DRAINAGE REPORTS

ABBREVEATED WATER & SEWER NEED REPORTS

WATER STUDY

WASTEWATER STUDY

STORMWATER WAIVER APPLICATION

Water Basis of Design Report

Cavalliere Flats
80-Lot Proposed Subdivision

Scottsdale, Arizona

Accepted for
City of Scottsdale
Water Resources Administration
9379 E. San Salvador
Scottsdale, AZ 85258
Doug Mann 9.10.14

Prepared for:

Taylor Morrison/Arizona, Inc.

Prepared by:

Kimley-Horn and Associates, Inc.
7740 North 16th Street, Suite 300
Phoenix, AZ 85020

191069012
August 2014
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Kimley»Horn

12-ZN-2014
9/8/2014

Water Basis of Design Report

Cavalliere Flats
80-Lot Proposed Subdivision

Scottsdale, Arizona

Prepared for:

Taylor Morrison/Arizona, Inc.
9000 E. Pima Center Parkway, Suite 350
Scottsdale, Arizona 85258

Prepared by:

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
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Jason M.
Burm
DATE SIGNED 8.28.14
ARIZONA U.S.A.
Expires: 06/30/17

191069012
August 2014
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1.0 INTRODUCTION

1.1 Intent

The purpose of this water report is to review the existing and proposed water system for the proposed Cavalliere Flats residential development located at the southeast corner of Alma School Parkway and Pinnacle Vista Drive in Scottsdale, Arizona. This report presents the basis of design criteria that will be used for the engineering design of the proposed development utilizing current water design standards and guidelines set forth by the City of Scottsdale, Arizona.

1.2 Project Description

The proposed project is located at the southeast corner of Alma School Parkway and Pinnacle Vista Drive in the City of Scottsdale, Arizona. It is more precisely described as a portion of the southeast quarter of Section 33, Township 5 North, Range 5 East, Maricopa County, Arizona. The proposed development consists of approximately 47 acres and is planned to include a 80-lot, single family residential subdivision. Refer to **Appendix A** for the Site Location Map.

2.0 DISTRIBUTION SYSTEM DESCRIPTION

2.1 Existing Distribution System

Per the City of Scottsdale Quarter Section Maps 49-53 and 49-54, three existing waterlines are located within Alma School Parkway to the west of the property. A 14-inch diameter asbestos concrete pipe (ACP), as well as 12-inch diameter and 20-inch diameter ductile iron pipe (DIP) mains. An 8-inch diameter to 12-inch diameter C900 Polyvinyl Chloride (PVC) waterline is located in Pinnacle Vista Drive to the north of the site. Additionally, to the west of the site within 111th Street and Bajada Drive is an 8-inch diameter C900 PVC waterline. To the south of the site exists a 12-inch ACP waterline within Jomax Road.

The subject site lies near the boundary of two separate water pressure zones and ranges in existing ground elevation from 2545 feet to 2600 feet, City of Scottsdale Datum. According to Figure 6.1-3 of the City of Scottsdale Design Standards and Policies Manual (DS&PM), the site is located within the south portion of Pressure Zone 12. The existing waterlines adjacent to the site appear to be operated in Pressure Zone 12. With the exception of the line within Jomax road, which appears to be located within Pressure Zone 11.

2.2 Proposed Distribution System

The proposed distribution system will consist of an 8" Class 350 DIP water line that will provide potable water and fire protection. The distribution system will connect to the existing 12-inch DIP (Zone 12) water main located in Alma School Parkway and loop through the project site and tie into the existing 12-inch ACP (Zone 11) water main in Jomax Road. The system will also connect to the existing 8-inch PVC (Zone 12) waterline in Bajada Drive. The system spans two pressure zones and will require a pressure reducing valve (PRV). A PRV is proposed along the waterline near lot 57. The north portion of the project will operate under Zone 12, while the south portion will operate under Zone 11. Refer to **Appendix C** for the Proposed Water System Layout Exhibit.

3.0 BASIS OF DESIGN

3.1 Design Methodology

The WaterCAD v8i water system modeling software distributed by Haestad Methods, Inc. was used to model the proposed water network. Three flow tests were performed to determine the residual and static pressures of the existing system. Flow Test #1 was taken from hydrants connected to Pressure Zone 11 along Jomax Road to the south of the site. Flow Test #2 was taken for hydrants along Bajada Drive operating in Pressure Zone 12. Flow Test #3 was taken from hydrants connected to Pressure Zone 12 along Pinnacle Drive to the north of the site. Refer to **Appendix B** for the results of the fire flow tests. According to the results of these flow tests, the maximum operating flows at 20 psi were calculated to be 4,276 gpm, 2,055 gpm and 3,059 gpm respectively.

According to Section 6-1.407 of the DSPM, distribution systems shall be designed with a minimum residual pressure of 50 psi and a maximum static pressure of 120 psi. In fire flow scenarios a minimum design pressure of 30 psi is required.

3.2 Water System Analysis

The proposed water distribution system for the project is modeled under 4 design scenarios. Average Day, Max Day, Peak Hour and Max Day plus Fire Flows scenarios are modeled. Average Day Demands are based on Figure 6.1-2 in the DS&PM, with peaking factors per section 6-1.404. A fire flow of 1,000 gpm per section 6-1.501 of the DS&PM was used. See the table below for a summary of water demands:

Water Demands								
Land Use	Dwelling units (du)	Average Daily Demand (gpd/du)	Average Daily Flow (gpd)	ADF (gpm)	Max Day Flow (gpd)	MDF (gpm)	Peak Hour Flow (gpd)	PHF (gpm)
<2 du/ac	80	485.6	38,848	27	77,696	54	135,968	94

Average Day, Max Day, and Peak Hour Demands are applied at hydraulic model nodes based on number of adjacent proposed units. Fire flow demands are applied to all junctions within the project boundary.

3.3 Results

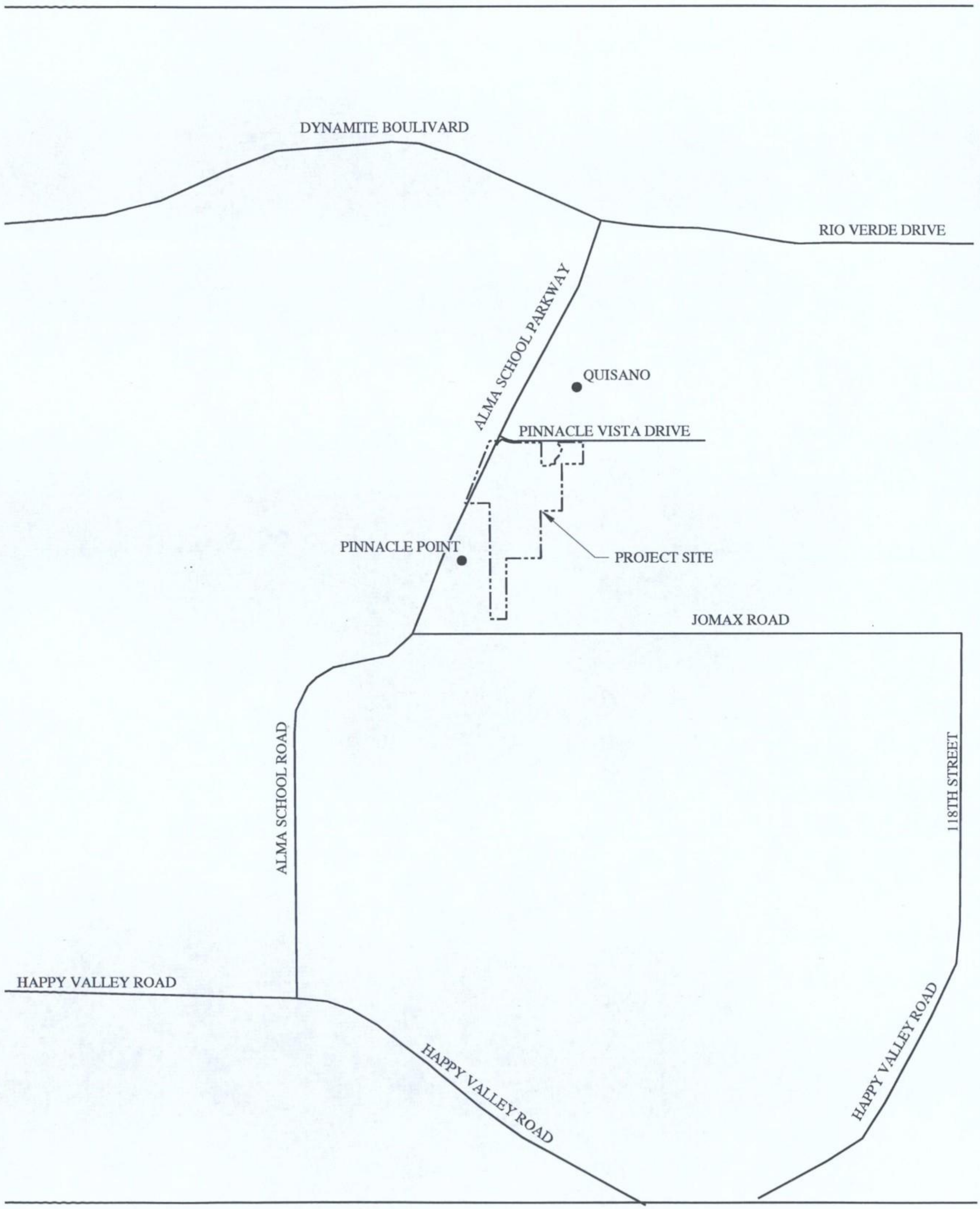
Results from the hydraulic water model indicated the system is able to supply the calculated demands at or above the minimum required pressures. The proposed PRV is set at an outflow pressure of 85 psi. This is an initial setting and may be adjusted as required by the city.

Refer to **Appendix D** for the WaterCAD node and fire flow reports.

Based on the fire flow tests performed and the results of the WaterCAD analysis, the water system appears adequate and sufficient to meet the fire flow and domestic demands of the Cavalliere Flats residential subdivision. Individual unit PRV's are required on all single family residential units.

APPENDIX A

SITE LOCATION MAP



K:\PHX_Civil\191069012 – Greasewood\Reports\WaterBOD\Exhibit\Vicinity Map.dwg May 19, 2014 zach.hill
XREFS: x69012BM x69012VM x69012TP

Kimley»Horn

APPENDIX B

FIRE FLOW TEST RESULTS

AFPC ALLIANCE FIRE PROTECTION CO. FIRE SPRINKLERS

ALLIANCE FIRE PROTECTION CO.
Phone: (480) 966-9178 Fax: (480) 967-9191
2114 East Cedar Street • Tempe, Arizona 85281
E-mail Address: afpc@afpc.com

AZ Lic. C-16 58130
AZ Lic. L-16 74007
NV Lic. C-41a 30135

FIRE HYDRANT FLOW TEST

Name: Kimley-Horn
Alma School & Lomax
Scottsdale Arizona

Date: 02/14/14
Time: 8:00 AM
Report #:
Tech: R.Pfeiff

Static Hydrant: 100 yards east of Windy Walk Dr. on north side of Jomax
Elevation: 2596
Dist. Between Hydrants: 500 yards
Diameter of Main:

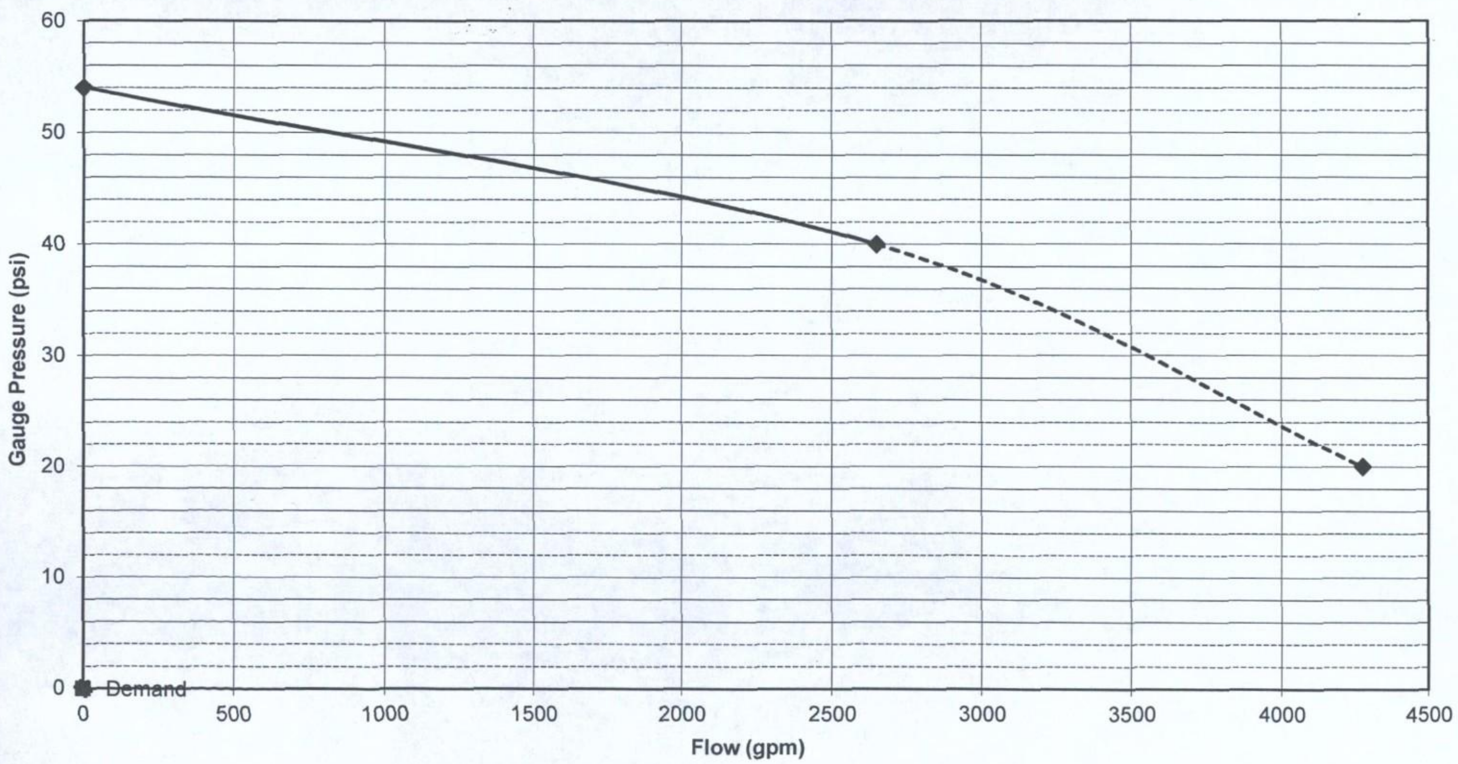
Static Pressure:	A	54.0	B	
Residual Pressure:	A	40.0	B	

Pump Present: NO
Tank Present: NO
Req. GPM: Req. PSI:

Flowing Hydrant: 200 yards easy of Alma School on north side of Jomax
Elevation: 2523
Type of Supply: CITY MAIN

Hydrant:	A	A	B	B
Outlet Diameter:	4.0			
Pitot Reading:	38.0			
Coeff:	0.90			
Discharge GPM:	2648	0	0	0

Flow A					Flow B				
Static pressure of	54	psi @	0	gpm	Static pressure of	0	psi @	0	gpm
Residual pressure of	40	psi @	2648	gpm	Residual pressure of	0	psi @	0	gpm
Available flow @	20	psi @	4276	gpm	Available flow @	20	psi @		gpm



Comments: Elevations are approximate

NOTES:
1. Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
2. Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test
3. The distance between hydrants, elevations & main diameters are for information only.

AFPC
ALLIANCE FIRE PROTECTION CO.
FIRE SPRINKLERS

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AZ Lic. L-16 74007
NV Lic. C-41a 30135

FIRE HYDRANT FLOW TEST

Name: Kimley-Horn
111th Street & Bajada
Scottsdale Arizona

Date: 02/14/14
Time: 8:15 AM
Report #:
Tech: R.Pfeiff

Static Hydrant: 150 yards west of 111th St. on South side of Bajada
Elevation: 2602
Dist. Between Hydrants: 150 yards
Diameter of Main:

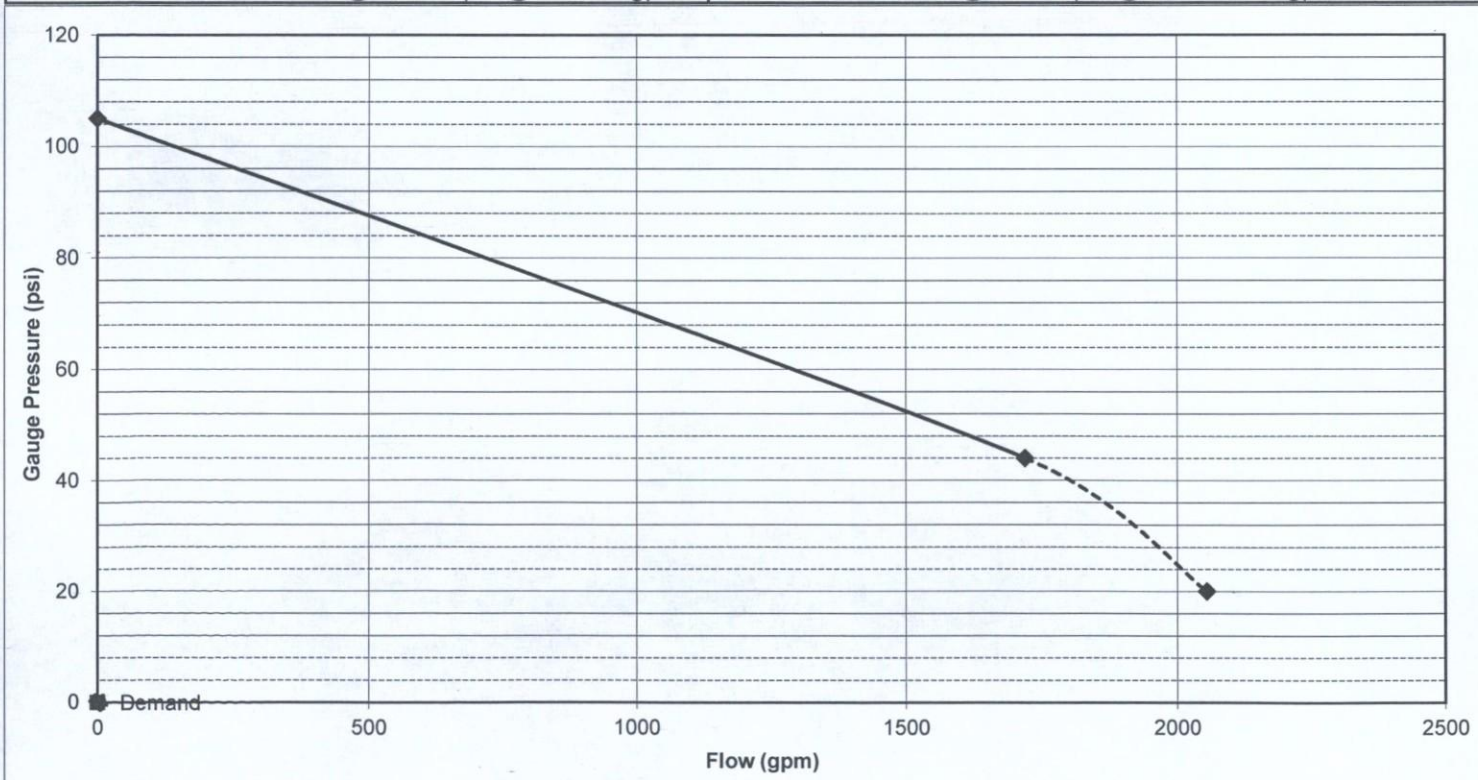
Flowing Hydrant: 300 yards west of 111th St. on South side of Bajada
Elevation: 2581
Type of Supply: CITY MAIN

Static Pressure:	A	105.0	B	
Residual Pressure:	A	44.0	B	

Pump Present: NO
Tank Present: NO
Req. GPM: Req. PSI:

Hydrant:	A	A	B	B
Outlet Diameter:	4.0			
Pitot Reading:	16.0			
Coeff:	0.90			
Discharge GPM:	1718	0	0	0

Flow A					Flow B				
Static pressure of	105	psi @	0	gpm	Static pressure of	0	psi @	0	gpm
Residual pressure of	44	psi @	1718	gpm	Residual pressure of	0	psi @	0	gpm
Available flow @	20	psi @	2055	gpm	Available flow @	20	psi @		gpm



Comments: Elevations are approximate

NOTES:

1. Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
2. Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test
3. The distance between hydrants, elevations & main diameters are for information only.

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AZ Lic. C-16 58130
AZ Lic. L-16 74007
NV Lic. C-41a 30135

FIRE HYDRANT FLOW TEST

Name: Kimley-Horn
Alma School & Pinnacle Vista
Scottsdale Arizona

Date: 02/14/14
Time: 8:15 AM
Report #:
Tech: R.Pfeiff

Static Hydrant: 100 yards east of Alma School on North side of Pinnacle Vista
Elevation: 2616
Dist. Between Hydrants: 400 yards
Diameter of Main:

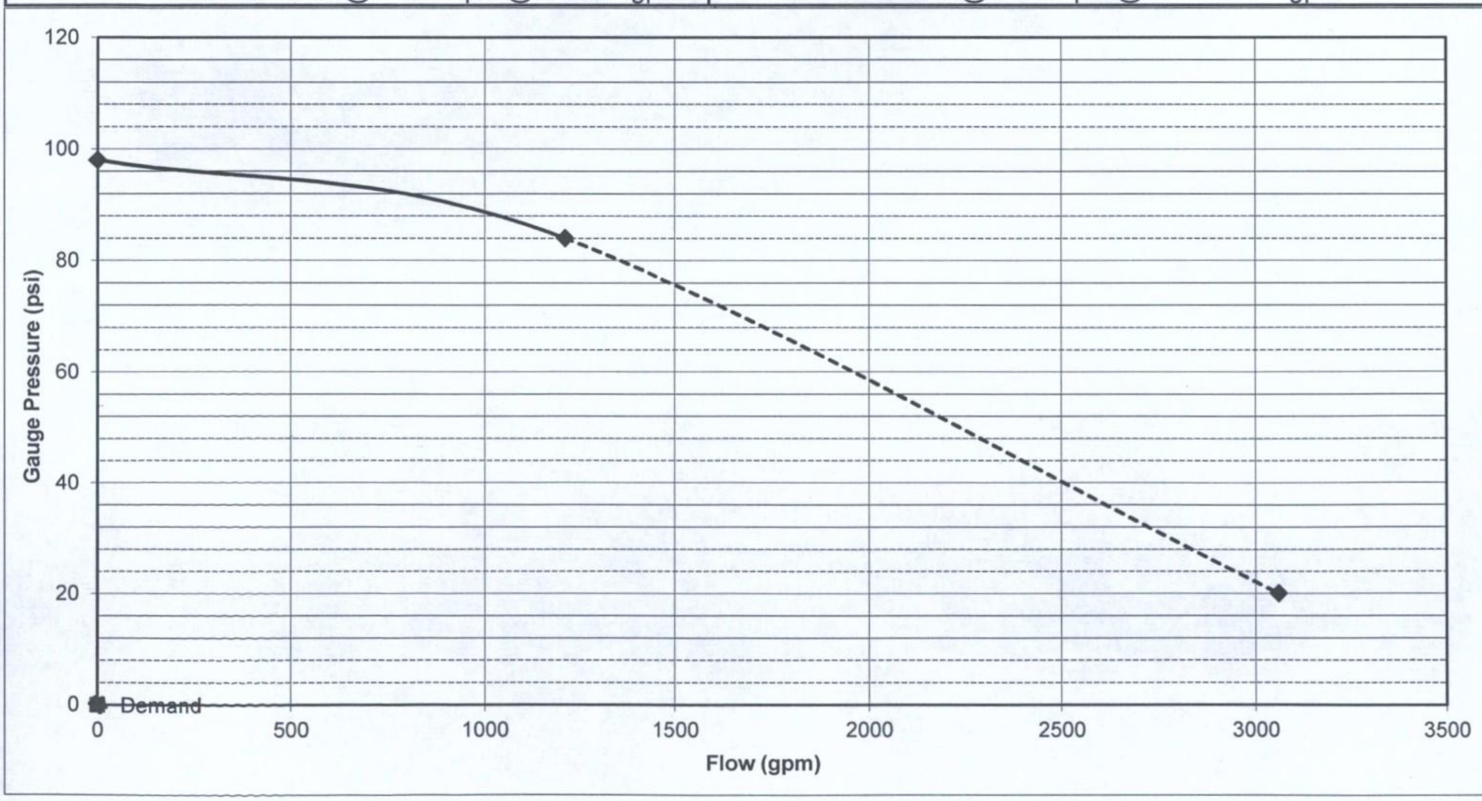
Flowing Hydrant: 500 yards east of Alma School on North side of Pinnacle Vista
Elevation: 2592
Type of Supply: CITY MAIN

Static Pressure:	A	98.0	B	
Residual Pressure:	A	84.0	B	

Hydrant:	A	A	B	B
Outlet Diameter:	2.5			
Pitot Reading:	52.0			
Coeff:	0.90			
Discharge GPM:	1210	0	0	0

Pump Present: NO
Tank Present: NO
Req. GPM: Req. PSI:

Flow A					Flow B				
Static pressure of	98	psi @	0	gpm	Static pressure of	0	psi @	0	gpm
Residual pressure of	84	psi @	1210	gpm	Residual pressure of	0	psi @	0	gpm
Available flow @	20	psi @	3059	gpm	Available flow @	20	psi @		gpm



Comments: Elevations are approximate

NOTES:

1. Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
2. Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test
3. The distance between hydrants, elevations & main diameters are for information only.

