135.	9.24
+		HYDROGRAPH AT	40	385.	12.05	27.	7.	2.	0.15
+		HYDROGRAPH AT	60	326.	12.10	25.	7.	2.	0.18
+		3 COMBINED AT	CP60	10990.	12.50	1530.	417.	139.	9.58
+		ROUTED TO	RT60	10652.	12.55	1530.	417.	139.	9.58
+		HYDROGRAPH AT	47	951.	12.20	91.	23.	8.	0.55
+		HYDROGRAPH AT	46	436.	12.10	28.	7.	2.	0.17
+		2 COMBINED AT	CP46	1302.	12.15	119.	31.	10.	0.72
+		ROUTED TO	RT46	1242.	12.20	119.	31.	10.	0.72
+		HYDROGRAPH AT	37	1439.	12.10	104.	26.	9.	0.63
+		ROUTED TO	RT37	1334.	12.20	104.	26.	9.	0.63
		HYDROGRAPH AT							

+		44	248.	12.10	14.	4.	1.	0.13
+	HYDROGRAPH AT	42	651.	12.10	47.	12.	4.	0.32
+	4 COMBINED AT	CP42	3352.	12.15	282.	72.	24.	1.79
+	ROUTED TO	RT42	3155.	12.20	282.	72.	24.	1.79
+	HYDROGRAPH AT	45	259.	12.10	17.	4.	1.	0.16
+	HYDROGRAPH AT	48	2150.	12.25	247.	62.	21.	1.57
+	ROUTED TO	RT48A	2134.	12.30	247.	62.	21.	1.57
+	DIVERSION TO	DT48A	1967.	12.30	239.	60.	20.	1.57
+	HYDROGRAPH AT	D48A	167.	12.30	8.	2.	1.	1.57
+	ROUTED TO	RTD48A	147.	12.35	8.	2.	1.	1.57
+	2 COMBINED AT	CP45	264.	12.15	25.	7.	2.	0.25
+	ROUTED TO	RT45	247.	12.25	25.	7.	2.	0.25
+	HYDROGRAPH AT	41	745.	12.10	56.	16.	5.	0.35
+	3 COMBINED AT	CP41	3950.	12.20	360.	94.	31.	2.39
+	ROUTED TO	RT41	3815.	12.25	360.	94.	31.	2.39
+	HYDROGRAPH AT	61	313.	12.10	28.	8.	3.	0.12
+	ROUTED TO	RT61	267.	12.15	28.	8.	3.	0.12
+	HYDROGRAPH AT	62	338.	12.05	21.	6.	2.	0.12
+	4 COMBINED AT	CP62	12119.	12.50	1882.	510.	170.	12.21
+	ROUTED TO	RT62	11574.	12.60	1882.	510.	170.	12.21
+	HYDROGRAPH AT	63	683.	12.15	68.	21.	7.	0.39
+	2 COMBINED AT	CP63	11652.	12.60	1940.	528.	177.	12.59
+	ROUTED TO	RT63	11281.	12.70	1940.	528.	177.	12.59
+	HYDROGRAPH AT	D48A	1967.	12.30	239.	60.	20.	1.57
+	ROUTED TO	RT48B	1933.	12.40	239.	60.	20.	1.57
+	HYDROGRAPH AT	49	660.	12.20	65.	18.	6.	0.43
+	2 COMBINED AT	CP49	2337.	12.30	302.	77.	26.	1.91
+	ROUTED TO	RT49	2298.	12.40	302.	77.	26.	1.91
+	HYDROGRAPH AT	43	305.	12.10	18.	5.	2.	0.14
+	HYDROGRAPH AT	51	1135.	12.20	112.	30.	10.	0.72
+	HYDROGRAPH AT	50	265.	12.10	19.	6.	2.	0.14
+	4 COMBINED AT	CP50	3158.	12.30	445.	117.	39.	2.91
+	ROUTED TO	RT50	3006.	12.45	445.	117.	39.	2.91
+	HYDROGRAPH AT	52	1174.	12.15	96.	24.	8.	0.60