APPENDIX C

PROPOSED WATER SYSTEM LAYOUT

K: \PHX_Civil\191069012 – Greasewood\Reports\WaterBOD\Exhibit\191069012 – Water System Layout.dwg Aug 28, 2014 zach.hill
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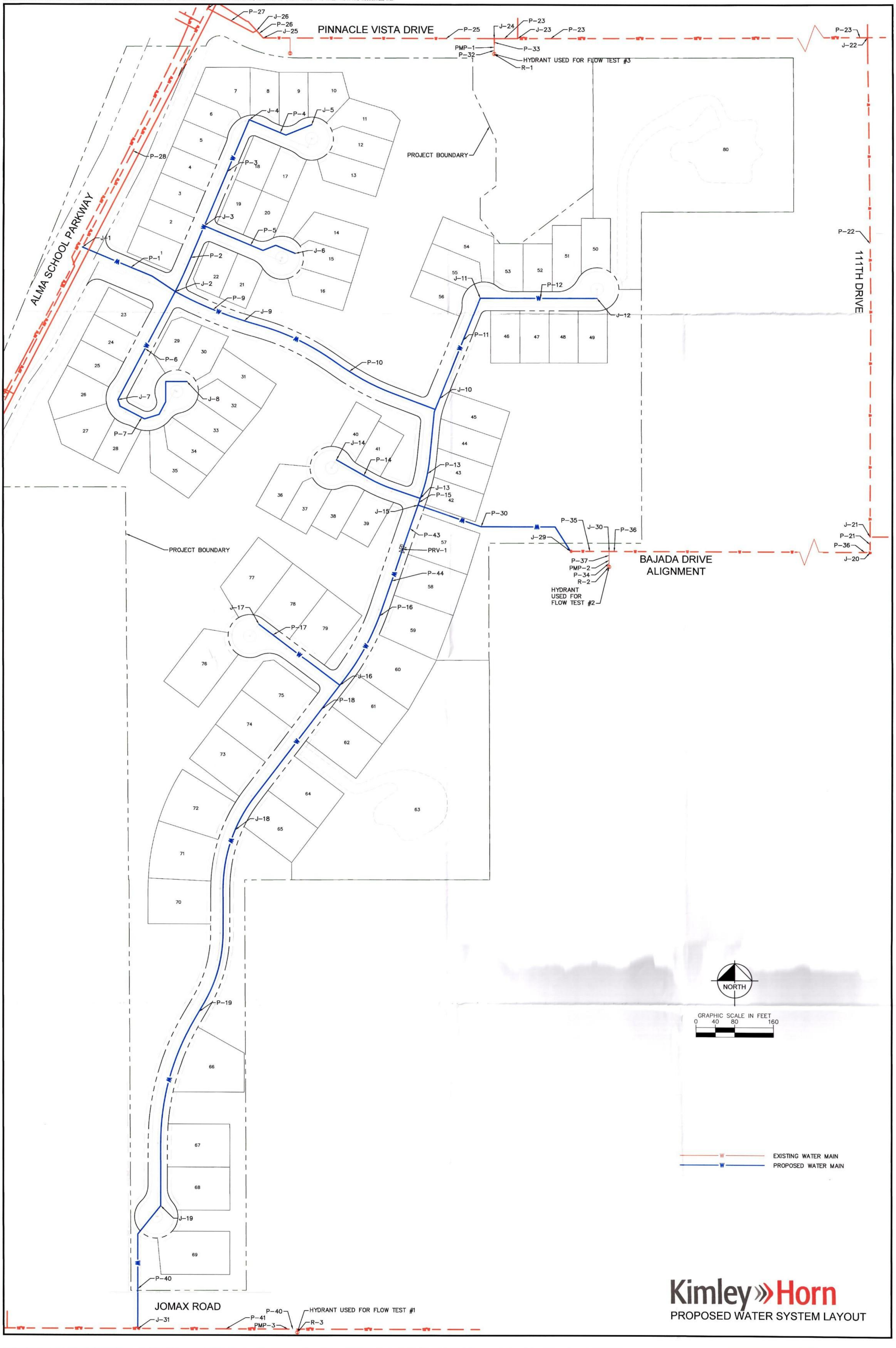

PROPOSED WATER SYSTEM LAYOUT

APPENDIX D

WATERCAD ANALYSIS RESULTS

FlexTable: Junction Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Average Day
Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Zone
J-1	2,591.00	0	2,846.02	110.3	Zone 12
J-2	2,581.00	0	2,846.01	114.7	Zone 12
J-3	2,586.00	2	2,846.01	112.5	Zone 12
J-4	2,591.00	2	2,846.01	110.3	Zone 12
J-5	2,585.00	2	2,846.01	112.9	Zone 12
J-6	2,580.00	2	2,846.01	115.1	Zone 12
J-7	2,578.00	2	2,846.01	116.0	Zone 12
J-8	2,570.00	2	2,846.01	119.4	Zone 12
J-9	2,576.00	0	2,846.01	116.8	Zone 12
J-10	2,575.00	1	2,846.01	117.3	Zone 12
J-11	2,576.00	2	2,846.01	116.8	Zone 12
J-12	2,583.00	2	2,846.01	113.8	Zone 12
J-13	2,569.00	1	2,846.01	119.9	Zone 12
J-14	2,568.00	2	2,846.01	120.3	Zone 12
J-15	2,569.00	0	2,846.01	119.9	Zone 12
J-16	2,557.00	2	2,762.53	88.9	Zone 11
J-17	2,558.00	2	2,762.53	88.5	Zone 11
J-18	2,548.00	3	2,762.53	92.8	Zone 11
J-19	2,535.00	1	2,762.53	98.4	Zone 11
J-20	2,620.00	0	2,846.02	97.8	Zone 12
J-21	2,622.00	0	2,846.02	96.9	Zone 12
J-22	2,635.00	0	2,846.02	91.3	Zone 12
J-23	2,618.00	0	2,846.02	98.7	Zone 12
J-24	2,616.00	0	2,846.02	99.5	Zone 12
J-25	2,592.00	0	2,846.02	109.9	Zone 12
J-26	2,593.00	0	2,846.02	109.5	Zone 12
J-27	2,598.00	0	2,846.02	107.3	Zone 12
J-29	2,582.00	0	2,846.01	114.2	Zone 12
J-30	2,590.00	0	2,846.01	110.8	Zone 12
J-31	2,533.00	0	2,762.53	99.3	Zone 11

FlexTable: Pipe Table (Greasewood-WaterCAD-Model.wtg)

Active Scenario: Average Day

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	215	J-1	J-2	8.0	130.0	17	0.11	0.000
P-2	151	J-2	J-3	8.0	130.0	7	0.05	0.000
P-3	240	J-3	J-4	8.0	130.0	3	0.02	0.000
P-4	139	J-4	J-5	8.0	130.0	2	0.01	0.000
P-5	199	J-3	J-6	8.0	130.0	2	0.01	0.000
P-6	256	J-2	J-7	8.0	130.0	4	0.03	0.000
P-7	154	J-7	J-8	8.0	130.0	2	0.02	0.000
P-9	152	J-9	J-2	8.0	130.0	-5	0.03	0.000
P-10	449	J-9	J-10	8.0	130.0	5	0.03	0.000
P-11	226	J-10	J-11	8.0	130.0	4	0.03	0.000
P-12	240	J-11	J-12	8.0	130.0	2	0.02	0.000
P-13	213	J-10	J-13	8.0	130.0	1	0.00	0.000
P-14	193	J-13	J-14	8.0	130.0	2	0.01	0.000
P-15	85	J-13	J-15	8.0	130.0	-2	0.02	0.000
P-17	245	J-16	J-17	8.0	130.0	2	0.01	0.000
P-18	337	J-16	J-18	8.0	130.0	4	0.03	0.000
P-19	846	J-18	J-19	8.0	130.0	1	0.01	0.000
P-21	33	J-20	J-21	8.0	130.0	-10	0.06	0.000
P-22	1,042	J-21	J-22	8.0	130.0	-10	0.06	0.000
P-23	1,209	J-22	J-23	12.0	130.0	-10	0.03	0.000
P-24	50	J-23	J-24	12.0	130.0	-10	0.03	0.000
P-25	477	J-24	J-25	8.0	130.0	17	0.11	0.000
P-26	20	J-25	J-26	8.0	130.0	17	0.11	0.000
P-27	113	J-26	J-27	8.0	130.0	17	0.11	0.000
P-28	562	J-27	J-1	12.0	130.0	17	0.05	0.000
P-30	174	J-15	J-29	8.0	130.0	-10	0.06	0.000
P-32	22	PMP-1	R-1	48.0	130.0	-27	0.00	0.000
P-33	30	PMP-1	J-24	48.0	130.0	27	0.00	0.000
P-34	37	R-2	PMP-2	48.0	130.0	0	0.00	0.000
P-35	250	J-29	J-30	8.0	130.0	-10	0.06	0.000
P-36	1,023	J-30	J-20	8.0	130.0	-10	0.06	0.000
P-37	36	PMP-2	J-30	48.0	130.0	0	0.00	0.000
P-40	195	J-19	J-31	6.0	130.0	0	0.00	0.000
P-41	513	J-31	PMP-3	8.0	130.0	(N/A)	(N/A)	(N/A)
P-42	93	PMP-3	R-3	6.0	130.0	(N/A)	(N/A)	(N/A)
P-43	97	J-15	PRV-1	8.0	130.0	7	0.05	0.000
P-44	244	PRV-1	J-16	8.0	130.0	7	0.05	0.000

FlexTable: PRV Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Average Day

Current Time: 0.000 hours

Label	Elevation (ft)	Pressure (From) (psi)	Pressure (To) (psi)	Flow (gpm)	Headloss (ft)	Zone
PRV-1	2,566.00	121.1	85.0	7	83.48	Zone 11

FlexTable: Pump Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Average Day

Current Time: 0.000 hours

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)	Flow (Design) (gpm)	Head (Design) (ft)	Zone
PMP-1	2,616.00	2,620.00	2,846.02	27	226.02	1,210	193.75	Zone 12
PMP-2	2,590.00	2,592.00	2,846.01	0	0.00	1,718	101.49	Zone 12
PMP-3	2,596.00	(N/A)	(N/A)	(N/A)	(N/A)	2,648	92.40	Zone 11

FlexTable: Reservoir Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Average Day

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	2,620.00	Zone 12	27	2,620.00
R-2	2,592.00	Zone 12	0	2,592.00
R-3	2,600.00	Zone 11	(N/A)	(N/A)

FlexTable: Junction Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Max Day

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Zone
J-1	2,591.00	0	2,845.92	110.3	Zone 12
J-2	2,581.00	0	2,845.92	114.6	Zone 12
J-3	2,586.00	5	2,845.92	112.5	Zone 12
J-4	2,591.00	3	2,845.91	110.3	Zone 12
J-5	2,585.00	3	2,845.91	112.9	Zone 12
J-6	2,580.00	3	2,845.92	115.0	Zone 12
J-7	2,578.00	4	2,845.92	115.9	Zone 12
J-8	2,570.00	5	2,845.92	119.4	Zone 12
J-9	2,576.00	0	2,845.92	116.8	Zone 12
J-10	2,575.00	1	2,845.91	117.2	Zone 12
J-11	2,576.00	3	2,845.91	116.8	Zone 12
J-12	2,583.00	5	2,845.91	113.8	Zone 12
J-13	2,569.00	2	2,845.91	119.8	Zone 12
J-14	2,568.00	4	2,845.91	120.2	Zone 12
J-15	2,569.00	0	2,845.91	119.8	Zone 12
J-16	2,557.00	3	2,762.53	88.9	Zone 11
J-17	2,558.00	3	2,762.53	88.5	Zone 11
J-18	2,548.00	5	2,762.53	92.8	Zone 11
J-19	2,535.00	3	2,762.53	98.4	Zone 11
J-20	2,620.00	0	2,845.93	97.8	Zone 12
J-21	2,622.00	0	2,845.93	96.9	Zone 12
J-22	2,635.00	0	2,845.95	91.3	Zone 12
J-23	2,618.00	0	2,845.95	98.6	Zone 12
J-24	2,616.00	0	2,845.95	99.5	Zone 12
J-25	2,592.00	0	2,845.93	109.9	Zone 12
J-26	2,593.00	0	2,845.93	109.4	Zone 12
J-27	2,598.00	0	2,845.93	107.3	Zone 12
J-29	2,582.00	0	2,845.92	114.2	Zone 12
J-30	2,590.00	0	2,845.92	110.7	Zone 12
J-31	2,533.00	0	2,762.53	99.3	Zone 11

FlexTable: Pipe Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Max Day

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	215	J-1	J-2	8.0	130.0	34	0.22	0.000
P-2	151	J-2	J-3	8.0	130.0	15	0.09	0.000
P-3	240	J-3	J-4	8.0	130.0	7	0.04	0.000
P-4	139	J-4	J-5	8.0	130.0	3	0.02	0.000
P-5	199	J-3	J-6	8.0	130.0	3	0.02	0.000
P-6	256	J-2	J-7	8.0	130.0	9	0.06	0.000
P-7	154	J-7	J-8	8.0	130.0	5	0.03	0.000
P-9	152	J-9	J-2	8.0	130.0	-11	0.07	0.000
P-10	449	J-9	J-10	8.0	130.0	11	0.07	0.000
P-11	226	J-10	J-11	8.0	130.0	8	0.05	0.000
P-12	240	J-11	J-12	8.0	130.0	5	0.03	0.000
P-13	213	J-10	J-13	8.0	130.0	1	0.01	0.000
P-14	193	J-13	J-14	8.0	130.0	4	0.03	0.000
P-15	85	J-13	J-15	8.0	130.0	-5	0.03	0.000
P-17	245	J-16	J-17	8.0	130.0	3	0.02	0.000
P-18	337	J-16	J-18	8.0	130.0	8	0.05	0.000
P-19	846	J-18	J-19	8.0	130.0	3	0.02	0.000
P-21	33	J-20	J-21	8.0	130.0	-20	0.13	0.000
P-22	1,042	J-21	J-22	8.0	130.0	-20	0.13	0.000
P-23	1,209	J-22	J-23	12.0	130.0	-20	0.06	0.000
P-24	50	J-23	J-24	12.0	130.0	-20	0.06	0.000
P-25	477	J-24	J-25	8.0	130.0	34	0.22	0.000
P-26	20	J-25	J-26	8.0	130.0	34	0.22	0.000
P-27	113	J-26	J-27	8.0	130.0	34	0.22	0.000
P-28	562	J-27	J-1	12.0	130.0	34	0.10	0.000
P-30	174	J-15	J-29	8.0	130.0	-20	0.13	0.000
P-32	22	PMP-1	R-1	48.0	130.0	-54	0.01	0.000
P-33	30	PMP-1	J-24	48.0	130.0	54	0.01	0.000
P-34	37	R-2	PMP-2	48.0	130.0	0	0.00	0.000
P-35	250	J-29	J-30	8.0	130.0	-20	0.13	0.000
P-36	1,023	J-30	J-20	8.0	130.0	-20	0.13	0.000
P-37	36	PMP-2	J-30	48.0	130.0	0	0.00	0.000
P-40	195	J-19	J-31	6.0	130.0	0	0.00	0.000
P-41	513	J-31	PMP-3	8.0	130.0	(N/A)	(N/A)	(N/A)
P-42	93	PMP-3	R-3	6.0	130.0	(N/A)	(N/A)	(N/A)
P-43	97	J-15	PRV-1	8.0	130.0	15	0.09	0.000
P-44	244	PRV-1	J-16	8.0	130.0	15	0.09	0.000

FlexTable: PRV Table (Greasewood-WaterCAD-Model.wtg)

Active Scenario: Max Day

Current Time: 0.000 hours

Label	Elevation (ft)	Pressure (From) (psi)	Pressure (To) (psi)	Flow (gpm)	Headloss (ft)	Zone
PRV-1	2,566.00	121.1	85.0	15	83.38	Zone 11

FlexTable: Pump Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Max Day

Current Time: 0.000 hours

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)	Flow (Design) (gpm)	Head (Design) (ft)	Zone
PMP-1	2,616.00	2,620.00	2,845.95	54	225.95	1,210	193.75	Zone 12
PMP-2	2,590.00	2,592.00	2,845.92	0	0.00	1,718	101.49	Zone 12
PMP-3	2,596.00	(N/A)	(N/A)	(N/A)	(N/A)	2,648	92.40	Zone 11

FlexTable: Reservoir Table (Greasewood-WaterCAD-Model.wtg)

Active Scenario: Max Day

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	2,620.00	Zone 12	54	2,620.00
R-2	2,592.00	Zone 12	0	2,592.00
R-3	2,600.00	Zone 11	(N/A)	(N/A)

FlexTable: Junction Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Peak Hour

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Zone
J-1	2,591.00	0	2,845.69	110.2	Zone 12
J-2	2,581.00	0	2,845.67	114.5	Zone 12
J-3	2,586.00	8	2,845.67	112.3	Zone 12
J-4	2,591.00	6	2,845.67	110.2	Zone 12
J-5	2,585.00	6	2,845.67	112.8	Zone 12
J-6	2,580.00	6	2,845.67	114.9	Zone 12
J-7	2,578.00	7	2,845.67	115.8	Zone 12
J-8	2,570.00	8	2,845.67	119.3	Zone 12
J-9	2,576.00	0	2,845.67	116.7	Zone 12
J-10	2,575.00	2	2,845.67	117.1	Zone 12
J-11	2,576.00	6	2,845.66	116.7	Zone 12
J-12	2,583.00	8	2,845.66	113.6	Zone 12
J-13	2,569.00	4	2,845.67	119.7	Zone 12
J-14	2,568.00	7	2,845.67	120.1	Zone 12
J-15	2,569.00	0	2,845.67	119.7	Zone 12
J-16	2,557.00	6	2,762.53	88.9	Zone 11
J-17	2,558.00	6	2,762.53	88.5	Zone 11
J-18	2,548.00	9	2,762.53	92.8	Zone 11
J-19	2,535.00	5	2,762.52	98.4	Zone 11
J-20	2,620.00	0	2,845.72	97.7	Zone 12
J-21	2,622.00	0	2,845.72	96.8	Zone 12
J-22	2,635.00	0	2,845.76	91.2	Zone 12
J-23	2,618.00	0	2,845.76	98.5	Zone 12
J-24	2,616.00	0	2,845.76	99.4	Zone 12
J-25	2,592.00	0	2,845.72	109.8	Zone 12
J-26	2,593.00	0	2,845.71	109.3	Zone 12
J-27	2,598.00	0	2,845.70	107.2	Zone 12
J-29	2,582.00	0	2,845.67	114.1	Zone 12
J-30	2,590.00	0	2,845.68	110.6	Zone 12
J-31	2,533.00	0	2,762.52	99.3	Zone 11

FlexTable: Pipe Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Peak Hour

Current Time: 0.000 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	215	J-1	J-2	8.0	130.0	60	0.38	0.000
P-2	151	J-2	J-3	8.0	130.0	26	0.17	0.000
P-3	240	J-3	J-4	8.0	130.0	12	0.08	0.000
P-4	139	J-4	J-5	8.0	130.0	6	0.04	0.000
P-5	199	J-3	J-6	8.0	130.0	6	0.04	0.000
P-6	256	J-2	J-7	8.0	130.0	15	0.10	0.000
P-7	154	J-7	J-8	8.0	130.0	8	0.05	0.000
P-9	152	J-9	J-2	8.0	130.0	-19	0.12	0.000
P-10	449	J-9	J-10	8.0	130.0	19	0.12	0.000
P-11	226	J-10	J-11	8.0	130.0	14	0.09	0.000
P-12	240	J-11	J-12	8.0	130.0	8	0.05	0.000
P-13	213	J-10	J-13	8.0	130.0	2	0.01	0.000
P-14	193	J-13	J-14	8.0	130.0	7	0.05	0.000
P-15	85	J-13	J-15	8.0	130.0	-9	0.05	0.000
P-17	245	J-16	J-17	8.0	130.0	6	0.04	0.000
P-18	337	J-16	J-18	8.0	130.0	14	0.09	0.000
P-19	846	J-18	J-19	8.0	130.0	5	0.03	0.000
P-21	33	J-20	J-21	8.0	130.0	-35	0.22	0.000
P-22	1,042	J-21	J-22	8.0	130.0	-35	0.22	0.000
P-23	1,209	J-22	J-23	12.0	130.0	-35	0.10	0.000
P-24	50	J-23	J-24	12.0	130.0	-35	0.10	0.000
P-25	477	J-24	J-25	8.0	130.0	60	0.38	0.000
P-26	20	J-25	J-26	8.0	130.0	60	0.38	0.000
P-27	113	J-26	J-27	8.0	130.0	60	0.38	0.000
P-28	562	J-27	J-1	12.0	130.0	60	0.17	0.000
P-30	174	J-15	J-29	8.0	130.0	-35	0.22	0.000
P-32	22	PMP-1	R-1	48.0	130.0	-94	0.02	0.000
P-33	30	PMP-1	J-24	48.0	130.0	94	0.02	0.000
P-34	37	R-2	PMP-2	48.0	130.0	0	0.00	0.000
P-35	250	J-29	J-30	8.0	130.0	-35	0.22	0.000
P-36	1,023	J-30	J-20	8.0	130.0	-35	0.22	0.000
P-37	36	PMP-2	J-30	48.0	130.0	0	0.00	0.000
P-40	195	J-19	J-31	6.0	130.0	0	0.00	0.000
P-41	513	J-31	PMP-3	8.0	130.0	(N/A)	(N/A)	(N/A)
P-42	93	PMP-3	R-3	6.0	130.0	(N/A)	(N/A)	(N/A)
P-43	97	J-15	PRV-1	8.0	130.0	26	0.17	0.000
P-44	244	PRV-1	J-16	8.0	130.0	26	0.17	0.000

FlexTable: Pump Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Peak Hour

Current Time: 0.000 hours

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)	Flow (Design) (gpm)	Head (Design) (ft)	Zone
PMP-1	2,616.00	2,620.00	2,845.76	94	225.76	1,210	193.75	Zone 12
PMP-2	2,590.00	2,592.00	2,845.68	0	0.00	1,718	101.49	Zone 12
PMP-3	2,596.00	(N/A)	(N/A)	(N/A)	(N/A)	2,648	92.40	Zone 11

FlexTable: Reservoir Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Peak Hour

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	2,620.00	Zone 12	94	2,620.00
R-2	2,592.00	Zone 12	0	2,592.00
R-3	2,600.00	Zone 11	(N/A)	(N/A)

FlexTable: PRV Table (Greasewood-WaterCAD-Model.wtg)
Active Scenario: Peak Hour

Current Time: 0.000 hours

Label	Elevation (ft)	Pressure (From) (psi)	Pressure (To) (psi)	Flow (gpm)	Headloss (ft)	Zone
PRV-1	2,566.00	121.0	85.0	26	83.13	Zone 11

Fire Flow Node FlexTable: Fire Flow Report (Greasewood-WaterCAD-Model.wtg)

Active Scenario: Max Day + FF

Current Time: 0.000 hours

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Zone Lower Limit @ Total Flow Needed) (psi)	Satisfies Fire Flow Constraints?
J-1	2,591.00	1,000	3,930	84.8	True
J-2	2,581.00	1,000	3,853	84.9	True
J-3	2,586.00	1,000	3,509	84.9	True
J-4	2,591.00	1,000	3,109	84.9	True
J-5	2,585.00	1,000	2,982	84.9	True
J-6	2,580.00	1,000	3,272	84.9	True
J-7	2,578.00	1,000	3,445	84.9	True
J-8	2,570.00	1,000	3,273	84.9	True
J-9	2,576.00	1,000	3,951	85.0	True
J-10	2,575.00	1,000	3,958	85.2	True
J-11	2,576.00	1,000	3,458	85.2	True
J-12	2,583.00	1,000	3,087	85.2	True
J-13	2,569.00	1,000	4,150	85.4	True
J-14	2,568.00	1,000	3,730	85.4	True
J-15	2,569.00	1,000	4,234	85.4	True
J-16	2,557.00	1,000	3,567	86.5	True
J-17	2,558.00	1,000	3,198	86.9	True
J-18	2,548.00	1,000	3,163	86.5	True
J-19	2,535.00	1,000	2,540	86.5	True
J-20	2,620.00	1,000	3,468	84.8	True
J-21	2,622.00	1,000	3,447	84.7	True
J-22	2,635.00	1,000	3,801	89.8	True
J-23	2,618.00	1,000	4,131	84.4	True
J-24	2,616.00	1,000	4,147	84.5	True
J-25	2,592.00	1,000	4,029	84.7	True
J-26	2,593.00	1,000	4,007	84.7	True
J-27	2,598.00	1,000	3,887	84.8	True
J-29	2,582.00	1,000	4,219	85.5	True
J-30	2,590.00	1,000	4,338	85.7	True
J-31	2,533.00	1,000	2,096	86.5	True

Sewer Basis of Design Report

Cavalliere Flats
80-Lot Proposed Subdivision

Scottsdale, Arizona

Accepted for
City of Scottsdale
Water Resources Administration
9379 E. San Salvador
Scottsdale, AZ 85258
Doug Mann 9.10.14

Prepared for:

Taylor Morrison/Arizona, Inc.

Prepared by:

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7740 North 16th Street, Suite 300
Phoenix, AZ 85020

191069012
August 2014
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Kimley»Horn

12-ZN-2014
9/8/2014

Sewer Basis of Design Report

Cavalliere Flats
80-Lot Proposed Subdivision

Scottsdale, Arizona

Prepared for:

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191069012
August 2014
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LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Intent

The purpose of this water report is to review the existing and proposed wastewater system for the proposed Cavalliere Flats residential development located at the southeast corner of Alma School Parkway and Pinnacle Vista Drive in Scottsdale, Arizona. This report presents the basis of design criteria that will be used for the engineering design of the proposed development utilizing current wastewater design standards and guidelines set forth by the City of Scottsdale, Arizona.

1.2 Project Description

The proposed project is located at the southeast corner of Alma School Parkway and Pinnacle Vista Drive in the City of Scottsdale, Arizona. It is more precisely described as a portion of the southeast quarter of Section 33, Township 5 North, Range 5 East, Maricopa County, Arizona. The proposed development consists of approximately 47 acres and is planned to include a 80-lot, single family residential subdivision. Refer to **Appendix A** for the Site Location Map.

2.0 COLLECTION SYSTEM DESCRIPTION

2.1 Existing Collection System

Per the City of Scottsdale Sewer Quarter Section Map 49-53, an 8-inch ~~asbestos concrete pipe (ACP)~~ sewer main is located in Alma School Parkway to the west of the site. Additionally an 8-inch diameter (PVC) sewer line is located along Jomax Road to the south of the site. The line is located within the north, unpaved half-street of Jomax Road.

2.2 Proposed Collection System

The proposed ~~distribution~~ system will consist of 8" PVC gravity sewer line that will collect and convey wastewater flows generated by the site. The collection system will connect to the existing 8-inch PVC ~~water~~ line stub located in Jomax Road. They system also provides a stub to Bajada Drive to the east of the site for a future connection. Refer to **Appendix B** for the Proposed ~~Water~~ System Layout Exhibit.

3.0 BASIS OF DESIGN

3.1 Design Criteria

Average Day Demand design flows are calculated based on design criteria detailed within the City of Scottsdale Design Standards and Polices Manual (DS&PM). Per DS&PM Chapter 7, a design flow of 100 gallons per capita per day (gpcpd) shall be used. The DS&PM also requires a peaking factor of 4.0 and a residential density of 2.5 persons per dwelling unit. A summary of design criteria and calculated demands is included in the table below:

	No. of Units	Density	Population	Average Day Demand (GPD)	Peak Flow (GPD)	Peak Flow (GPM)
8-inch Sewer	80	2.5	200	20,000	8,000	55.6

Per the DS&PM proposed sewer lines were designed to achieve a full flow velocity of between 2.5 and 10 feet per second and maintain a maximum d/D ration 0.65 when calculated with a Manning's "n" value of 0.013. To satisfy these requirements the proposed public 8-inch sewer will meet be design with a minimum slope of 0.0052 ft/ft (0.52%) and a maximum slope of 0.0833 ft/ft (8.33%). See **Appendix C** for pipe slope calculations.

3.2 Wastewater System Analysis and Results

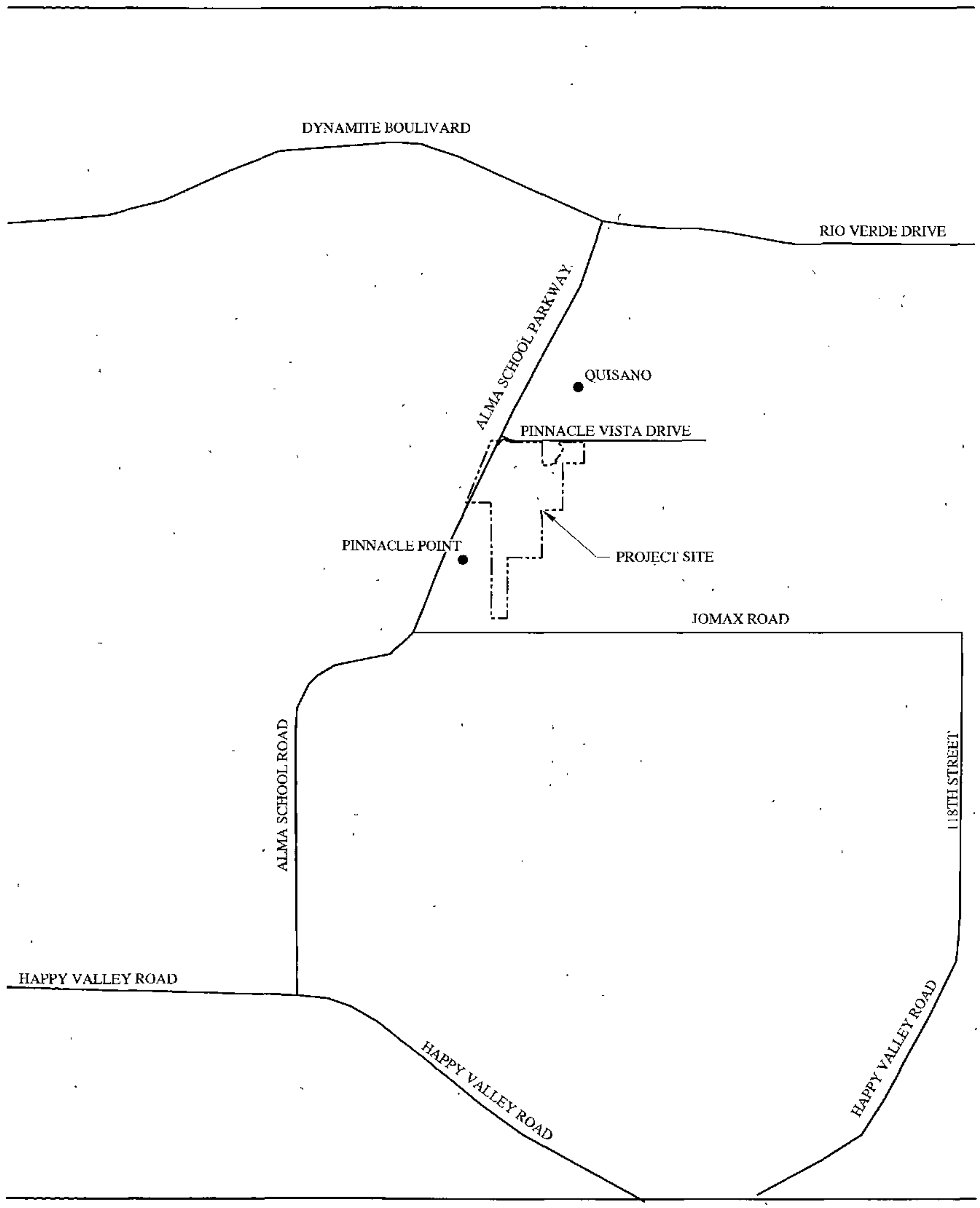
To determine the capacity of the proposed wastewater collection system, the peak design flow was analyzed within the minimum design pipe slope. At the minimum design slope of 0 0052 ft/ft an 8-inch line has the capacity to convey approximately 563,000 gallons per day. An 8-inch line at the minimum design slope can convey the proposed peak design flow of 80,000 gallons per day at a normal depth of 0.17' or a d/D ratio of 0.25, at a velocity of 1.77 ft/s. **See Appendix C – Flowmaster Calculations** for pipe capacity calculations.

3.3 Conclusions

The proposed wastewater collection system will collect and convey wastewater flows from the proposed 80 unit residential subdivision, Cavalliere Flats. The system will discharge to the existing City of Scottsdale sewer system using a connection point at an existing 8-inch sewer stub within Jomax Road. Based on the calculations included within, the proposed system has the capacity to convey the calculated peak flow The sizes and slopes of the proposed system have been design in accordance with City of Scottsdale design requirements per the DS&PM The capacity of the sewer system downstream of the proposed connection location has not been analyzed.

APPENDIX A

SITE LOCATION MAP


DYNAMITE BOULIVARD
RIO VERDE DRIVE
ALMA SCHOOL PARKWAY
QUISANO
PINNACLE VISTA DRIVE
PINNACLE POINT
PROJECT SITE
JOMAX ROAD
ALMA SCHOOL ROAD
118TH STREET
HAPPY VALLEY ROAD
HAPPY VALLEY ROAD
HAPPY VALLEY ROAD

Kimley»Horn

APPENDIX B

PROPOSED WASTEWATER SYSTEM LAYOUT

APPENDIX C
FLOWMASTER CALCULATIONS

Worksheet for 8-Inch Full - Min

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00520	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft
Discharge	563167.59	gal/day

Results

Discharge	563167.59	gal/day
Normal Depth	0.67	ft
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.44	ft
Percent Full	100.0	%
Critical Slope	0.00857	ft/ft
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.76	ft
Froude Number	0.00	
Maximum Discharge	0.94	ft³/s
Discharge Full	0.87	ft³/s
Slope Full	0.00520	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 8-Inch Full - Min

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.44	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00857	ft/ft

Worksheet for 8-Inch Full -Max

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.08330	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft
Discharge	2254023.72	gal/day

Results

Discharge	2254023.72	gal/day
Normal Depth	0.67	ft
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.66	ft
Percent Full	100.0	%
Critical Slope	0.07763	ft/ft
Velocity	9.99	ft/s
Velocity Head	1.55	ft
Specific Energy	2.22	ft
Froude Number	0.00	
Maximum Discharge	3.75	ft³/s
Discharge Full	3.49	ft³/s
Slope Full	0.08330	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 8-Inch Full -Max

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0 67	ft
Critical Depth	0 66	ft
Channel Slope	0 08330	ft/ft
Critical Slope	0 07763	ft/ft

Worksheet for 8-Inch Capacity

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0 013	
Channel Slope	0.00520	ft/ft
Diameter	0.67	ft
Discharge	80000.00	gal/day

Results

Normal Depth	0.17	ft
Flow Area	0.07	ft²
Wetted Perimeter	0.71	ft
Hydraulic Radius	0 10	ft
Top Width	0 58	ft
Critical Depth	0.16	ft
Percent Full	25 5	%
Critical Slope	0 00650	ft/ft
Velocity	1 77	ft/s
Velocity Head	0.05	ft
Specific Energy	0 22	ft
Froude Number	0.90	
Maximum Discharge	0 94	ft³/s
Discharge Full	0.87	ft³/s
Slope Full	0 00010	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0 00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0 00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	25.46	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8-Inch Capacity

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.16	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00650	ft/ft

File Copy

Case Drainage Report Review – Cavalliere Flats

PROJECT NAME: CAVALLIERE FLATS
LOCATION: SOUTHEAST CORNER OF ALMA SCHOOL PARKWAY AND EAST PINNACLE VISTA DRIVE
CASE NUMBERS: 12-ZN-2014

Review comments for case drainage report by Kimley-Horn and Associates, Inc. sealed August 28, 2014. The drainage report was received by the City of Scottsdale (City) on September 8, 2014. The date of the review is September 30, 2014. Our review comments are as follows:

1. The City will continue to work with the applicant and his engineer on the location, design and requirements for the crossing of stormwater outflows from Cavalliere Park across Pinnacle Vista Drive. The applicant and engineer should be aware that the outcome of these discussions may have a significant impact on the layout and design of the development.

2. It is unclear how stormwater flows from the existing east culvert on Pinnacle Vista Drive and the northeast corner of the development parcel will drain through the development. Figure 4 shows a 100-year flow of 200 cfs for this wash based on the overflow of the outflow from Doc Cavalliere Park. Existing flows, excluding the 200 cfs overflow, are likely on the order of 30 cfs based on the size of the existing culvert and the contributing area to the east. Figure 4 shows this flow being routed through a proposed out parcel for the development.

3. It is unclear how stormwater flows from the west crossing Alma School Parkway will drain through the development. The drainage report shows 100-year flows of around 45 cfs from two locations entering the development site. However, there does not appear to be adequate area within the development site to route these flows to the south then east around the proposed lots.

4. Due to the conceptual nature of the drainage report, it is likely there will be a number of future significant review comments and issues resulting from the review of the preliminary drainage report and preliminary grading and drainage plan to be prepared and submitted in support of the preliminary plat case for this development.

Richard M. Anderson, P.E.
Senior Civil Engineer
Stormwater Management Division
City of Scottsdale
Phone: 480-312-2729
Fax: 480-312-9202

Response to Drainage Comments:

1. It is understood that more detail will be required for the preliminary plat applications. As mentioned in comment 3, the storage requirement for pre verses post will be included in the preliminary drainage report included with preliminary plat. Discussion with City staff on the offsite flows that impact the site from the North is ongoing and will be addressed further at the preliminary plat as well.
2. An offsite drainage exhibit has been provided as Figure 2. Excerpts from the *Addendum to the Preliminary Drainage Report for the Rocks at Reata Pass* have been included in the report to help validate the offsite flows from the west. Figures 3 and 4 have been revised to show all required items.
3. As discussed in the response to comment 1, a pre verses post development analysis will be conducted as part of the preliminary plat submittal to show that the project will not increase flows downstream.
4. The discussion of a channel to convey 200 cfs has been removed from the report due to the ongoing discussion with City staff to identify a different solution for flows crossing Pinnacle Vista Drive.
5. Discussion is currently underway with City staff to determine a mutually acceptable solution to the flows crossing Pinnacle Vista Drive. A solution will be shown at the preliminary plat submittal.
6. The HEC-RAS model has been updated with the revised manning's n values. The manning's n values have been varied based on aerial photography.
7. A disc containing HEC-1 and HEC-RAS models are included with the report for City review.

Preliminary Drainage Report
Prepared: August 2014

Cavalliere Flats

Prepared for:

Taylor Morrison/Arizona, Inc.
9000 E. Pima Center Parkway, Suite 350
Scottsdale, Arizona 85258

Prepared by:

Kimley-Horn and Associates, Inc.
7740 N. 16th Street, Suite 300
Phoenix, AZ 85020
(602) 944-5500

191069012
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August, 2014.

Kimley»Horn

12-ZN-2014
9/8/2014

Preliminary Drainage Report
Prepared: August 2014

Cavalliere Flats

Prepared for:

Taylor Morrison/Arizona, Inc.
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Scottsdale, Arizona 85258

Prepared by:

Kimley-Horn and Associates, Inc.
7740 N. 16th Street, Suite 300
Phoenix, AZ 85020
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Registered Professional Engineer (Civil)
CERTIFICATE NO.
52081
Jason M.
Burm
DATE SIGNED 8.28.14
ARIZONA U.S.A.
Expires: 06/30/17

191069012
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August, 2014.

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APPENDIX B – EXCERPTS FROM OFFSITE DRAINAGE REPORTS

APPENDIX C – HYDROLOGY

APPENDIX D –HYDRUALICS

APPENDIX E – STORMWATER STORAGE WAIVER

LIST OF FIGURES

1.0 INTRODUCTION

1 1 Project Description

This Preliminary Drainage report has been prepared for the proposed Cavalliere Flats residential subdivision development. Cavalliere Flats is a proposed 47-acre single family residential subdivision. The proposed development consists of 80 single family residential units. The proposed site is located within the City of Scottsdale and falls under the city's Environmentally Sensitive Lands Ordinance (ESLO)

1.2 Project Location and Description

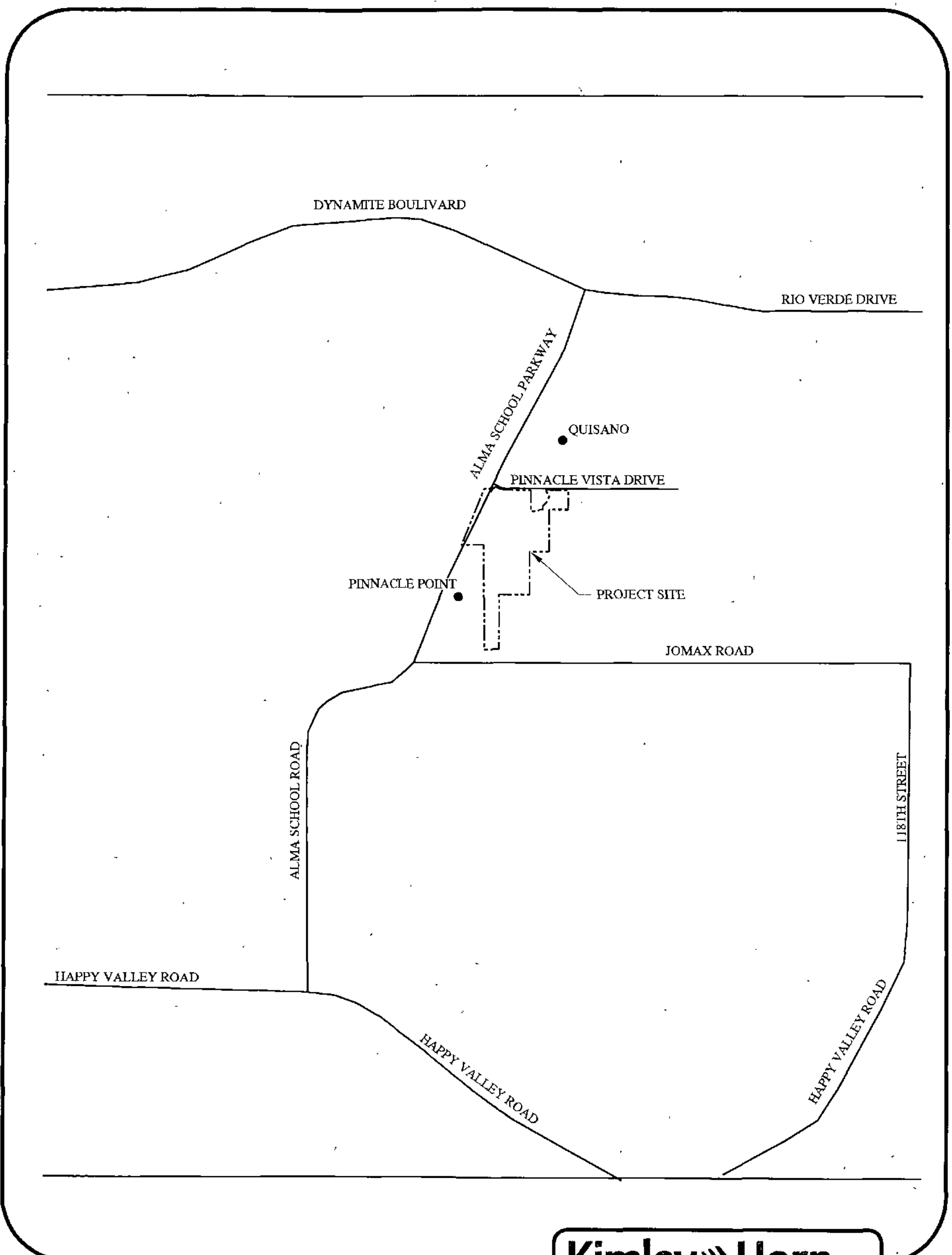
Cavalliere Flats is located within Section 33 of Township 5 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is bound to the north by the Pinnacle Vista Drive and the west by Alma School Parkway Jomax Road bounds the site to the south, with the majority of the land south of the site being undeveloped desert. An existing condominium development called Pinnacle Point is located to the southwest of the site. Scattered single family residential dwellings are located to the west of the site North of Pinnacle Vista Drive is Quisana; an existing single family residential subdivision. To the east of Quisana and northeast of the site is Troon North Park, which also serves as a City of Scottsdale regional detention basin. (see Figure 1. Vicinity Map).

The project property is home to the existing Greasewood Flats bar and restaurant and the existing Reata Pass Steakhouse Also located on the property are multiple single family residences, as well as other miscellaneous structures. Minor improvements such as parking lots, street lights and fencing scatter the property.