+	ROUTED TO	RT52	1040.	12.30	96.	24.	8.	0.60
+	HYDROGRAPH AT	53	1037.	12.20	99.	25.	8.	0.70
+	2 COMBINED AT	CP53	2027.	12.25	194.	49.	16.	1.30
+	HYDROGRAPH AT	55	737.	12.10	55.	14.	5.	0.34
+	HYDROGRAPH AT	56	1809.	12.25	188.	47.	16.	1.23
+	2 COMBINED AT	CP56	2423.	12.20	241.	60.	20.	1.57
+	ROUTED TO	RT56	2194.	12.30	241.	60.	20.	1.57
+	HYDROGRAPH AT	54	818.	12.15	70.	18.	6.	0.49
+	HYDROGRAPH AT	57	194.	12.05	9.	2.	1.	0.08
+	3 COMBINED AT	CP54	2841.	12.25	318.	79.	26.	2.14
+	2 COMBINED AT	CP54A	4812.	12.25	505.	126.	42.	3.44
+	ROUTED TO	RT54	4572.	12.35	505.	126.	42.	3.44
+	HYDROGRAPH AT	64	1119.	12.15	111.	33.	11.	0.64
+	4 COMBINED AT	CP64	15618.	12.60	2828.	759.	254.	19.58

*** NORMAL END OF HEC-1 ***

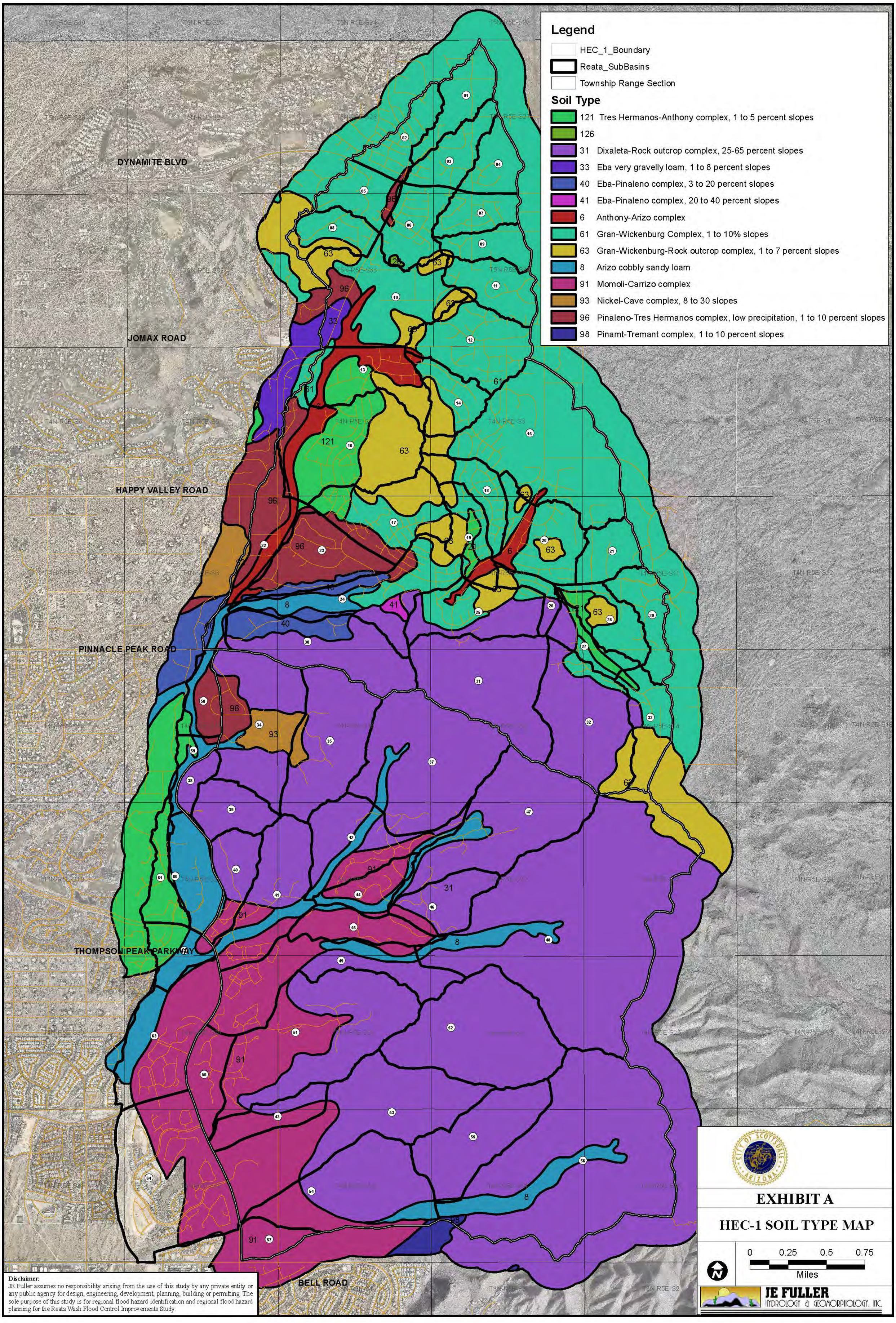
Appendix C Exhibits

Exhibit A – Soil Type Map

Exhibit B – Land Use Map

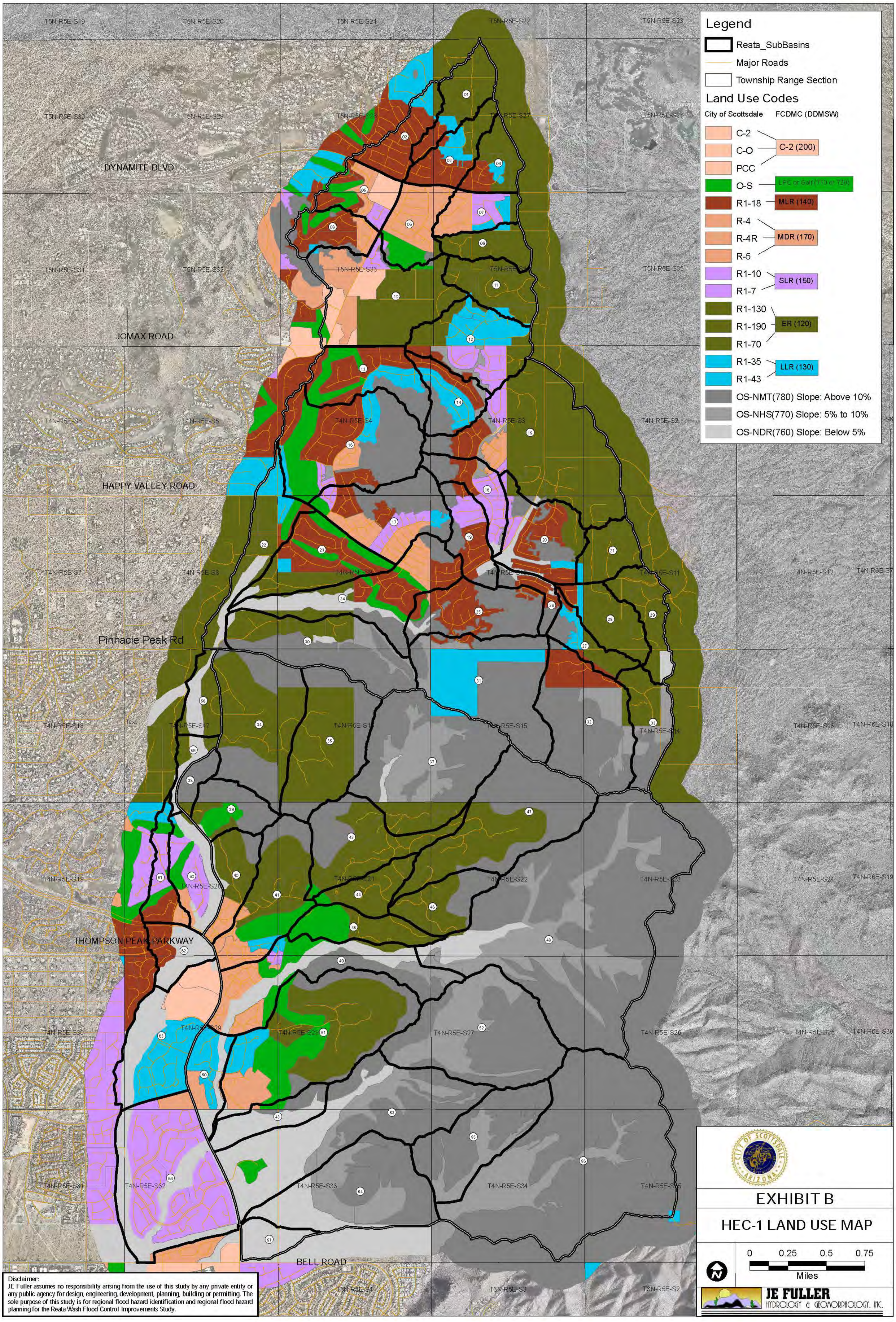
Exhibit C – Watershed Map

REATA WASH FLOOD CONTROL IMPROVEMENT STUDY

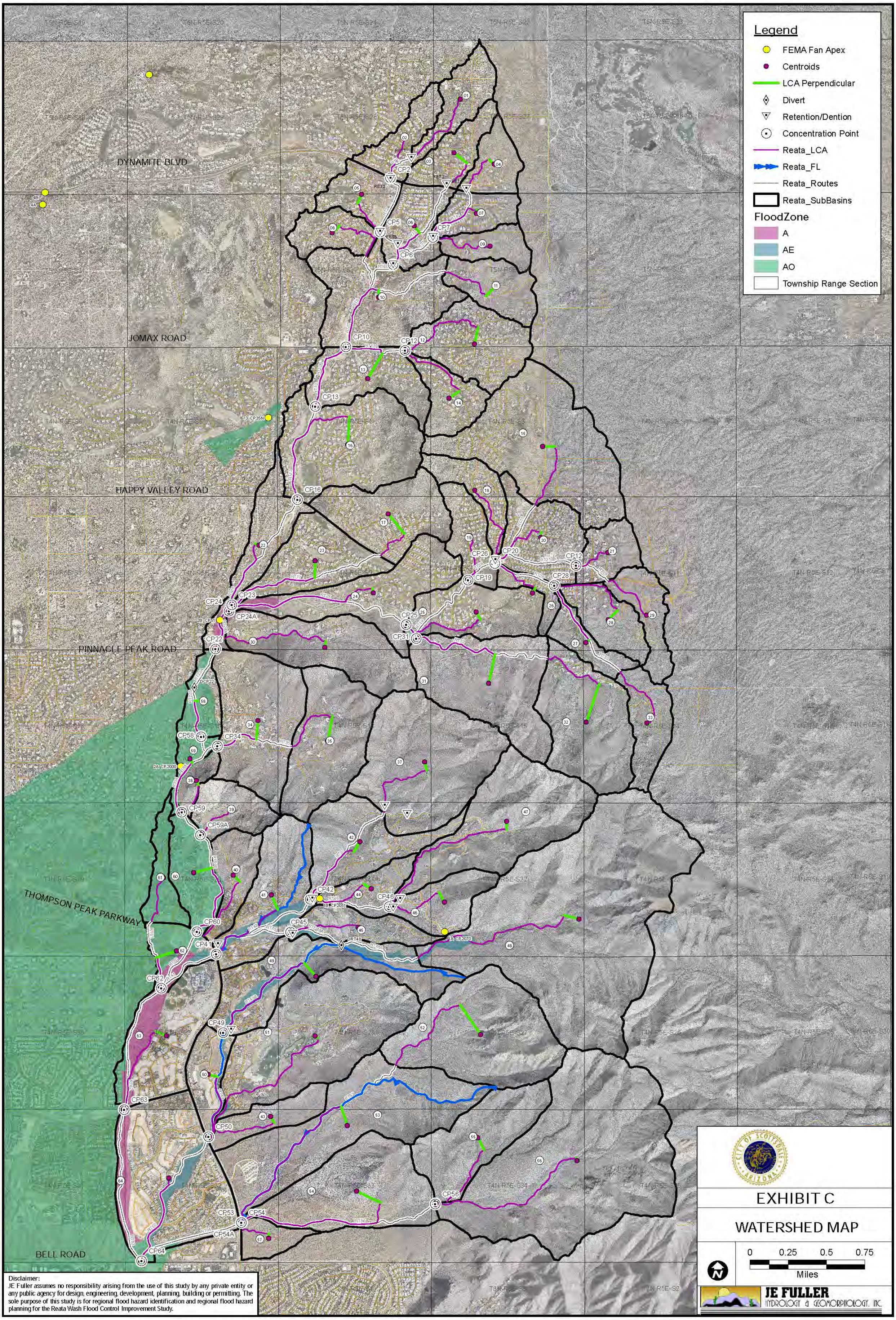


Disclaimer:
JE Fuller assumes no responsibility arising from the use of this study by any private entity or any public agency for design, engineering, development, planning, building or permitting. The sole purpose of this study is for regional flood hazard identification and regional flood hazard planning for the Reata Wash Flood Control Improvements Study.

REATA WASH FLOOD CONTROL IMPROVEMENT STUDY



REATA WASH FLOOD CONTROL IMPROVEMENT STUDY



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