1 3 Scope of Drainage Report

This Preliminary Drainage report for Cavalliere Flats establishes preliminary drainage parameters and criteria for the development of the site. This report demonstrates compliance with the City of Scottsdale Design Standards and Polices Manual (DS&PM) as well as Flood Control District of Maricopa County (FCDMC) drainage polices.

This report will quantify existing offsite flows currently being conveyed though the development area and onto the property and evaluate existing and proposed drainage paths The report will also present the preliminary hydrologic analysis of both on-site and off-site runoff for the pre-developed and post-developed conditions.


DYNAMITE BOULIVARD
RIO VERDE DRIVE
ALMA SCHOOL PARKWAY
QUISANO
PINNACLE VISTA DRIVE
PINNACLE POINT
PROJECT SITE
JOMAX ROAD
ALMA SCHOOL ROAD
118TH STREET
HAPPY VALLEY ROAD
HAPPY VALLEY ROAD
HAPPY VALLEY ROAD

Kimley»Horn

2.0 DISCRIPTION OF EXISTING DRAINAGE CONDITIONS AND CHARACTERTICS

2.1 Existing Site Conditions

The site property is occupied by the existing Greasewood Flats bar and restaurant and the Reata Pass Steakhouse. These two structures are located near the western edge of the site with access to Alma School Parkway. Associated with these building are typical improvements associated with commercial locations including paved parking lots, street lights, and fencing. Both structures include outdoor patio seating which does not appear to be an impervious surface.

There are also two existing single family residences located in the northeast portion of the project The western residence of these two properties will be excluded from the development area and not included as part of the development. The eastern residence will be included in the development with the existing dwelling unit remaining in its current location.

Other minor improvements and non-native materials scatter the site These include small shed-like structures, power and light poles, telephone poles, animal fences and pens, abandoned vehicles and other large scrap metal items.

2.2 Existing On-Site Drainage Conditions

Topography of the site generally slopes towards the single major wash which bisects the site. The wash and major drainage way flows southwest through the entirety of the site.

2.3 Existing Off-Site Drainage Conditions

Off-site flows impact the site from the north, east and west. Flows to the west originate in the Rocks at Reata Pass development and are conveyed through a portion of the Four Seasons Resort property. Two existing culverts convey the offsite flow across Alma School Parkway onto the site. According to the Addendum to the Preliminary Drainage Report for the Rocks at Reata Pass, approximately 33 cfs exits the Rocks at Reata Pass property Due to the uncertainty of how the offsite flow is conveyed through the Four Seasons Resort, the offsite flow from the west was determined based on the capacity of each culvert. Excerpts from the addendum are included in **Appendix B.**

The largest impact to the site comes from the northern property boundary across Pinnacle Vista Drive Off-site flows from both the existing Quisana development and the Troon North Park detention basin are channelized north of Pinnacle Vista Drive. At approximately 500 feet east of Alma School Parkway the flows cross Pinnacle Vista Drive and impact the site This flow is conveyed through the site within the existing onsite wash

According to the Conceptual Drainage Report prepared for Quisana, the Troon North Park outlet channel has the capacity to convey the 100-year storm event. The capacity of the channel was determined to be 348 cfs using a normal depth analysis. According to this analysis, approximately 200 cfs will overtop the channel during the 100-year event This overtopping flow does not assume any other failures along the channel, however,

according to discussion with City staff, the channel experiences failures at more frequent storm events. Discussion with City staff on a solution to this offsite drainage issue is ongoing and will be presented in future drainage reports for preliminary plat. For the analysis associated with this report, it is assumed that 200 cfs will overtop the channel and be routed south separately across the site.

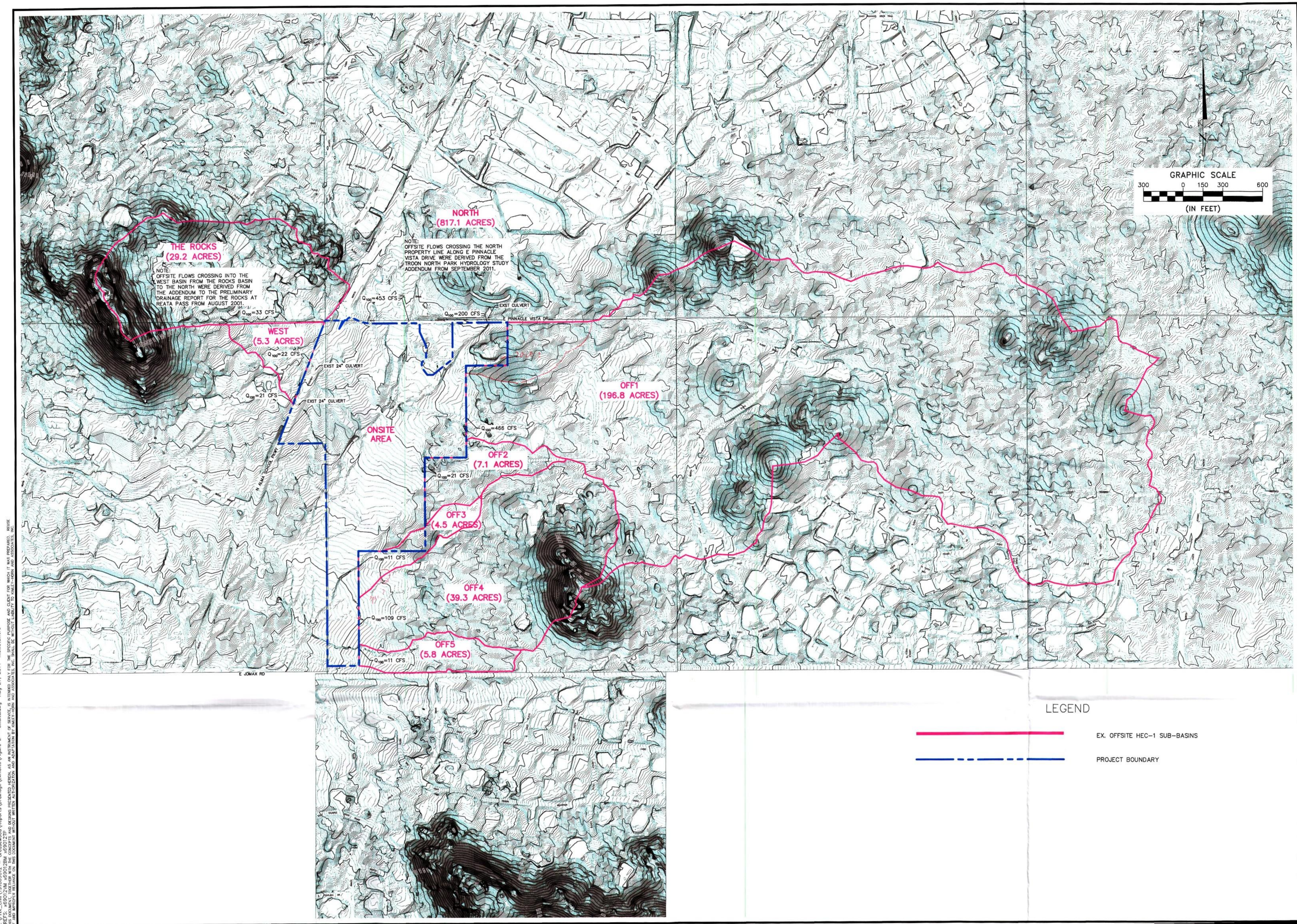
From the east minor washes convey local flows onto the site. A single large wash conveys a large regional flow onto the site, just north of the existing Greasewood Flats bar

Flows from the north and east were determined using a HEC-1 analysis based on the models included with the Troon North Park Hydrology Study Addendum Report prepared by Argus Consulting in September 2011. Excerpts from this report are included in **Appendix B** See Figure 2 for the offsite drainage exhibit. Existing condition flows are detailed on Figure 3, for complete existing hydrology and hydraulics see **Appendix C** and **Appendix D** respectively

2 4 Flood hazards Zones

The development is located within one flood zones as shown on Flood Insurance Rate Map (FIRM) panel number 04013C1330L, dated October 16, 2013 (see **Appendix A** for FIRM). Fema defines the flood zone for the site area as:

> "Other Flood Areas" Zone X – "Areas of 0 2% annual chance flood, areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood."



NO.	REVISION	BY	DATE	APPR.

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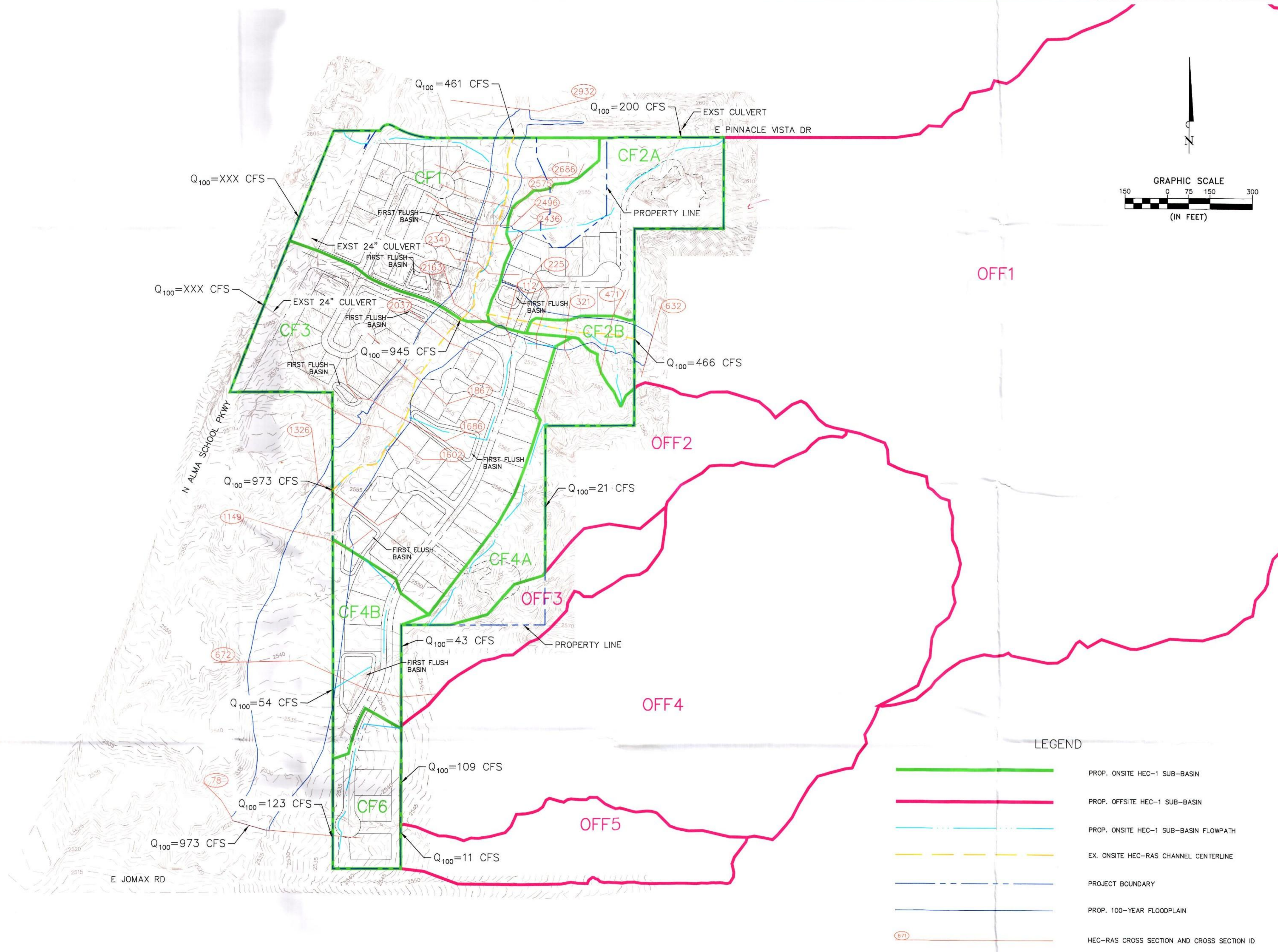
7878 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=300'
SCALE (V): NONE
DESIGNED BY: MAW
DRAWN BY: NAS
CHECKED BY: MAW
DATE: AUG 2014

CAVALLIERE FLATS
OFFSITE DRAINAGE CONDITIONS
FIGURE 2
SCOTTSDALE, ARIZONA

PROJECT NO.
191069102
DRAWING NAME
FIGURE 2
1 OF 1



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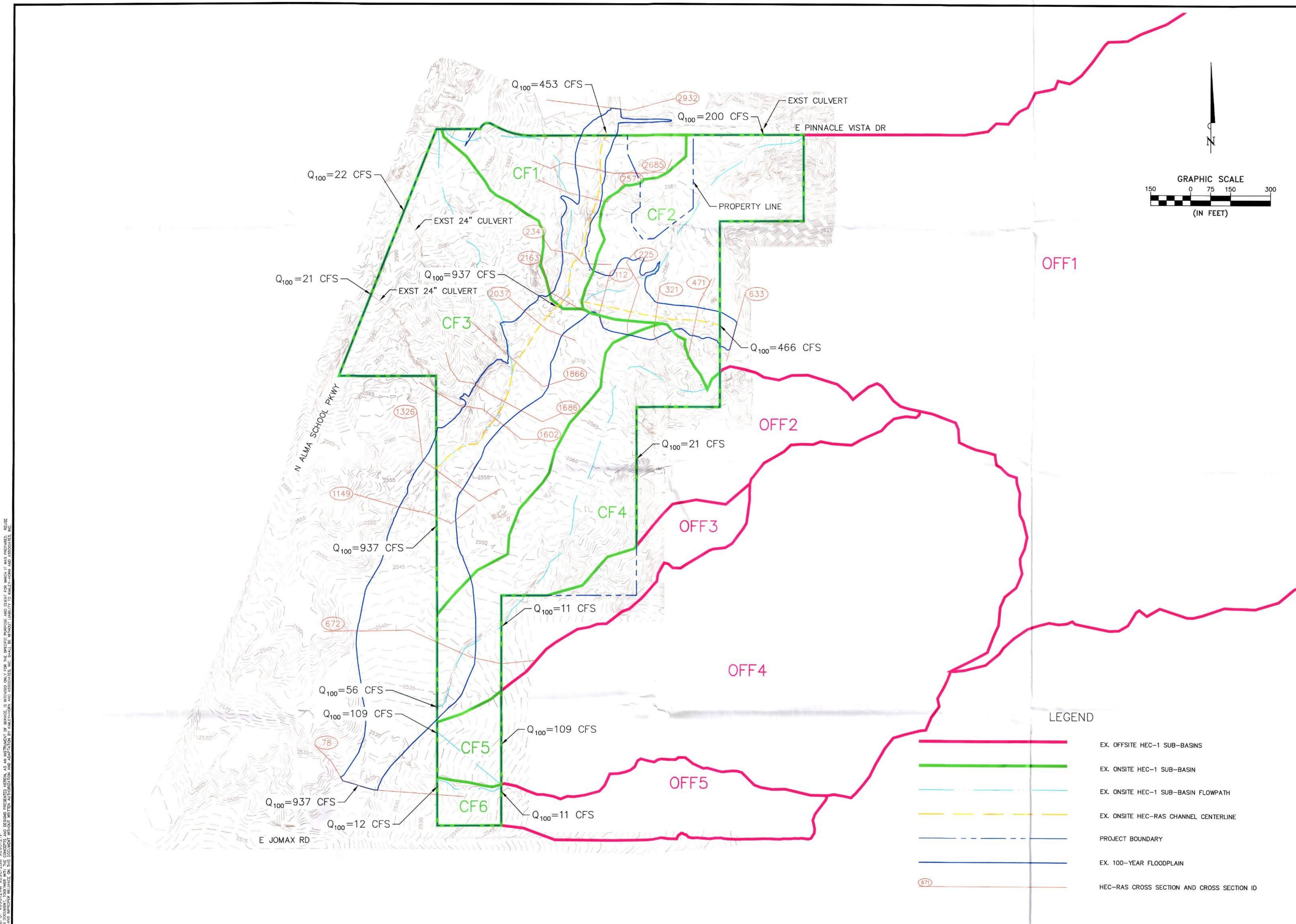
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=150'
SCALE (V): NONE
DESIGNED BY: MAW
DRAWN BY: NAS
CHECKED BY: MAW
DATE: AUG 2014

CAVALLIERE FLATS
PROPOSED DRAINAGE CONDITIONS
FIGURE 4
SCOTTSDALE, ARIZONA

PROJECT NO. 191069102
DRAWING NAME FIGURE 4
1 OF 1



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SCALE (V): NONE
DESIGNED BY: MAW
DRAWN BY: NAS
CHECKED BY: MAW
DATE: AUG 2014

CAVALLIERE FLATS
EXISTING DRAINAGE CONDITIONS
FIGURE 3
SCOTTSDALE, ARIZONA

PROJECT NO. 191069102
DRAWING NAME FIGURE 3
2 OF 2

3.0 PROPOSED PRELIMINARY DRAINAGE PLAN

3.1 General Discussion

Stormwater runoff generally flows south though the site. Following development of Cavalliere Flats, runoff will be conveyed in the streets and/or in on-site swales and storm drain systems to several first flush detention basins located throughout the project. These basins will discharge into the existing central wash. The post development flows exiting the site will be attenuated though the first flush basin to a level equal to or less than pre-development flows

3.2 Methodology

When stormwater is conveyed though streets the 10-year flow will be contained within the curb, and the 100-year flow will be contained within the street right of way or tract at a maximum depth of 8 inches above the street.

For cross road culvert crossings the 10-year flow will be conveyed under the road, while the 100-year storm will be conveyed with a maximum depth over the road of 12-inches. All lots and structures will be accessible by at least one route with a depth of flow no greater than 1 foot during the 100-year event.

Culverts have been sized for crossings that will convey the offsite flows. Additional culvert crossings for local on-site flows will be sized during final design. The culverts conveying runoff in the two previously mentioned large off-site washes were sized as part of the proposed conditions HEC-RAS model to be 3 – 6-ft x 5-ft reinforced concrete box culverts and 4 – 36-in pipe culverts for the flows coming from the north and east, respectively. An additional culvert crossing was sized for off-site flows being conveyed from east across the southern portion of the site. This culvert was sized to be 1 – 36-in pipe in HY-8. See **Appendix D** for HY-8 output

The site will be protected from off-site runoff that crosses Alma School Road and overtops the Pinnacle Vista Drive channel by drainage channels and swales that will direct the runoff to the large off-site washes Sizing of these channels and swales will be completed during final design

3 3 Stormwater Storage Requirements

On-site first flush basins will be provided for the development of the Site. First flush basin will be designed to detain the first half inch of runoff generated on the site First flush basins will discharge into the existing central wash on-site Discharge will be controlled with a bleed off pipe with attached orifice plate and overflow weir if necessary. The first flush basins will be used to attenuate post development flows leaving the site Additional basin size beyond the required first flush volume may be required to achieve pre vs. post compliance. See Figure 4 – Preliminary Drainage Plan Map for first flush basin locations and post development flows. For complete proposed condition hydrology and hydraulics see **Appendix C** and **Appendix D** respectively.

3 4 Erosion Setback Analysis

A Level I erosion setback analysis was performed on the two large off-site washes The analysis followed the requirement in the Arizona Department of Water Resources (ADWR) Sate Standard Attachment 5-96. Based on this analysis, a setback of 22 feet

4.0 DATA ANALYSIS METHODS

4.1 General Discussion

Detailed hydrologic and hydraulic models were prepared for the two large washes that traverse the Site. The sections below provide the hydrology and hydraulic methodology.

As mentioned in Section 2.3, the Quisana Conceptual Drainage Report states that the Troon North Park outlet channel north of Pinnacle Vista Drive has the capacity to convey the 100-year storm runoff The channel capacity was analyzed and determined that approximately 200 cfs will overtop the channel in the 100-year storm event. This revision has been reflected in the hydrology and hydraulic analysis.

4 2 Hydrology

The U.S. Army Corps of Engineers HEC-1 hydrologic computer program was used to determine the 10- and 100-year peak discharges for off-site and on-site flows HEC-1 models were prepared for the existing and proposed development conditions based on the hydrology models prepared for Troon North Park. The Troon North Park models contain the drainage areas north of Pinnacle Vista Road, including the regional detention facilities. The Drainage Design Management System for Windows (DDMSW) program was used to develop the hydrologic parameters for the on-site drainage areas and off-site drainage areas east of the Site. Green and Ampt rainfall loss parameters were estimated using DDMSW and the Flood Control District of Maricopa County (FCDMC) Drainage Design Manual – Hydrology. The HEC-1 models were prepared using the Clark Unit Hydrograph Rainfall depths were not changed from the Troon North Park hydrology study.

Four different soil types were identified for the on-site and eastern off-site watersheds using the web soil survey from the National Resource Conservation Service (NRCS). A map showing the different soil types is shown in **Appendix C**. A list of the soils found in the watershed is shown below:

- Anthony-Arizo complex
- Gran-Wickenburg complex, 1 to 10 percent slopes
- Gran-Wickenburg-Rock outcrop complex, 1 to 7 percent slopes
- Pinaleno-Tres Hermanos complex, 1 to 10 percent slopes

Land use types for the HEC-1 models were based on the DS&PM and DDMSW codes. The proposed development is a combination of Zones R-4, R1-10 and R1-190. Land use maps for the existing and proposed development conditions are provided in **Appendix C**.

As discussed in Section 2.3, the Troon North Park outlet channel north of Pinnacle Vista Drive does not have the capacity to convey the 100-year runoff. A diversion record was added to the upstream portion of the model to model the conditions of the channel more accurately. The capacity of the outlet channel was calculated with FlowMaster at the most constricted location of the channel based on the detailed mapping obtained for this project. FlowMaster output is provided in **Appendix C**.

4 3 Hydraulics

The existing 100-year BFEs for the two large on-site washes were established using the U.S. Army Corps of Engineers HEC-RAS (v4.1.1) computer program Cross sections were cut for the existing wash using the detailed mapping obtained for this project The hydraulic models were run using sub-critical conditions with the normal depth boundary condition. In the proposed conditions model, culvert crossings at the proposed local road crossings were modeled. Expansion and contraction coefficients were determined from Table 3-2 of the HEC-RAS Hydraulic Reference Manual. Manning's 'n' coefficients for the channels vary from 0.035 to 0.045 and values for the overbanks are 0.050. Based on field observations and aerial photography the large wash is an undisturbed natural desert with an impervious weed barrier. Refer to **Appendix D** for the results of the hydraulic modeling.

4.4 Stormwater Storage Method

The existing property is a part of the Environmentally Sensitive Lands Ordinance (ESLO). Based on new City ordinances, a waiver will need to be obtained for any volume less than the 100-year, 2-hour volume. However, there is no waiver fee associated with the volumes that do not result in an increase in downstream runoff. See **Appendix E** for a copy of the waiver. Refer to **Appendix C** for the pre- and post-development hydrologic model results.

5.0 CONCLUSION

1) Two large washes cross the development. Impacts to the washes include two roadway crossing and encroachment from proposed development A hydraulic model for the existing and proposed conditions was prepared to show the 100-year inundation limits and establish BFEs for the existing washes.

2) According to the Quisana Conceptual Drainage Report, the Troon North Park outlet channel north of Pinnacle Vista Drive has the capacity to convey the 100-year storm runoff. The channel capacity was analyzed and determined that approximately 200 cfs will overtop the channel in the 100-year storm event. Discussion with City staff indicate that the channel has experienced failures in the past and a solution to this offsite drainage issue will be presented as part of the preliminary plat.

3) Onsite runoff will be conveyed through the local streets, storm drains and culverts to the major wash corridors.

4) Seven detention basins are located on the development to control runoff exiting the property The detention basins will use orifice plates and concrete weir structures to control post-development runoff.

5) Hydrologic models were prepared for the on-site and off-site areas for the pre- and post-development conditions

6) The individual lots will be graded at a later date but will follow the patterns set forth in this report. The proposed pad elevations are established a minimum of one foot above the BFE in the large wash The finished floors for the future structure will be established as part of the single lot grading plans

7) A Level I Erosion Setback analysis was performed on the two large washes conveying off-site runoff. Locations where the setback is located within a lot will require an erosion cutoff wall. The erosion cutoff walls will be designed during final design

6.0 REFERENCES

City of Scottsdale, *Addendum to the Preliminary Drainage Report for the Rocks at Reata Pass*, prepared by Gannett Fleming, Inc., revised August 2001.

City of Scottsdale, *Conceptual Drainage Report for Quisana*, prepared by Southwest Land Consulting, P.C., July 2005

City of Scottsdale, *Design Standards and Policies Manual,* January 2010

City of Scottsdale, *Troon North Park Hydrology Study Addendum*, prepared by Argus Consulting, September 2011

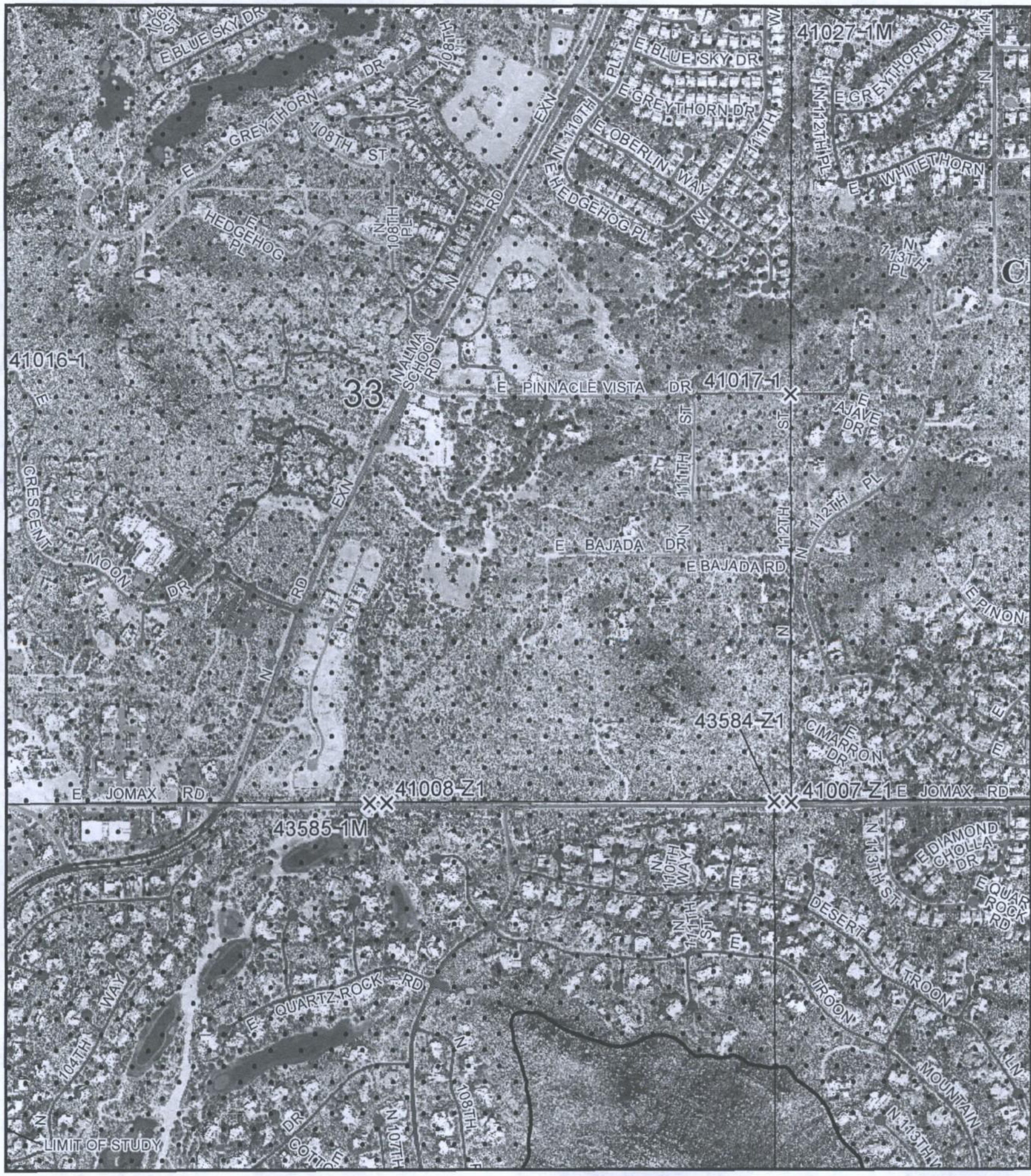
Federal Emergency Management Agency, *Flood Insurance Rate Map Panel No. 04013C1330L*, October 16, 2013

Flood Control District of Maricopa County, *Drainage Design Manual – Hydrology,* updated August 15, 2013

U.S Army Corps of Engineers, Hydrologic Engineering Center, *HEC-RAS, River Analysis System Hydraulic Reference Manual Version 4.1*, January 2010.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, *HEC-RAS, River Analysis System User's Manual Version 4.1*, January 2010.

Appendix A – FLOOD INSURANCE RATE MAPS



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFIP

PANEL 1330L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1330 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SCOTTSDALE, CITY OF	045012	1330	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1330L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix B– EXCERPTS FROM OFFSITE DRAINAGE REPORTS

Addendum to the Preliminary Drainage Report for the Rocks at Reata Pass

Conceptual Drainage Report for Quisana

Troon North Park Hydrology Study and Addendum

REVISED 08/27/01

ADDENDUM TO THE

PRELIMINARY DRAINAGE REPORT
FOR

THE ROCKS AT REATA PASS

Monarch
Communities, LLC
SCOTTSDALE, ARIZONA

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
20950
RONALD D. SCHREIER
(CIVIL)
Date Signed 8/21/01
ARIZONA, U.S.A.

Prepared By:
Gannett Fleming, Inc.
3001 East Camelback Road, Suite 130
Phoenix, Arizona 85016-4498

GF Job Number 37500.013
JULY 2001

115 DR 2000 #2

THE ROCKS AT REATA PASS

HEC-1 SUMMARY

Det Basin B

	Pre-Development 2yr-6hr	Post-Development 2yr-6hr	Pre-Development 10yr-6hr	Post-Development 10yr-6hr	Pre-Development 100yr-6hr	Post-Development 100yr-6hr
Runoff Curve Number	88	88	88	88	88	88
Percent Impervious	-	27	-	27	-	27
Total Runoff	6	9	13	15	22	24
Storage Available(CUFT)	-	2047	-	2047	-	2047
Det Basin Outflow (CFS)	-	6	-	13	-	20

Det Basin C

	Pre-Development 2yr-6hr	Post-Development 2yr-6hr	Pre-Development 10yr-6hr	Post-Development 10yr-6hr	Pre-Development 100yr-6hr	Post-Development 100yr-6hr
Runoff Curve Number	88	88	88	88	88	88
Percent Impervious	-	27	-	27	-	27
Total Runoff	1	1	1	2	2	2
Storage Available(CUFT)	-	958	-	958	-	958
Det Basin Outflow (CFS)	-	1	-	1	-	2

Det Basin F

	Pre-Development 2yr-6hr	Post-Development 2yr-6hr	Pre-Development 10yr-6hr	Post-Development 10yr-6hr	Pre-Development 100yr-6hr	Post-Development 100yr-6hr
Runoff Curve Number	88	88	88	88	88	88
Percent Impervious	-	27	-	27	-	27
Total Runoff	2	2	3	4	6	6
Storage Available(CUFT)	-	2744	-	2745	-	2746
Det Basin Outflow (CFS)	-	1	-	3	-	4

Det Basin I-3

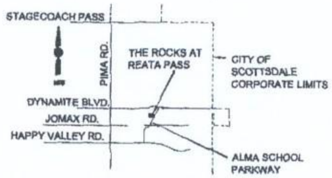
	Pre-Development 2yr-6hr	Post-Development 2yr-6hr	Pre-Development 10yr-6hr	Post-Development 10yr-6hr	Pre-Development 100yr-6hr	Post-Development 100yr-6hr
Runoff Curve Number	88	88	88	88	88	88
Percent Impervious	-	27	-	27	-	27
Total Runoff	6	8	13	15	21	23
Storage Available(CUFT)	-	1307	-	1307	-	1307
Det Basin Outflow (CFS)	-	7	-	13	-	20

ROUTED TO

Det Basin I (Parking Lot)

	Pre-Development 2yr-6hr	Post-Development 2yr-6hr	Pre-Development 10yr-6hr	Post-Development 10yr-6hr	Pre-Development 100yr-6hr	Post-Development 100yr-6hr
Runoff Curve Number	88	88	88	88	88	88
Percent Impervious	-	27	-	27	-	27
Total Runoff	7	9	18	17	26	25
Storage Available(CUFT)	-	1307	-	1307	-	1307
Det Basin Outflow (CFS)	-	7	-	7	-	7

EXHIBIT 2



VICINITY MAP

LEGEND

- DRAINAGE BASIN BOUNDARY
- ⊗ CONCENTRATION POINT
- DIRECTION OF FLOW
- PARCEL BOUNDARY

ONSITE DRAINAGE MAP

MONARCH COMMUNITIES, LLC.

PROJECT TITLE: THE ROCKS AT REATA PASS

SCALE	DRAWN BY	DATE	JOB NO.	SHT.
HORIZ. 1"=30'	SBV	6-27-01		
VERT. NONE	SBV	AS-BUILT	PROJECT NO. 37500.013	1 OF 1

I. INTRODUCTION

This parcel is a proposed single-family residence located at the intersection of Alma School Parkway and Pinnacle Vista Drive in Scottsdale, Arizona. The land is situated within a portion of Section 33, Township 5N, Range 5E, and is bounded by Pinnacle Vista Drive to the south, a fire station to the north, Alma School Parkway to the west and a future city park to the east (see Vicinity Map, Figure 1). This parcel is comprised of 13.0-acres zoned for S-R, Service Residential.

The land consists of natural desert with typical upper desert vegetation and slopes to the south at a gradient of approximately 2.5%. A small hill is located partially on the property with exposed rock along the east property line. Based on a field walk, an aerial photo and current topography (see Figures 2, 3 and 4) there is evidence of several washes which affect the proposed onsite development.

All onsite development has been designed to comply with the Drainage Regulations for the Flood Control District of Maricopa County (FCDMC) and the City of Scottsdale's Design Standards and Policies Manual (References 1, 2 and 3) while maintaining the original intent of the Troon North Drainage Master Plan.

II. FLOOD PLAIN DESIGNATION

The site is located within Zone "X" as shown on the FEMA Flood Insurance Rate Map 04013C1255F dated 6/19/01 (see Figure 5). Flood Zone "X" is defined as:

> "areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood."

III. OFFSITE DRAINAGE

A drainage report was previously completed for this property, which will be the basis of the preliminary drainage design for this project (see Appendix B and reference 4). During the preliminary plat submittal a more detailed report will be completed as the design becomes more in depth. There are two natural washes that enter the site via culvert crossings beneath Alma School Parkway. The main wash to the north discharges from an existing 10'x3' RBC and the second discharges from 2-30" RCP's. Both of these washes intercept runoff from developments to the west and also contain storm water retention/detention facilities. Street runoff will enter the site within the two existing scuppers provided in Alma School Parkway at the north and south ends of the project. Based on the size of the second crossing and the 100-year peak discharge there may be considerable overtopping of Alma School Parkway near the south end of the project. Therefore, the proposed onsite development will minimize disturbance in this area to eliminate flooding onsite and an alteration of the existing drainage patterns. During improvements to Pinnacle Vista Drive a channel was constructed along the north side of the paved surface and partially located on the subject parcel. This channel is an outlet for the existing dam located within the proposed City Park to the east. The channel was constructed

as a public improvement by the City of Scottsdale and will fully contain the 100-year peak discharge.

IV. PRE-DEVELOPED ONSITE CONDITIONS

Currently, the site is mostly natural desert with natural upper desert vegetation. However, several man-made structures have been added over the years in the form of a Troon North sign and vertical ramps for local bicycle riders. All of the mentioned items will be removed during the onsite development. A field walk revealed that the main wash (Wash 1) flowing diagonally thru the site is showing signs of severe erosion just downstream of the box culvert outlet (see Figures 6 & 7). In this region Wash 1 has eroded to a depth of 3'-4' deep and 3' wide since the installation of the box culvert many years ago. One of the reasons for this issue is the box appears to have been installed below the natural grade without a positive outfall. Over time during the large storms a path for positive drainage was established via erosion and Wash 1 has returned to its historic location. The narrowing of the channel width has decreased the active floodway/floodplain which can result in inundation of the parcel beyond what occurred in the past. There seems to be evidence of this in the above average vegetation along this reach of the watercourse. Further downstream Wash 1 has returned to the characteristics of similar washes in the region, a sandy bottom with gradually sloping sides containing typical vegetation (see Figure 8). The secondary wash (Wash 2) to the south enters the site and meanders across the southwest corner. Wash 2 shows minor signs of erosion typical for the region but nothing unusual (see Figure 9). Evidence to demonstrate that overtopping of Alma School Parkway occurs due to an undersized crossing at this location is not apparent. Therefore, only during a major storm of considerable duration might this occur. Both washes exit the site via the provided wet crossings within Pinnacle Vista Drive and continue downstream to a confluence location just south of this project.

V. POST-DEVELOPED ONSITE CONDITIONS

A full retention waiver was submitted with the original layout for this parcel and will be requested with the latest design (see Appendix B and Reference 4). The current zoning district along with the large areas of wash and hillside conservation make this the most sensitive way to develop the parcel while maintaining the theme of the Troon North Master Plan. During the development of the adjacent parcels a portion of upstream contributing areas to this project were diverted into the future park site. The reduction in watershed allows this development to waive the storm water storage requirement without increasing post-development discharges above historic flow rates

A. Lot Drainage

Lots will ultimately be graded to drain the rear yard to the front and into the street. A time of concentration of 10 minutes will be used for lot drainage for determining rainfall intensity during final design.

Troon North Park

Hydrology Study Addendum

Registered Professional Engineer (Civil)
CERTIFICATE NO.
28638
JORGE R.
GARRE
Date Signed 9-20-11
ARIZONA, U.S.A.

EXPIRES 12/31/12

prepared for:

City of Scottsdale
7447 E. Indian School Road
Scottsdale, Arizona 85251

prepared by:

ARGUS CONSULTING
A CIVIL ENGINEERING COMPANY

10115 E. Bell Road, Suite 107 - #104
Scottsdale, Arizona 85260
480 596 1131

September 2011

3.0 MAPPING AND SURVEYING INFORMATION

3.1 Mapping

The available mapping utilized in this study was as follows:

1. **Topographic Map:** City of Scottsdale digital mapping with contour of 1-foot was used for drainage areas to delineate watershed boundaries and subbasins.

2. **Aerial Photos:** City of Scottsdale aerial photos were used to provide vegetation cover patterns and identify existing flow path locations. They also help to verify land uses and densities and existing drainage infrastructure.

3. **SCS Soils Maps:** The Soil Survey of Aguila-Carefree Area (**Ref.1**) was used to identify the soils map units in each sub-basin. The general soil map of this survey shows one soil association over the study area. This association normally consists of one or more major soils and at least one minor soil, and is named for the major soil. The study area has the following soil map units:

- Gran-Wickenburg complex: This map unit is about 40% Gran very gravelly sandy loam and 35% Wickenburg gravelly sandy loam. Included in this unit are small areas of Eba, Pinaleno, and Arizo soils, and Rock outcrops.

- Pinaleno-Tres Hermanos complex: This map unit is about 45% Pinaleno very gravelly clay loam and 40% Tres Hermanos gravelly loam. Runoff is slow, and the hazard for water erosion slight.

4.0 HYDROLOGIC ANALYSIS

4.1 General

The hydrologic analyses presented for this report were developed using the current guidelines and procedures presented in the Drainage Design Manual for Maricopa County, Hydrology (**Ref.2**). The following outlines the design criteria used to develop the hydrologic analysis:

- Hydrologic calculations were completed for 2-, 10-, 50-, and 100-Year storm frequency.
- Storm duration of 6 hours was investigated.
- Storm distribution patterns for a 6-hour local storm were utilized.
- Green and Ampt method was used to estimate rainfall loss rates.

- Clark Unit Hydrograph method was utilized to generate hydrographs.
- The Normal Depth method was utilized for hydrologic routing.
- Reservoir routing was used to model detention basins.
- The U.S. Army Corps of Engineers HEC-1 computer program (**Ref.3**) was utilized for runoff calculations.

Appendix E contains input and output data for the HEC-1 models, hydrographs, and peak flow summary tables. Estimated peak flows impacting Pinnacle Vista Drive roadway are summarized below:

Table 4.1 – Peak Flow Summary at Pinnacle Vista Drive

	Concentration Point C042			Concentration Point C043		
	Peak Flow cfs	**Time of Peak hr**	**Area Sq.Mi.**	**Peak Flow cfs**	**Time of Peak hr**	**Area Sq.Mi.**
2-Yr/6-Hr	206	4.83	1.20	25	4.17	0.05
10-Yr/6-Hr	308	5.25	1.20	47	4.17	0.05
50-Yr/6-Hr	427	5.50	1.20	72	4.17	0.05
100-Yr/6-Hr	548	5.17	1.20	83	4.17	0.05

Table 4.2 – Combined Peak Flow at Pinnacle Vista Drive

	Concentration Point COMB		
	Peak Flow cfs	**Time of Peak hr**	**Area Sq.Mi.**
2-Yr/6-Hr	213	4.83	1.25
10-Yr/6-Hr	313	5.17	1.25
50-Yr/6-Hr	431	5.50	1.25
100-Yr/6-Hr	558	5.08	1.25

4.2 Hydrologic Parameters

4.2.1 Rainfall

The watershed area (less than 40 Square Miles) falls in the category of local storms. Therefore, a 6-Hour duration storm event was modeled to represent the local storm for this watershed. NOAA Precipitation-Frequency Atlas No.14 was used for obtaining rainfall data (Appendix A). Flood Control District of Maricopa County (FCDMC) is currently operating and maintaining a rain and a stream gage at Detention No.2 in Troon North Park. Appendix A also contains information on the precipitation gage data for the site.

4.2.2 Rainfall Losses

Rainfall losses are generally considered to be the result of evaporation of water from the land surface, interception of rainfall by vegetal cover, depression storage on the land surface (paved or unpaved), and the infiltration of water into the soil matrix (**Ref.2**). The selection of parameters to simulate rainfall losses was performed using the Drainage Design Management System for Windows (DDMSW) computer program available through FCDMC. Urban development was represented by adding a percentage of impervious cover to the drainage subbasin (Plate B). Results of parameters estimation can be found in Appendix B.

4.2.3 Hydrograph Generation

For this project the Clark Unit Hydrograph method was utilized for generation of hydrographs. Two numeric parameters, Time of Concentration (Tc) and Storage Coefficient (R), and a graphical parameter, the time-area relations were determined for each subbasin area using DDMSW computer program (Appendix B).

4.2.4 Runoff Routing

The Normal Depth routing method was selected for flow routing. This method is based on the principle of hydraulic diffusivity, which simulates an attenuation of the flood peak through the routing reach. This method can be used for both man-made and natural channels where overbank flow is expected, provided the conveyance can be accurately described with an eight-point cross section (**Ref.2**). Channel routing parameters were based on natural topography/channels (Plate C).

4.2.5 Reservoir Routing

Detention/Retention Basins located throughout the watershed were modeled using the Level Pool Reservoir Routing routines in the HEC-1 computer program. Data and Exhibits of modeled detention and retention basins can be found in Appendix C.

4.3 Troon North Park Regional Basins

Regional stormwater detention basins located within Troon North Park collects rainfall runoff from approximately 1.12 square miles, or 89.6%, of the study area. These basins temporarily store floodwaters by providing a controlled outflow to downstream waterways. The combined stormwater storage capacity at Troon North Park is 49.4 Ac-Ft (**Ref.4**).

4.4 Special Considerations

4.4.1 Jurisdictional Dam

In Arizona all dams, except those owned or operated by a government agency, are under the jurisdiction of the Arizona Department of Water Resources (ADWR). A detention or retention basin that impounds stormwater above the natural ground surface may be considered as being a dam under the authority of ADWR.

A "Jurisdictional Dam" is classified as a structure that is either 25 or more feet in height or has capacity to store more than 50 acre-feet. Height is measured as the vertical distance from the lowest point on the downstream toe (at natural ground) to the emergency spillway crest. Capacity is calculated as the maximum storage that can be impounded when there is no discharge of water.

Appendix C– HYDROLOGY

Parameters

Existing Conditions

Proposed Conditions

Troon North Park

Hydrology Study Addendum

Registered Professional Engineer (Civil)
CERTIFICATE NO.
28638
JORGE R.
GARRE
Date Signed 9-20-11
ARIZONA, U.S.A.

EXPIRES 12/31/12

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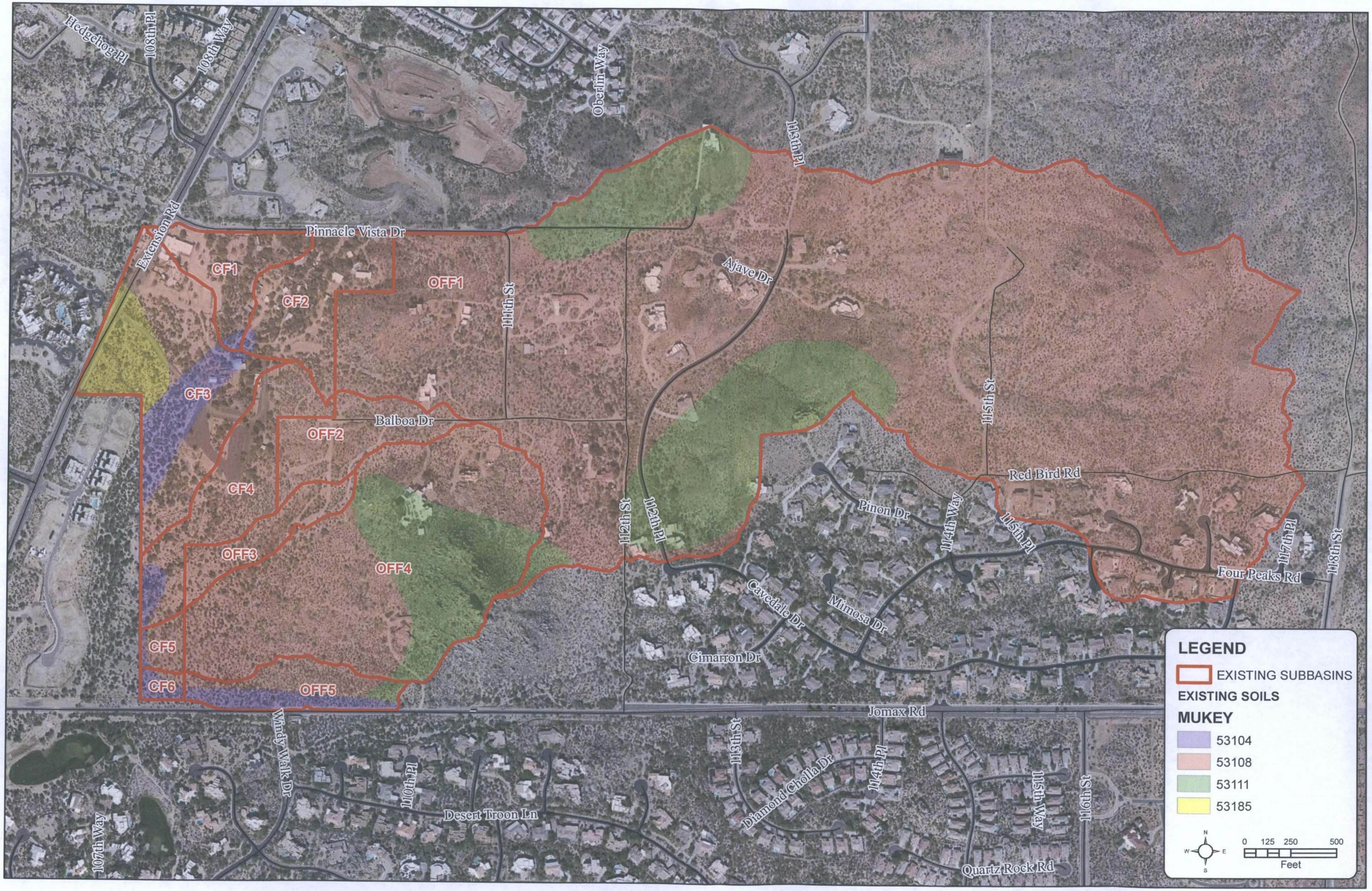
10115 E. Bell Road, Suite 107 - #104
Scottsdale, Arizona 85260
480 596 1131

September 2011

Flood Control District of Maricopa County
Drainage Design Management System
RAINFALL DATA
Project Reference: TROON NORTH PARK

 4/21/2010

ID	Method	Duration	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
DEFAULT	NOAA14	5 MIN	0.313	0.422	0.504	0.612	0.694	0.777
	NOAA14	10 MIN	0.476	0.642	0.767	0.932	1.057	1.182
	NOAA14	15 MIN	0.590	0.796	0.951	1.155	1.310	1.466
	NOAA14	30 MIN	0.795	1.072	1.281	1.556	1.764	1.974
	NOAA14	1 HOUR	0.984	1.326	1.585	1.925	2.183	2.443
	NOAA14	2 HOUR	1.128	1.496	1.778	2.159	2.448	2.746
	NOAA14	3 HOUR	1.198	1.560	1.847	2.247	2.564	2.891
	NOAA14	6 HOUR	1.417	1.796	2.100	2.518	2.845	3.183
	NOAA14	12 HOUR	1.701	2.134	2.479	2.946	3.306	3.675
	NOAA14	24 HOUR	2.072	2.702	3.212	3.936	4.524	5.147



CAVALLIRE FLATS
EXISTING CONDITIONS
SOILS USE MAP

SCALE(H):1"= 500'
SCALE(V): N/A
DESIGNED BY: MAW
DRAWN BY: JAG
CHECKED BY: MAW
DATE: MAY 2014

Kimley»Horn

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Engineering, Planning and Environmental Consultants

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

NO.	REVISION	BY	DATE	APPR.

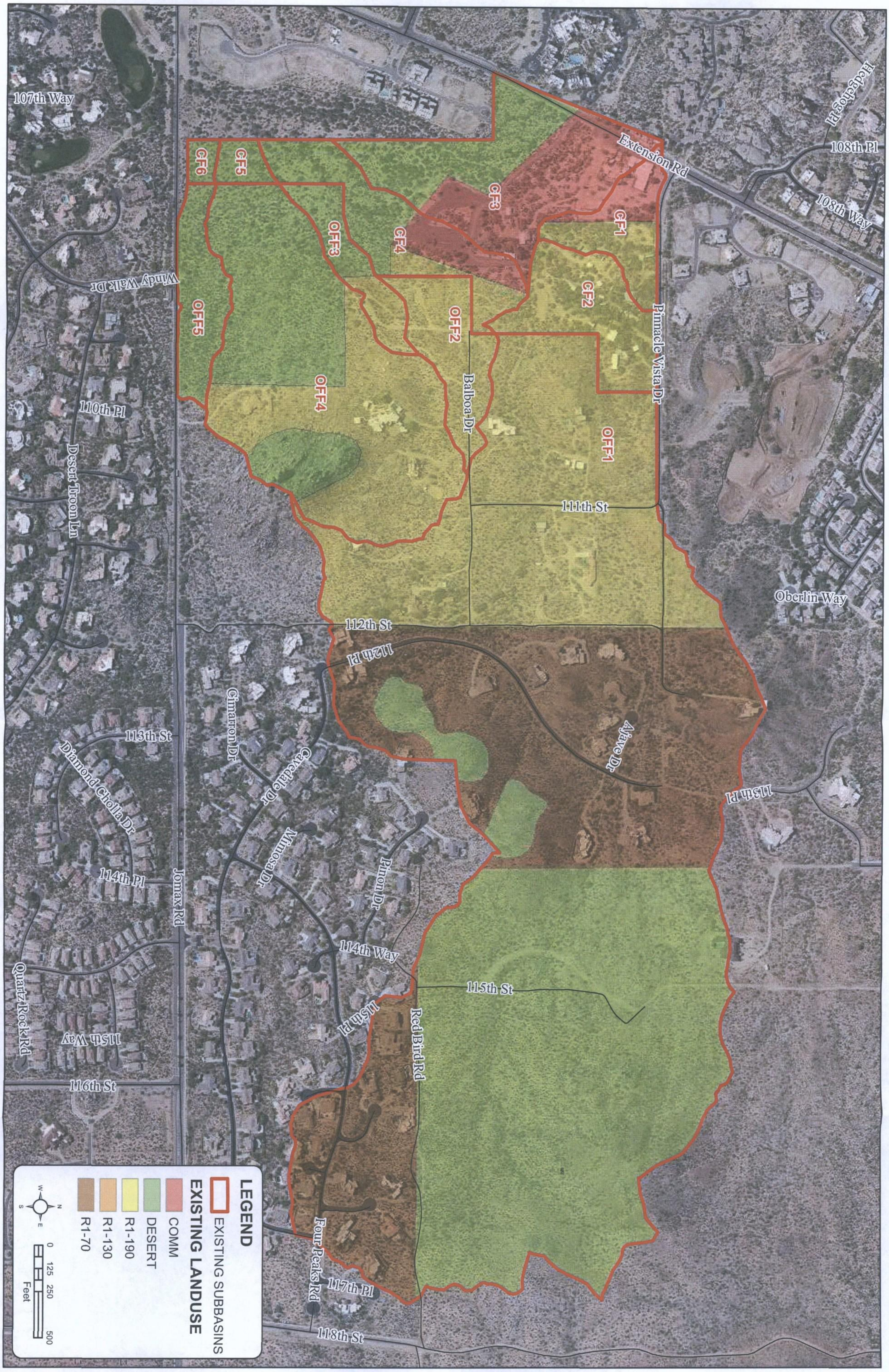
PROJECT NO.
191069012

DRAWING NAME
Existing_Soils.mxd

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)

Major Basin ID: 01

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)
CF1	645	6	6456	0.000	4.30	0.62	-	100
	645	61	64561	0.009	95.70	0.15	-	100
CF2	645	6	6456	0.000	2.10	0.62	-	100
	645	61	64561	0.014	97.90	0.15	-	100
CF3	645	6	6456	0.007	22.00	0.62	-	100
	645	61	64561	0.016	54.30	0.15	-	100
	645	96	64596	0.007	23.70	0.07	-	100
CF4	645	6	6456	0.001	7.20	0.62	-	100
	645	61	64561	0.016	92.80	0.15	-	100
CF5	645	6	6456	0.000	8.70	0.62	-	100
	645	61	64561	0.002	91.30	0.15	-	100
CF6	645	6	6456	0.001	78.60	0.62	-	100
	645	61	64561	0.000	21.40	0.15	-	100
OFF1	645	61	64561	0.261	84.90	0.15	-	100
	645	63	64563	0.047	15.10	0.14	25.00	100
OFF2	645	61	64561	0.011	100.00	0.15	-	100
OFF3	645	61	64561	0.007	100.00	0.15	-	100
OFF4	645	61	64561	0.040	65.70	0.15	-	100
	645	63	64563	0.021	34.30	0.14	25.00	100
OFF5	645	6	6456	0.004	42.90	0.62	-	100
	645	61	64561	0.005	50.50	0.15	-	100
	645	63	64563	0.001	6.60	0.14	25.00	100



PROJECT NO. 191069012	DRAWING NAME Existing_Landuse.mxd

CAVALLIRE FLATS EXISTING CONDITIONS LAND USE MAP

SCALE(H): 1"= 500'
SCALE(V): N/A
DESIGNED BY: MAW
DRAWN BY: JAG
CHECKED BY: MAW
DATE: MAY 2014

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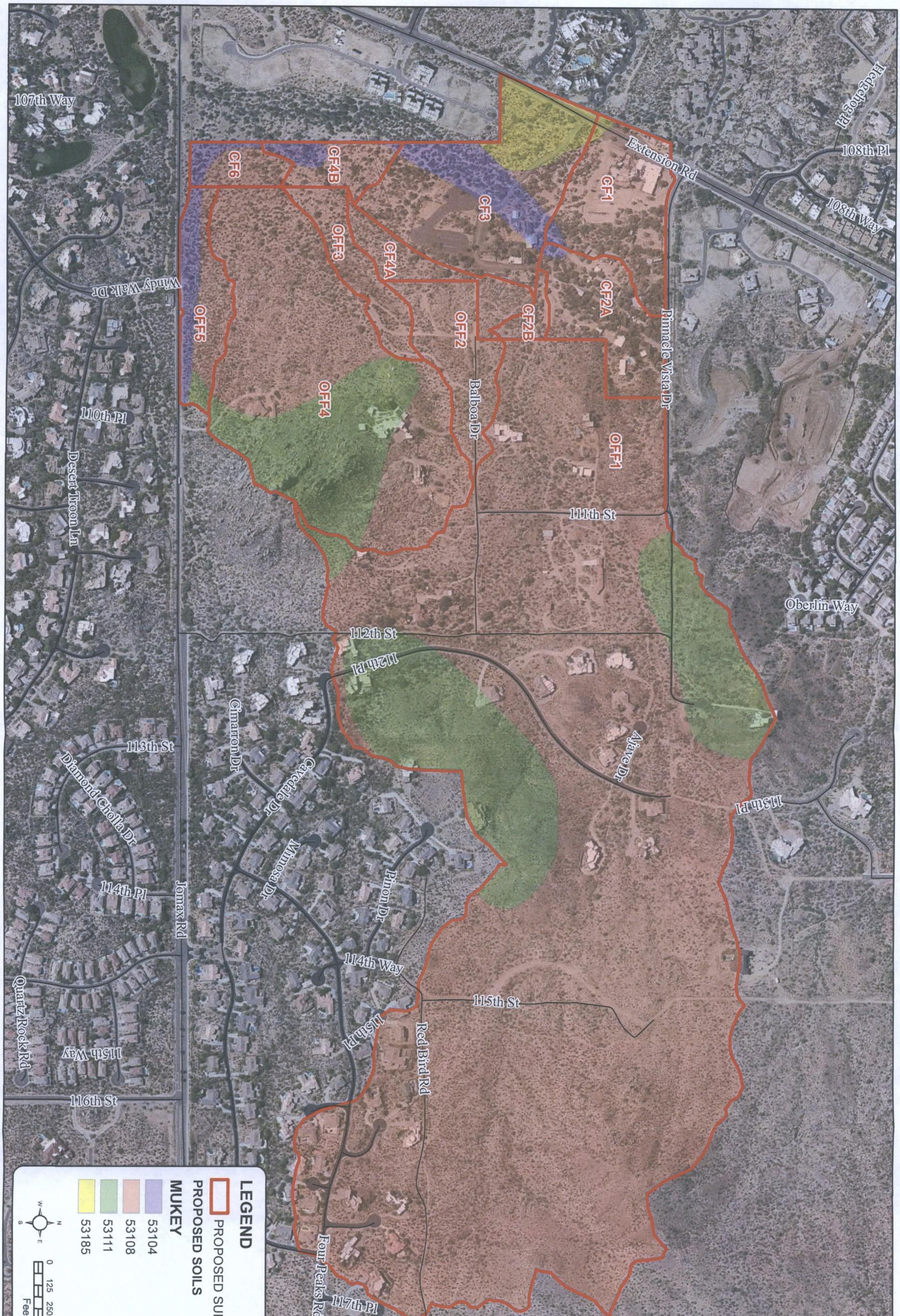
Phoenix, Arizona 85020 (602) 944-5500

NO.	REVISION	BY	DATE	APPR.

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
CF1	COMM	0.004	39.8	0.10	85	75.0	NORMAL	0.035
	R1-190	0.006	60.2	0.30	6	20.0	NORMAL	0.035
		0.009	**100.0**					
CF2	R1-190	0.014	100.0	0.30	6	20.0	NORMAL	0.034
		0.014	**100.0**					
CF3	COMM	0.017	56.8	0.10	85	75.0	NORMAL	0.032
	DESERT	0.013	43.2	0.35	0	25.0	DRY	0.062
		0.030	**100.0**					
CF4	COMM	0.005	26.8	0.10	85	75.0	NORMAL	0.034
	DESERT	0.009	51.2	0.35	0	25.0	DRY	0.066
	R1-190	0.004	22.0	0.30	6	20.0	NORMAL	0.034
		0.017	**100.0**					
CF5	DESERT	0.002	100.0	0.35	0	25.0	DRY	0.079
		0.002	**100.0**					
CF6	DESERT	0.001	100.0	0.35	0	25.0	DRY	0.083
		0.001	**100.0**					
OFF1	DESERT	0.128	41.7	0.35	0	25.0	DRY	0.048
	R1-190	0.072	23.5	0.30	6	20.0	NORMAL	0.026
	R1-70	0.107	34.8	0.30	12	20.0	NORMAL	0.026
		0.308	**100.0**					
OFF2	R1-190	0.011	100.0	0.30	6	20.0	NORMAL	0.035
		0.011	**100.0**					
OFF3	DESERT	0.004	57.7	0.35	0	25.0	DRY	0.071
	R1-190	0.003	42.3	0.30	6	20.0	NORMAL	0.036
		0.007	**100.0**					
OFF4	DESERT	0.030	49.3	0.35	0	25.0	DRY	0.058
	R1-190	0.031	50.7	0.30	6	20.0	NORMAL	0.030
		0.061	**100.0**					
OFF5	DESERT	0.009	100.0	0.35	0	25.0	DRY	0.070
		0.009	**100.0**					



CAVALLIRE FLATS
PROPOSED CONDITIONS
SOILS USE MAP

SCALE(H):1"= 500'
SCALE(V): N/A
DESIGNED BY: MAW
DRAWN BY: JAG
CHECKED BY: MAW
DATE: MAY 2014

Kimley»Horn
2014 KIMLEY-HORN AND ASSOCIATES, INC.
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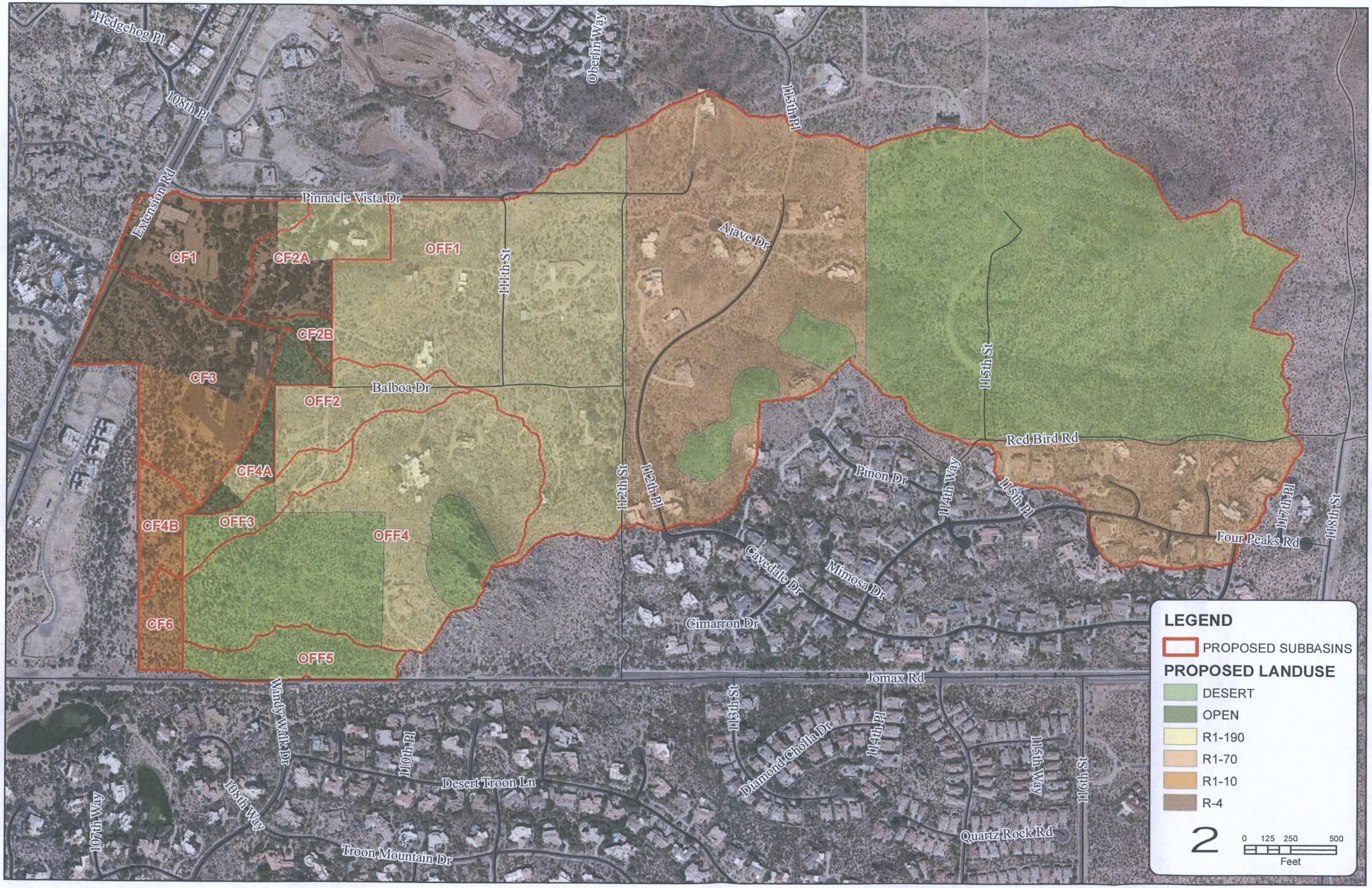
NO.	REVISION	BY	DATE	APPR.

PROJECT NO. 191069012
DRAWING NAME Proposed_Soils.mxd

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)
Major Basin ID: 01								
CF1	645	6	6456	0.000	2.60	0.62	-	100
	645	61	64561	0.015	95.50	0.15	-	100
	645	96	64596	0.000	1.90	0.07	-	100
CF2A	645	6	6456	0.000	2.40	0.62	-	100
	645	61	64561	0.012	97.60	0.15	-	100
CF2B	645	61	64561	0.002	100.00	0.15	-	100
CF3	645	6	6456	0.007	23.00	0.62	-	100
	645	61	64561	0.015	53.20	0.15	-	100
	645	96	64596	0.007	23.80	0.07	-	100
CF4A	645	61	64561	0.007	100.00	0.15	-	100
CF4B	645	6	6456	0.001	24.50	0.62	-	100
	645	61	64561	0.004	75.50	0.15	-	100
CF6	645	6	6456	0.001	31.00	0.62	-	100
	645	61	64561	0.003	69.00	0.15	-	100
OFF1	645	61	64561	0.261	84.90	0.15	-	100
	645	63	64563	0.047	15.10	0.14	25.00	100
OFF2	645	61	64561	0.011	100.00	0.15	-	100
OFF3	645	61	64561	0.007	100.00	0.15	-	100
OFF4	645	61	64561	0.040	65.70	0.15	-	100
	645	63	64563	0.021	34.30	0.14	25.00	100
OFF5	645	6	6456	0.004	42.90	0.62	-	100
	645	61	64561	0.005	50.50	0.15	-	100
	645	63	64563	0.001	6.60	0.14	25.00	100



NO	REVISION	BY	DATE	APPR

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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE(H):1"= 500'
SCALE(V): N/A
DESIGNED BY: MAW
DRAWN BY: JAG
CHECKED BY: MAW
DATE: MAY 2014

CAVALLIRE FLATS PROPOSED CONDITIONS LAND USE MAP

PROJECT NO.
191069012
DRAWING NAME
Proposed_Landuse.mxd

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
CF1	R1-190	0.001	5.8	0.30	6	20.0	NORMAL	0.034
	R-4	0.015	94.2	0.25	65	50.0	NORMAL	0.034
		0.016	**100.0**					
CF2A	R1-190	0.006	51.6	0.30	6	20.0	NORMAL	0.034
	R-4	0.006	48.4	0.25	65	50.0	NORMAL	0.034
		0.012	**100.0**					
CF2B	OPEN	0.002	100.0	0.10	0	10.0	DRY	0.039
		0.002	**100.0**					
CF3	R1-10	0.013	44.5	0.25	36	50.0	NORMAL	0.032
	R-4	0.016	55.5	0.25	65	50.0	NORMAL	0.032
		0.028	**100.0**					
CF4A	OPEN	0.006	84.6	0.10	0	10.0	DRY	0.036
	R1-190	0.001	15.4	0.30	6	20.0	NORMAL	0.036
		0.007	**100.0**					
CF4B	R1-10	0.005	100.0	0.25	36	50.0	NORMAL	0.037
		0.005	**100.0**					
CF6	R1-10	0.004	100.0	0.25	36	50.0	NORMAL	0.037
		0.004	**100.0**					
OFF1	DESERT	0.128	41.7	0.35	0	25.0	DRY	0.048
	R1-190	0.072	23.5	0.30	6	20.0	NORMAL	0.026
	R1-70	0.107	34.8	0.30	12	20.0	NORMAL	0.026
		0.308	**100.0**					
OFF2	R1-190	0.011	100.0	0.30	6	20.0	NORMAL	0.035
		0.011	**100.0**					
OFF3	DESERT	0.004	57.7	0.35	0	25.0	DRY	0.071
	R1-190	0.003	42.3	0.30	6	20.0	NORMAL	0.036
		0.007	**100.0**					
OFF4	DESERT	0.030	49.3	0.35	0	25.0	DRY	0.058
	R1-190	0.031	50.7	0.30	6	20.0	NORMAL	0.030
		0.061	**100.0**					
OFF5	DESERT	0.009	100.0	0.35	0	25.0	DRY	0.070
		0.009	**100.0**					

Area ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Sub Basin Parameters							Rainfall Losses						Return Period Parameters					
Major Basin ID: 01																		
CF1	0.016	0.23	168.9	168.9	URBAN	0.034	0.25	0.25	6.00	0.21	62	**Tc (Hrs)**	0.183*	0.176*	0.164*	0.151*	0.143*	0.136*
												Vel (f/s)	1.84	1.92	2.06	2.23	2.36	2.48
												R (Hrs)	0.183	0.176	0.162	0.148	0.139	0.132
CF2A	0.012	0.17	132.5	132.5	URBAN	0.034	0.28	0.25	5.85	0.20	35	**Tc (Hrs)**	0.184*	0.175*	0.161*	0.146*	0.137*	0.130*
												Vel (f/s)	1.36	1.42	1.55	1.71	1.82	1.92
												R (Hrs)	0.170	0.161	0.147	0.132	0.123	0.116
CF2B	0.002	0.10	153.1	153.1	URBAN	0.039	0.10	0.40	6.00	0.15		**Tc (Hrs)**	0.160*	0.151*	0.136*	0.120*	0.112*	0.105*
												Vel (f/s)	0.92	0.97	1.08	1.22	1.31	1.40
												R (Hrs)	0.266	0.249	0.221	0.193	0.178	0.167
CF3	0.028	0.22	119.4	119.4	URBAN	0.032	0.25	0.25	5.71	0.24	52	**Tc (Hrs)**	0.200*	0.192*	0.178*	0.163*	0.153*	0.146*
												Vel (f/s)	1.61	1.68	1.81	1.98	2.11	2.21
												R (Hrs)	0.141	0.135	0.125	0.113	0.106	0.100
CF4A	0.007	0.16	197.5	197.5	Natural	0.036	0.13	0.38	6.00	0.15	1	**Tc (Hrs)**	0.179*	0.169*	0.152*	0.135*	0.125*	0.118*
												Vel (f/s)	1.31	1.39	1.54	1.74	1.88	1.99
												R (Hrs)	0.214	0.201	0.178	0.156	0.144	0.135
CF4B	0.005	0.12	100.0	100.0	URBAN	0.037	0.25	0.25	5.24	0.30	36	**Tc (Hrs)**	0.179*	0.171*	0.157*	0.143*	0.134*	0.126*
												Vel (f/s)	0.98	1.03	1.12	1.23	1.31	1.40
												R (Hrs)	0.206	0.195	0.179	0.160	0.149	0.140
CF6	0.004	0.11	35.7	35.7	URBAN	0.037	0.25	0.25	5.05	0.33	36	**Tc (Hrs)**	0.237*	0.226*	0.208*	0.189*	0.177*	0.167*
												Vel (f/s)	0.68	0.71	0.78	0.85	0.91	0.97
												R (Hrs)	0.298	0.283	0.258	0.232	0.216	0.202
OFF1	0.307	1.20	141.3	141.3	Natural	0.035	0.32	0.31	6.00	0.17	9	**Tc (Hrs)**	0.542	0.512	0.462	0.409	0.379	0.356
												Vel (f/s)	3.25	3.44	3.81	4.30	4.64	4.94
												R (Hrs)	0.425	0.399	0.356	0.311	0.286	0.267
OFF2	0.011	0.23	219.8	218.0	Natural	0.035	0.30	0.25	6.00	0.17	6	**Tc (Hrs)**	0.204*	0.193*	0.173*	0.154*	0.143*	0.135*
												Vel (f/s)	1.65	1.75	1.95	2.19	2.36	2.50
												R (Hrs)	0.256	0.240	0.213	0.187	0.172	0.161

* Non default value or value out of range

Area ID	Sub Basin Parameters: Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	Rainfall Losses: IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		Return Period Parameters: 2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF3	0.007	0.21	240.5	233.7	Natural	0.056	0.33	0.34	6.00	0.17	3	**Tc (Hrs)**	0.257 *	0.242 *	0.217*	0.191*	0.176*	0.165*
												Vel (f/s)	1.20	1.27	1.42	1.61	1.75	1.87
												R (Hrs)	0.398	0.371	0.330	0.286	0.261	0.243
OFF4	0.061	0.53	337.1	274.7	Natural	0.044	0.32	0.32	6.00	0.17	12	**Tc (Hrs)**	0.326	0.308	0.279*	0.248*	0.230*	0.216*
												Vel (f/s)	2.38	2.52	2.79	3.13	3.38	3.60
												R (Hrs)	0.316	0.297	0.266	0.233	0.214	0.200
OFF5	0.009	0.26	245.1	236.8	Natural	0.070	0.35	0.35	4.65	0.33	2	**Tc (Hrs)**	0.357	0.329	0.292*	0.257*	0.237*	0.219*
												Vel (f/s)	1.07	1.16	1.31	1.48	1.61	1.74
												R (Hrs)	0.589	0.537	0.470	0.409	0.373	0.342

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															
RCF1	0.035	0.035	0.035	690.00	0.0200	-	X:	-	30.00	67.50	72.50	77.50	82.50	120.00	150.00
							Y:	3.00	2.50	2.00	-	-	2.00	2.50	3.00
RCF2A	0.035	0.035	0.035	990.00	0.0200	-	X:	-	20.00	40.00	45.00	55.00	60.00	80.00	100.00
							Y:	2.00	1.50	1.00	-	-	1.00	1.50	2.00
RCF2B	0.035	0.035	0.035	530.00	0.0270	-	X:	-	15.00	30.00	35.00	90.00	95.00	110.00	125.00
							Y:	2.00	1.50	1.00	-	-	1.00	1.50	2.00
RCF3	0.035	0.035	0.035	795.00	0.0380	-	X:	-	35.00	80.50	100.00	106.00	125.50	565.00	600.00
							Y:	5.00	4.00	3.00	-	-	3.00	4.00	5.00
RCF4A	0.035	0.035	0.035	1,230.00	0.0250	-	X:	-	25.00	50.00	55.00	65.00	70.00	95.00	120.00
							Y:	3.00	2.50	2.00	-	-	2.00	2.50	3.00
RCF6	0.035	0.035	0.035	270.00	0.0300	-	X:	-	50.00	100.00	105.00	115.00	120.00	170.00	220.00
							Y:	1.00	0.75	0.50	-	-	0.50	0.75	1.00

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1***************************************                              ***************************************
 *                                     *                              *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                              *   U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN  1998              *                              *   HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1              *                              *        609 SECOND STREET            *
 *                                     *                              *     DAVIS, CALIFORNIA 95616         *
 * RUN DATE  02JUN14  TIME  14:32:05   *                              *        (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

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

            1      ID    Cavalliere Flats Rezoning
            2      ID    City of Scottsdale
            3      ID    Prepared by: Kimley-Horn and Associates, Inc.
            4      ID
            5      ID    Existing Conditions model
            6      ID    10-year, 6-hour Storm event
            7      ID
            8      ID    Based on Troon North Park Model:
            9      ID
           10      ID        PROJECT NAME: TROON NORTH PARK                          JOB#: 236-08
           11      ID        PREPARED FOR: CITY OF SCOTTSDALE
           12      ID        PREPARED BY : ARGUS CONSULTING, P.C.
           13      ID
           14      ID        FILE NAME   : TNP10YR.DAT
           15      ID        STORM EVENT : 10-YR/6-HR
           16      ID        Unit Hydrograph: Clark
           17      ID        01/24/2011
                   *
                   *
                   *
                   *
           18      IT       5 06JUN99    0000    2000
           19      IN      15
           20      IO       5
                   *DIAGRAM
                   *
                   *

           21      KK     001   BASIN
           22      BA   0.112
           23      PB   2.071
           24      PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.075
           25      PC   0.087   0.100   0.119   0.151   0.235   0.415   0.762   0.873   0.915   0.944
           26      PC   0.956   0.967   0.979   0.989   1.000
           27      LG    0.30    0.25    6.00    0.18       3
           28      UC   0.344   0.316
           29      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
           30      UA     100
                   *

           31      KK     002   BASIN
           32      BA  0.0167
           33      LG    0.30    0.25    6.00    0.18       7
           34      UC   0.262   0.408
           35      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
           36      UA     100
                   *

           37      KK   LP002   ROUTE INFLOW THRU STORAGE AREA
           38      KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
           39      KM           LOW FLOW OUTLET = 30" RCP
           40      RS       1    STOR     0.0
           41      SA    .003    .005    .026    .059
           42      SQ       0       5      15      30
           43      SE  2722.0  2723.0  2724.0  2725.0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  44          ST  2725.0      40     2.7     1.5
              *

  45          KK    C001 COMBINE HYDROGRAPHS FROM SUB 001 AND LP002
  46          HC       2
              *

  47          KK  LPC001   ROUTE INFLOW THRU STORAGE AREA
  48          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  49          KM           LOW FLOW OUTLET - OPEN SECTION BETWEEN BERM AND WALL
  50          RS       1    STOR     0.0
  51          SA    .001    .004    .013    .104    .150
  52          SQ       0     6.5      23      50      90
  53          SE  2713.0  2714.0  2715.0  2716.0  2717.0
  54          ST  2717.0      45     2.7     1.5
              *

  55          KK  RLPC01   ROUTE FLOW THRU SUB 007
  56          RS       1    FLOW       0
  57          RC   0.070   0.050   0.070    1736   0.025
  58          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
  59          RY     100    95.5    94.5      90      90    94.5    95.5     100
              *

  60          KK     007   BASIN
  61          BA   0.018
  62          LG    0.27    0.25    6.00    0.20      25
  63          UC   0.241   0.340
  64          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  65          UA     100
              *

  66          KK    C007 COMBINE HYDROGRPAHS FROM SUB 007 AND RLPC01
  67          HC       2
              *

  68          KK  LPC007   ROUTE INFLOW THRU STORAGE AREA
  69          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  70          KM           LOW FLOW OUTLET = 2-36" RCP
  71          RS       1    STOR     0.0
  72          SA    .001    .002    .004    .025    .040    .060    .100
  73          SQ       0      18      35      70     100     125     143
  74          SE    68.0    69.0    70.0    71.0    72.0    73.0    74.0
  75          ST    74.0      45     2.7     1.5
              *

  76          KK     003   BASIN
  77          BA   0.018
  78          LG    0.30    0.25    6.00    0.18       2
  79          UC   0.206   0.235
  80          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  81          UA     100
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  82          KK    R003   ROUTE FLOW THRU SUB 005
  83          RS       1    FLOW       0
  84          RC   0.070   0.050   0.070     470   0.023
  85          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
  86          RY     100    92.5    91.5      90      90    91.5    92.5     100
              *

  87          KK     005   BASIN
  88          BA   0.007
  89          LG    0.27    0.25    6.00    0.20      23
  90          UC   0.171   0.213
  91          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  92          UA     100
              *

  93          KK    C005 COMBINE HYDROGRPAHS FROM SUB 005 AND R003
  94          HC       2
              *

  95          KK   RC005   ROUTE FLOW THRU SUB 006
  96          RS       1    FLOW       0
  97          RC   0.070   0.050   0.070     450   0.022
  98          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
  99          RY     100    92.5    91.5      90      90    91.5    92.5     100
              *

 100          KK  LPC005   ROUTE INFLOW THRU STORAGE AREA
 101          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 102          KM           LOW FLOW OUTLET = 2-24" RCP
 103          RS       1    STOR       0
 104          SA    .001    .002    .030    .090    .190    .271
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   105          SQ       0      10      26      42      52      62
   106          SE    83.0    84.0    85.0    86.0    87.0    88.0
   107          ST    88.0      45     2.7     1.5
                *

   108          KK     004   BASIN
   109          BA   0.013
   110          LG    0.30    0.25    6.00    0.18       3
   111          UC   0.220   0.270
   112          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   113          UA     100
                *

   114          KK    R004   ROUTE FLOW THRU SUB 006
   115          RS       1    FLOW       0
   116          RC   0.070   0.050   0.070     732   0.024
   117          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
   118          RY     100    92.5    91.5      90      90    91.5    92.5     100
                *
1                                         HEC-1 INPUT                                               PAGE  4

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


   119          KK     006   BASIN
   120          BA   0.015
   121          LG    0.27    0.25    6.00    0.20      22
   122          UC   0.196   0.197
   123          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   124          UA     100
                *

   125          KK    C006 COMBINE HYDROGRAPHS FROM SUB 006 AND R004
   126          HC       2
                *

   127          KK  LPC006   ROUTE INFLOW THRU STORAGE AREA
   128          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   129          KM           LOW FLOW OUTLET = 30" RCP
   130          RS       1    STOR       0
   131          SA    .007    .007    .035    .070    .114    .171    .247
   132          SQ       0       6      18      30      38      45      51
   133          SE    80.0    81.0    82.0    83.0    84.0    85.0    86.0
   134          ST      86      45     2.7     1.5
                *

   135          KK     009   BASIN
   136          BA   0.007
   137          LG    0.27    0.25    6.00    0.20      25
   138          UC   0.174   0.218
   139          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   140          UA     100
                *

   141          KK    C009 COMBINE HYDROGRAPHS FROM SUB 009, LPC05, AND LPC06
   142          HC       3
                *

   143          KK  LPC009   ROUTE INFLOW THRU STORAGE AREA
   144          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   145          KM           LOW FLOW OUTLET = 2-36" RCP
   146          RS       1    STOR       0
   147          SA    .001    .010    .050    .107    .207    .305
   148          SQ       0      18      40      75     105     124
   149          SE    75.0    76.0    77.0    78.0    79.0    80.0
   150          ST    80.0      45     2.7     1.5
                *

   151          KK     012   BASIN
   152          BA   0.004
   153          LG    0.26    0.25    6.00    0.20      27
   154          UC   0.144   0.196
   155          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   156          UA     100
                *
1                                         HEC-1 INPUT                                               PAGE  5

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


   157          KK    C012 COMBINE HYDROGRAPHS SUB 012 AND LPC009
   158          HC       2
                *

   159          KK  LPC012   ROUTE INFLOW THRU STORAGE AREA
   160          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   161          KM           LOW FLOW OUTLET = 2-36" RCP
   162          RS       1    STOR       0
   163          SA    .001    .004    .021    .049    .084    .125    .180
   164          SQ       0      10      30      55      90     110     133
   165          SE    67.5    68.0    69.0    70.0    71.0    72.0    73.0
   166          ST    73.0      45     2.7     1.5
                *
```

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 167    KK     008   BASIN
 168    BA   0.003
 169    LG    0.27    0.25    6.00    0.20      25
 170    UC   0.181   0.366
 171    UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 172    UA     100
        *

 173    KK     010   BASIN
 174    BA   0.003
 175    LG    0.27    0.25    6.00    0.20      19
 176    UC   0.155   0.219
 177    UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 178    UA     100
        *

 179    KK    C010 COMBINE HYDROGRAPHS FROM SUB 008 AND SUB 010
 180    HC       2
        *

 181    KK   RC010   ROUTE FLOW THRU SUB 011
 182    RS       1    FLOW       0
 183    RC   0.070   0.050   0.070     390   0.020
 184    RX    1000    1001    1039    1045    1055    1061    1099    1100
 185    RY     100      93      92      90      90      92      93     100
        *

 186    KK     011   BASIN
 187    BA   0.005
 188    LG    0.26    0.25    6.00    0.20      25
 189    UC   0.168   0.205
 190    UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 191    UA     100
        *
1                               HEC-1 INPUT                                        PAGE  6

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

 192    KK    C011 COMBINE HYDROGRAPHS FROM SUB 011 AND RC010
 193    HC       2
        *

 194    KK   C013I COMBINE HYDROGRAPHS C011, LP012 AND LPC007
 195    HC       3
        *

 196    KK  LPC131   ROUTE INFLOW THRU STORAGE AREA
 197    KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 198    KM           LOW FLOW OUTLET = 10'w x 3'h RCB
 199    RS       1    STOR       0
 200    SA    .001    .005    .029    .082    .216    .432
 201    SQ       0      40      90     150     210     266
 202    SE    61.0    62.0    63.0    64.0    65.0    66.0
 203    ST    66.0      45     2.7     1.5
        *

 204    KK     013   BASIN
 205    BA   0.041
 206    LG    0.26    0.25    6.00    0.20      27
 207    UC   0.255   0.255
 208    UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 209    UA     100
        *

 210    KK    C013 COMBINE HYDROGRAPHS FROM SUB 013 AND LPC131
 211    HC       2
        *

 212    KK  LPC013   ROUTE INFLOW THRU STORAGE AREA
 213    KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 214    KM           LOW FLOW OUTLET = 10'w x 3'h RCB
 215    RS       1    STOR       0
 216    SA    .001    .003    .005    .024    .100    .355
 217    SQ       0      40     100     160     220     272
 218    SE    55.8    57.0    58.0    59.0    60.0    61.0
 219    ST    61.0      45     2.7     1.5
        *

 220    KK  RLPC13   ROUTE FLOW THRU SUB 018
 221    RS       1    FLOW       0
 222    RC   0.045   0.040   0.045    2178   0.020
 223    RX    1000    1001    1010    1022    1032    1044    1053    1054
 224    RY    95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
        *

 225    KK     014   BASIN
 226    BA   0.018
 227    LG    0.26    0.25    6.00    0.20      25
 228    UC   0.197   0.179
 229    UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 230    UA     100
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1                                      HEC-1 INPUT                                                  PAGE  7

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


  231       KK   LP014   ROUTE INFLOW THRU STORAGE AREA
  232       KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  233       KM           LOW FLOW OUTLET = 30" RCP
  234       RS       1    STOR      0
  235       SA    .001    .002   .003    .014    .054    .117
  236       SQ       0      10     22      33      42      48
  237       SE    64.5    66.0     67      68      69    70.0
  238       ST    70.0      45    2.7     1.5
            *

  239       KK  RLP014   ROUTE FLOW THRU SUB 015
  240       RS       1    FLOW      0
  241       RC   0.070   0.050  0.070    1764   0.021
  242       RX    1000    1001 1045.5    1050    1055  1059.5    1099    1100
  243       RY     100    92.5   91.5      90      90    91.5    92.5     100
            *

  244       KK     016   BASIN
  245       BA   0.031
  246       LG    0.28    0.25   6.00    0.22      19
  247       UC   0.225   0.190
  248       UA       0     5.0   16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  249       UA     100
            *

  250       KK   LP016   ROUTE INFLOW THRU STORAGE AREA
  251       KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  252       KM           LOW FLOW OUTLET = NONE
  253       RS       1    STOR      0
  254       SA   .0891    .939  1.154
  255       SQ       0       0    185
  256       SE    42.0    43.0   44.0
            *

  257       KK  RLP016   ROUTE FLOW THRU SUB 015
  258       RS       1    FLOW      0
  259       RC   0.070   0.050  0.070     730   0.016
  260       RX    1000    1001 1045.5    1050    1055  1059.5    1099    1100
  261       RY     100    92.5   91.5      90      90    91.5    92.5     100
            *

  262       KK     015   BASIN
  263       BA   0.060
  264       LG    0.28    0.25   6.00    0.20      30
  265       UC   0.278   0.251
  266       UA       0     5.0   16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  267       UA     100
            *
1                                      HEC-1 INPUT                                                  PAGE  8

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


  268       KK     017   BASIN
  269       BA   0.017
  270       LG    0.28    0.25   6.00    0.23      28
  271       UC   0.217   0.306
  272       UA       0     5.0   16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  273       UA     100
            *

  274       KK   DV017    SPLIT HYDROGRAPH SB017. THAT PORTION INTERCEPTED BY DOUBLE CATCH
  275       KM            BASIN AND STORM DRAIN @ INTERSECTION OF 108TH WY AND GRAYTHORN DR
  276       KM            IS DIVERTED FROM PRE-DEVELOPED FLOW PATH TO SB065. FLOW-BY
  277       KM            HYDROGRAPH WILL BE LABELED "DR140" WHICH WILL BE RETRIEVED LATER
  278       KM            AND ROUTED THRU SB145 AS "RR145". DI-DQ RECORD IS FROM GILBERTSON
  279       KM            AND ASSOC PARCEL "J" HEC-1 MODEL 90092100.DAT DATED 01-29-96.
  280       DT   DR017
            *          KK  DIV1
            *          KM DIVERT 32 CFS TO CP2I
            *          DT  DIV1
  281       DI       0      32     45     100
  282       DQ       0      32     32      32
            *

  283       KK    C017 COMBINE HYDROGRAPHS FROM DV017, SUB 015, RLP016 AND RLP014
  284       HC       4
            *

  285       KK   RC017    "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL TO REFLECT
  286       KM            ANTICIPATED DEVELOPMENT.
  287       RS       1    FLOW      0
  288       RC   0.070   0.040  0.070     690   0.011
  289       RX    1000    1001 1025.0    1040    1055  1070.0    1099    1100
  290       RY     100    97.0   95.0      90      90    95.0    97.0     100
            *
```

```
  291          KK     018   BASIN
  292          BA   0.050
  293          LG    0.22    0.21    6.40    0.18      33
  294          UC   0.277   0.277
  295          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  296          UA     100
               *

  297          KK    C018 COMBINE HYDROGRAPHS FROM SUB 018, RC017 AND RLPC13
  298          KM    THIS IS TNP INFLOW FROM ALMA SCHOOL RD. CULVERT
  299          HC       3
               *

  300          KK     019   BASIN
  301          BA   0.050
  302          LG    0.26    0.25    6.00    0.20      57
  303          UC   0.238   0.215
  304          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  305          UA     100
               *
1                                        HEC-1 INPUT                                          PAGE  9

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


  306          KK     020   BASIN
  307          BA   0.016
  308          LG    0.28    0.25    6.00    0.20      18
  309          UC   0.298   0.566
  310          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  311          UA     100
               *

  312          KK    C020 COMBINE HYDROGRAPHS FROM SUB 019 AND SUB 020
  313          HC       2
               *

  314          KK   RC020     NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
  315          KM                TO REFLECT EXISTING DEVELOPMENT.
  316          RS       1    FLOW       0
  317          RC   0.070   0.040   0.070     880   0.018
  318          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
  319          RY     100    95.5    94.5      90      90    94.5    95.5     100
               *

  320          KK     021   BASIN
  321          BA   0.024
  322          LG    0.26    0.25    6.00    0.20      56
  323          UC   0.225   0.250
  324          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  325          UA     100
               *

  326          KK    C021 COMBINE HYDROGRAPHS FROM SUB 021 AND RC020
  327          KM         THIS IS TNP INFLOW FROM C021
  328          HC       2
               *

  329          KK     022   BASIN
  330          BA   0.067
  331          LG    0.29    0.25    6.00    0.19      10
  332          UC   0.318   0.364
  333          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  334          UA     100
               *

  335          KK   LP022   ROUTE INFLOW THRU STORAGE AREA
  336          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  337          KM           LOW FLOW OUTLET = 4-24" RCP
  338          RS       1    STOR       0
  339          SA    .001    .004    .009    .011    .013    .060    .140
  340          SQ       0      17    48.5    79.5    97.0     113     127
  341          SE    71.0    72.0    73.0    74.0    75.0    76.0    77.0
  342          ST    77.0      45     2.7     1.5
               *
1                                        HEC-1 INPUT                                          PAGE 10

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


  343          KK     023   BASIN
  344          BA   0.065
  345          LG    0.27    0.25    6.00    0.20      22
  346          UC   0.276   0.261
  347          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  348          UA     100
               *

  349          KK   LP023   ROUTE INFLOW THRU STORAGE AREA
  350          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  351          KM           LOW FLOW OUTLET = 3-30" RCP
  352          RS       1    STOR       0
  353          SA    .001    .052    .288    .518    .751
```

```
 354          SQ       0      15      48      84     113
 355          SE    73.0    74.0    75.0    76.0    77.0
 356          ST    77.0      45     2.7     1.5
              *

 357          KK    C023 COMBINE HYDROGRAPHS FROM LP022 AND LP023
 358          HC       2
              *

 359          KK  RLPC23
 360          RS       2    FLOW       0
 361          RC   0.070   0.050   0.070    1235   0.022
 362          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
 363          RY     100    95.5    94.5      90      90    94.5    95.5     100
              *

 364          KK     024   BASIN
 365          BA   0.017
 366          LG    0.28    0.25    6.00    0.19      35
 367          UC   0.217   0.243
 368          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 369          UA     100
              *

 370          KK    C024 COMBINE HYDROGRAPHS FROM SUB 024 AND RLPC23
 371          HC       2
              *

 372          KK  LPC024   ROUTE INFLOW THRU STORAGE AREA
 373          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 374          KM           LOW FLOW OUTLET = NONE
 375          RS       1    STOR       0
 376          SA    .108    .346    .566    .815    1.05
 377          SQ       0       0       0      56     230
 378          SE    45.0    46.0    47.0    48.0    49.0
              *
1                                        HEC-1 INPUT                                                PAGE 11

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

 379          KK  RLPC24   NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
 380          KM                   TO REFLECT EXISTING DEVELOPMENT.
 381          RS       3    FLOW       0
 382          RC   0.070   0.040   0.070    1244   0.022
 383          RX    1000    1001  1022.0    1040    1055  1073.0    1099    1100
 384          RY     100    99.0    96.0      90      90    96.0    99.0     100
              *

 385          KK     025   BASIN
 386          BA   0.029
 387          LG    0.26    0.25    6.00    0.20      57
 388          UC   0.227   0.263
 389          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 390          UA     100
              *

 391          KK    C025 COMBINE HYDROGRAPHS FROM SUB 025 AND RR
 392          KM         THIS TNP INFLOW FROM C025
 393          HC       2
              *

 394          KK     026   BASIN
 395          BA   0.039
 396          LG    0.28    0.25    6.00    0.19      11
 397          UC   0.229   0.225
 398          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 399          UA     100
              *

 400          KK   LP026   ROUTE INFLOW THRU STORAGE AREA
 401          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 402          KM           LOW FLOW OUTLET = NONE
 403          RS       1    STOR       0
 404          SA    .142    .186    .210    .238
 405          SQ       0       0       0      78
 406          SE  2700.0  2701.0  2702.0  2703.0
              *

 407          KK  RLP026
 408          RS       4    FLOW       0
 409          RC   0.070   0.050   0.070    2870   0.024
 410          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
 411          RY     100    92.5    91.5      90      90    91.5    92.5     100
              *

 412          KK     028   BASIN
 413          BA   0.004
 414          LG    0.30    0.25    6.00    0.20       9
 415          UC   0.120   0.130
 416          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 417          UA     100
              *
```

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1                                                HEC-1 INPUT                                                   PAGE 12

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


  418           KK   LP028   ROUTE INFLOW THRU STORAGE AREA
  419           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  420           KM           LOW FLOW OUTLET = NONE
  421           RS       1    STOR       0
  422           SA    .020    .067    .124    .181    .275
  423           SQ       0       0       0       0       0
  424           SE    28.0    29.0    30.0    31.0    32.0
  425           ST    32.0      41     2.7     1.5
                *

  426           KK     030   BASIN
  427           BA   0.002
  428           LG    0.28    0.25    6.00    0.19      16
  429           UC   0.118   0.174
  430           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  431           UA     100
                *

  432           KK   LP030   ROUTE INFLOW THRU STORAGE AREA
  433           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  434           KM           LOW FLOW OUTLET = NONE
  435           RS       1    STOR       0
  436           SA    .001    .004    .013    .027    .046    .072
  437           SQ       0       0       0       0       0       0
  438           SE    11.0    12.0    13.0    14.0    15.0    16.0
  439           ST    16.0      45     2.7     1.5
                *

  440           KK     029   BASIN
  441           BA   0.005
  442           LG    0.28    0.25    6.00    0.19      13
  443           UC   0.175   0.291
  444           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  445           UA     100
                *

  446           KK    C029 COMBINE HYDROGRAPHS FROM SUB 029, LP028 AND LP029
  447           HC       3
                *

  448           KK  LPC029   ROUTE INFLOW THRU STORAGE AREA
  449           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  450           KM           LOW FLOW OUTLET = 24" RCP
  451           RS       1    STOR       0
  452           SA    .001    .002    .010    .039    .067    .100    .148
  453           SQ       0      13      20      26      31      35      38
  454           SE      01      03      04      05      06      07      08
  455           ST      08      40     2.7     1.5
                *
1                                                HEC-1 INPUT                                                   PAGE 13

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


  456           KK     027   BASIN
  457           BA   0.024
  458           LG    0.30    0.25    6.00    0.18       2
  459           UC   0.223   0.259
  460           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  461           UA     100
                *

  462           KK     031   BASIN
  463           BA   0.010
  464           LG    0.30    0.25    6.00    0.18       2
  465           UC   0.166   0.177
  466           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  467           UA     100
                *

  468           KK    C031 COMBINE HYDROGRAPHS FROM SUB 027, SUB 031 AND LPC029
  469           HC       3
                *

  470           KK   RC031
  471           KM          ROUTE FLOW THRU SUB 032
  472           RS       4    FLOW       0
  473           RC   0.070   0.050   0.070     894   0.019
  474           RX    1000    1001    1039    1045    1055    1061    1099    1100
  475           RY     100      93      92      90      90      92      93     100
                *

  476           KK     032   BASIN
  477           BA   0.014
  478           LG    0.27    0.25    6.00    0.20      21
  479           UC   0.206   0.264
  480           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  481           UA     100
```

```
                      *

       482            KK    C032 COMBINE HYDROGRAPHS FROM SUB 032 AND RC031
       483            HC       2
                      *

       484            KK  LPC032   ROUTE INFLOW THRU STORAGE AREA
       485            KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
       486            KM           LOW FLOW OUTLET - 42" RCP
       487            RS       1    STOR       0
       488            SA    .001    .007    .070    .136    .270
       489            SQ       0      11      23      46      63
       490            SE    77.0    78.0    79.0    80.0    81.0
       491            ST    81.0      45     2.7     1.5
                      *
1                                          HEC-1 INPUT                                          PAGE 14

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

       492            KK  RLPC32
       493            KM          ROUTE FLOW THRU SUB 033
       494            RS       4    FLOW       0
       495            RC   0.070   0.050   0.070    2176   0.021
       496            RX    1000    1001    1039    1045    1055    1061    1099    1100
       497            RY     100      93      92      90      90      92      93     100
                      *

       498            KK     033   BASIN
       499            BA   0.147
       500            LG    0.27    0.25    6.00    0.20      36
       501            UC   0.338   0.277
       502            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
       503            UA     100
                      *

       504            KK    C033 COMBINE HYDROGRAPHS FROM SUB 033, RLPC32 AND RLP026
       505            HC       3
                      *

       506            KK     034   BASIN
       507            BA   0.093
       508            LG    0.30    0.25    6.00    0.18       1
       509            UC   0.272   0.231
       510            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
       511            UA     100
                      *

       512            KK    R034    ROUTE FLOW THRU SUB 035
       513            RS       1    FLOW       0
       514            RC   0.045   0.040   0.045    2178   0.020
       515            RX    1000    1001    1010    1022    1032    1044    1053    1054
       516            RY    95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
                      *

       517            KK     035   BASIN
       518            BA   0.022
       519            LG    0.30    0.23    6.20    0.17       5
       520            UC   0.187   0.194
       521            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
       522            UA     100
                      *

       523            KK     036   BASIN
       524            BA   0.008
       525            LG    0.29    0.23    6.20    0.18      23
       526            UC   0.140   0.165
       527            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
       528            UA     100
                      *
1                                          HEC-1 INPUT                                          PAGE 15

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

       529            KK    C036 COMBINE HYDROGRAPHS FROM SUB 035, SUB 036, C033 AND R034
       530            KM         THIS IS TNP INFLOW FROM C036
       531            HC       4
                      *

       532            KK     037   BASIN
       533            BA   0.041
       534            LG    0.30    0.23    6.20    0.17       1
       535            UC   0.187   0.146
       536            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
       537            UA     100
                      *

       538            KK    C037 COMBINE ALL HYDROGRAPHS
       539            KM         THIS REPRESENTS TOTAL INFLOW TO BASIN No.1
       540            HC       5
       541            ZW             A=TROON         B=TNFLOW        C=FLOW
                      *
```

```
542         KK   DET#1     ROUTE INFLOW THRU DET BASIN #1 (UPPER BASIN)
543         KM             LOW FLOW OUTLET = 4-42" RCP
544         KM             INLET INVERT ELEV = 2598.80
545         KM             OUTLET INVERT ELEV = 2592.0
546         KM             SPILLWAY ELEV = 2610.0
547         KM             WEIR LENGTH = 50'
548         RS        1    STOR      0.0
549         SA    0.023    0.11     0.49     1.23     3.50     4.00     4.24     4.57     4.85     5.33
550         SA     5.95    6.67     7.80     8.95
551         SQ        0      45    103.5      185      264    328.5      382    428.5      470      507
552         SQ      543     575      725      999
553         SE     2599    2600     2601     2602     2603     2604     2605     2606     2607     2608
554         SE     2609    2610     2611     2612
555         ZW              A=TROON           B=DET#1          C=FLOW
            *

556         KK   DET#2     ROUTE INFLOW THRU DET BASIN #2 (LOWER BASIN)
557         KM             LOW FLOW OUTLET = 1-60" RCP
558         KM             INLET INVERT ELEV = 2590.36
559         KM             OUTLET INVERT ELEV = 2589.95
560         KM             SPILLWAY ELEV = 2607.0
561         KM             WEIR LENGTH = 35'
562         RS        1    STOR      0.0
563         SA    0.023   0.048    0.496    0.876    1.119    1.277    1.414    1.558    1.705    1.820
564         SA    1.930   2.042    2.365    2.487    2.615    2.770    2.935    3.258
565         SQ        0    11.5       29       47       78    112.5      148      177      204      226
566         SQ      248     266      283    300.5      315      330      345      378
567         SE   2590.3    2591     2592     2593     2594     2595     2596     2597     2598     2599
568         SE     2600    2601     2602     2603     2604     2605     2606     2607
569         ST     2607      35      3.0      1.5
570         ZW              A=TROON           B=DET#2          C=FLOW
            *
            *    ***************************************************************************
            *    *****************                                       ******************
            *    *****************  START CAVALLIERE FLATS MODEL CHANGES  ******************
            *    *****************                                       ******************
            *    ***************************************************************************
            *
1                                          HEC-1 INPUT                                            PAGE 16

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


571         KK  DDET#2
572         KM   Outlet channel capacity is 348 cfs. Divert overtopping flow.
573         DT    OVER
574         DI        0     348    348.1    10000
575         DQ        0       0      0.1     9652
            *
            *    ***************************************************************************
            *    *****************                                       ******************
            *    *****************   END CAVALLIERE FLATS MODEL CHANGES   ******************
            *    *****************                                       ******************
            *    ***************************************************************************
            *

576         KK  RDET#2     ROUTE FLOW THRU SUB 042
577         KM             OUTLET CHANNEL TROON NORTH PARK BASIN
578         RS        1    FLOW        0
579         RC    0.040   0.035    0.040      594    0.010
580         RX      990     992      994     1000     1010     1016     1018     1020
581         RY     14.0    13.5     13.0     10.0     10.0     13.0     13.5     14.0
            *
            *    ***************************************************************************
            *    ***************************************************************************
            *                          STARTS DOWNSTREAM OFFSITE AREAS MODEL
            *
            *    ***************************************************************************
            *    ***************************************************************************
            *

582         KK      038    BASIN
583         BA    0.047
584         LG     0.28    0.25     6.00     0.21       26
585         UC    0.234   0.266
586         UA        0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
587         UA      100
            *

588         KK    LP038    ROUTE INFLOW THRU STORAGE AREA
589         KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
590         KM             LOW FLOW OUTLET = 3-36" RCP
591         RS        1    STOR        0
592         SA     .001    .007     .047     .086     .160
593         SQ        0      33       82      132      165
594         SE     24.6    26.0     27.0     28.0     29.0
595         ST     29.0      45      2.7      1.5
            *

596         KK      040    BASIN
597         BA    0.018
598         LG     0.26    0.25     6.00     0.20       49
```

```
     599          UC    0.184    0.202
     600          UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
     601          UA      100
                  *
1                                             HEC-1 INPUT                                                   PAGE 17

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


     602          KK     C040 COMBINE HYDROGRAPHS FROM SUB 040 AND LP038
     603          HC        2
                  *

     604          KK    LP040    ROUTE INFLOW THRU STORAGE AREA
     605          KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
     606          KM             LOW FLOW OUTLET = 3-36" RCP
     607          RS        1     STOR        0
     608          SA     .001     .024     .077     .127
     609          SQ        0       82      132      165
     610          SE     06.6     09.0     10.0     11.0
     611          ST     11.0       45      2.7      1.5
                  *

     612          KK   RLP040    ROUTE FLOW THRU SUB 042
     613          RS        1     FLOW        0
     614          RC    0.045    0.040    0.045      927    0.016
     615          RX      990      992      994     1000     1012     1018     1020     1022
     616          RY     13.2     13.1     13.0     10.0     10.0     13.0     13.1     13.2
                  *

     617          KK      042    BASIN
     618          BA    0.020
     619          LG     0.27     0.25     6.00     0.20       20
     620          UC    0.289    0.433
     621          UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
     622          UA      100
                  *

     623          KK     C042 COMBINE HYDROGRAPHS FROM RDET#2, SUB 042 AND RLP040
     624          HC        3
     625          ZW              A=PVISTA        B-C042            C=FLOW
                  *

     626          KK      039    BASIN
     627          BA    0.035
     628          LG     0.26     0.25     6.00     0.20       39
     629          UC    0.225    0.292
     630          UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
     631          UA      100
                  *

     632          KK    LP039    ROUTE INFLOW THRU STORAGE AREA
     633          KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
     634          KM             LOW FLOW OUTLET = 3-30" RCP
     635          RS        1     STOR        0
     636          SA     .001     .007     .015     .024     .037
     637          SQ        0       49       84      112      135
     638          SE     17.0     19.0     20.0     21.0     22.0
     639          ST     22.0       45      2.7      1.5
                  *
1                                             HEC-1 INPUT                                                   PAGE 18

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


     640          KK      041    BASIN
     641          BA    0.011
     642          LG     0.28     0.25     6.00     0.19       33
     643          UC    0.231    0.353
     644          UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
     645          UA      100
                  *

     646          KK     C041 COMBINE HYDROGRAPHS FROM SUB 041 AND LP039
     647          HC        2
                  *

     648          KK    LP041    ROUTE INFLOW THRU STORAGE AREA
     649          KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
     650          KM             LOW FLOW OUTLET = 3-30" RCP
     651          RS        1     STOR        0
     652          SA     .001     .020     .039     .072     .104
     653          SQ        0       14       49       84      113
     654          SE     07.0     08.0     09.0     10.0     11.0
     655          ST     11.0       45      2.7      1.5
                  *

     656          KK   RLP041     ROUTE FLOW THRU SUB 041/042
     657          RS        1     FLOW        0
     658          RC    0.045    0.040    0.045     1314    0.017
     659          RX      990      992      994     1000     1008     1014     1016     1018
     660          RY     13.2     13.1     13.0     10.0     10.0     13.0     13.1     13.2
                  *
```

```
 661           KK     043   BASIN
 662           BA   0.008
 663           LG    0.26    0.25    6.00    0.20      29
 664           UC   0.231   0.376
 665           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 666           UA     100
               *

 667           KK    C043 COMBINE HYDROGRAPHS FROM SUB 043 AND RLP041
 668           HC       2
 669           ZW           A=PVISTA        B=C043          C=FLOW
               *

 670           KK    COMB COMBINE HYDROGRAPHS FROM C042 AND C043
 671           KM           THIS REPRESENTS COMBINED FLOWS AT PINNACLE VISTA ROAD
 672           HC       2
 673           ZW           A=PVISTA        B=COMB          C=FLOW
               *
               *  ****************************************************************************
               *  ******************                                      ******************
               *  ******************  START CAVALLIERE FLATS MODEL CHANGES  ******************
               *  ******************                                      ******************
               *  ****************************************************************************
               *
1                                            HEC-1 INPUT                                          PAGE 19

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


 674           KK    RCF1   ROUTE
 675           RS       1    FLOW
 676           RC   0.035   0.035   0.035     690  0.0200    0.00
 677           RX    0.00   30.00   67.50   72.50   77.50   82.50  120.00  150.00
 678           RY    3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
               *

 679           KK     CF1   BASIN
 680           BA   0.009
 681           LG    0.22    0.25    5.85    0.22      37
 682           UC   0.158   0.193
 683           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 684           UA     100
               *

 685           KK    CCF1 COMBINE
 686           HC       2
               *

 687           KK  ODET#2
 688           KM   Retrieve flow overtopping Troon North Park Basin outlet channel
 689           DR    OVER
               *

 690           KK   RCF2A   ROUTE
 691           RS       1    FLOW
 692           RC   0.035   0.035   0.035     990  0.0200    0.00
 693           RX    0.00   20.00   40.00   45.00   55.00   60.00   80.00  100.00
 694           RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
               *

 695           KK    OFF1   BASIN
 696           BA   0.307
 697           LG    0.32    0.31    6.00    0.17       9
 698           UC   0.462   0.356
 699           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 700           UA     100
               *

 701           KK   RCF2B   ROUTE
 702           RS       1    FLOW
 703           RC   0.035   0.035   0.035     530  0.0270    0.00
 704           RX    0.00   15.00   30.00   35.00   90.00   95.00  110.00  125.00
 705           RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
               *

 706           KK     CF2   BASIN
 707           BA   0.014
 708           LG    0.30    0.25    5.85    0.18       6
 709           UC   0.187   0.188
 710           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 711           UA     100
               *
1                                            HEC-1 INPUT                                          PAGE 20

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


 712           KK   CCF2A COMBINE
 713           HC       3
               *

 714           KK   CCF2B COMBINE
```

```
 715          HC        2
              *

 716          KK     RCF3   ROUTE
 717          RS        1    FLOW
 718          RC    0.035   0.035   0.035     795  0.0380    0.00
 719          RX     0.00   35.00   80.50  100.00  106.00  125.50  565.00  600.00
 720          RY     5.00    4.00    3.00    0.00    0.00    3.00    4.00    5.00
              *

 721          KK      CF3   BASIN
 722          BA    0.030
 723          LG     0.21    0.31    5.71    0.25      48
 724          UC    0.210   0.174
 725          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 726          UA      100
              *

 727          KK     CCF3 COMBINE
 728          HC        2
              *

 729          KK     OFF2   BASIN
 730          BA    0.011
 731          LG     0.30    0.25    6.00    0.17       6
 732          UC    0.173   0.213
 733          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 734          UA      100
              *

 735          KK    RCF4A   ROUTE
 736          RS        1    FLOW
 737          RC    0.035   0.035   0.035    1230  0.0250    0.00
 738          RX     0.00   25.00   50.00   55.00   65.00   70.00   95.00  120.00
 739          RY     3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
              *

 740          KK     OFF3   BASIN
 741          BA    0.007
 742          LG     0.33    0.34    6.00    0.17       3
 743          UC    0.225   0.357
 744          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 745          UA      100
              *
1                                            HEC-1 INPUT                                          PAGE 21

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


 746          KK    RCF4B   ROUTE
 747          RS        1    FLOW
 748          RC    0.035   0.035   0.035     410  0.0220    0.00
 749          RX     0.00   25.00   50.00   55.00   65.00   70.00   95.00  120.00
 750          RY     3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
              *

 751          KK      CF4   BASIN
 752          BA    0.017
 753          LG     0.27    0.32    5.71    0.22      24
 754          UC    0.279   0.395
 755          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 756          UA      100
              *

 757          KK     CCF4 COMBINE
 758          HC        3
              *

 759          KK     OFF4   BASIN
 760          BA    0.061
 761          LG     0.32    0.32    6.00    0.17      12
 762          UC    0.279   0.266
 763          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 764          UA      100
              *

 765          KK     RCF5   ROUTE
 766          RS        1    FLOW
 767          RC    0.035   0.035   0.035     270  0.0300    0.00
 768          RX     0.00   50.00  100.00  105.00  115.00  120.00  170.00  220.00
 769          RY     1.00    0.75    0.50    0.00    0.00    0.50    0.75    1.00
              *

 770          KK      CF5   BASIN
 771          BA    0.002
 772          LG     0.35    0.39    5.71    0.20       0
 773          UC    0.155   0.169
 774          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 775          UA      100
              *

 776          KK     CCF5 COMBINE
 777          HC        2
```

```
                        *

         778            KK    OFF5   BASIN
         779            BA   0.009
         780            LG    0.35    0.35    4.65    0.33       2
         781            UC   0.292   0.470
         782            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         783            UA     100
                        *
1                                                        HEC-1 INPUT                                                 PAGE 22

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


         784            KK    RCF6   ROUTE
         785            RS       1    FLOW
         786            RC   0.035   0.035   0.035     260  0.0350    0.00
         787            RX    0.00   50.00  100.00  105.00  110.00  115.00  165.00  215.00
         788            RY    3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
                        *

         789            KK     CF6   BASIN
         790            BA   0.001
         791            LG    0.35    0.35    3.75    0.54       0
         792            UC   0.163   0.231
         793            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         794            UA     100
                        *

         795            KK    CCF6 COMBINE
         796            HC       2
                        *
         797            ZZ

               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE    (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   21        001
              .
              .
   31         .          002
              .            V
              .            V
   37         .        LP002
              .            .
              .            .
   45       C001...........
              V
              V
   47     LPC001
              V
              V
   55     RLPC01
              .
              .
   60         .          007
              .            .
              .            .
   66       C007...........
              V
              V
   68     LPC007
              .
              .
   76         .          003
              .            V
              .            V
   82         .         R003
              .            .
              .            .
   87         .            .          005
              .            .            .
              .            .            .
   93         .         C005............
              .            V
              .            V
   95         .        RC005
              .            V
              .            V
  100         .       LPC005
              .            .
              .            .
  108         .            .          004
              .            .            V
              .            .            V
  114         .            .         R004
              .            .            .
              .            .            .
  119         .            .            .          006
              .            .            .            .
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                   .           .           .           .
     125           .           .        C006............
                   .           .           V
                   .           .           V
     127           .           .      LPC006
                   .           .           .
                   .           .           .
     135           .           .           .         009
                   .           .           .           .
                   .           .           .           .
     141           .        C009........................
                   .           V
                   .           V
     143           .      LPC009
                   .           .
                   .           .
     151           .           .         012
                   .           .           .
                   .           .           .
     157           .        C012............
                   .           V
                   .           V
     159           .      LPC012
                   .           .
                   .           .
     167           .           .         008
                   .           .           .
                   .           .           .
     173           .           .           .         010
                   .           .           .           .
                   .           .           .           .
     179           .           .        C010............
                   .           .           V
                   .           .           V
     181           .           .       RC010
                   .           .           .
                   .           .           .
     186           .           .           .         011
                   .           .           .           .
                   .           .           .           .
     192           .           .        C011............
                   .           .           .
                   .           .           .
     194       C013I........................
                   V
                   V
     196      LPC13I
                   .
                   .
     204           .         013
                   .           .
                   .           .
     210        C013............
                   V
                   V
     212      LPC013
                   V
                   V
     220      RLPC13
                   .
                   .
     225           .         014
                   .           V
                   .           V
     231           .       LP014
                   .           V
                   .           V
     239           .      RLP014
                   .           .
                   .           .
     244           .           .         016
                   .           .           V
                   .           .           V
     250           .           .       LP016
                   .           .           V
                   .           .           V
     257           .           .      RLP016
                   .           .           .
                   .           .           .
     262           .           .           .         015
                   .           .           .           .
                   .           .           .           .
     268           .           .           .           .         017
                   .           .           .           .           .
                   .           .           .           .           .
     280           .           .           .           .           .------->   DR017
     274           .           .           .           .       DV017
                   .           .           .           .           .
                   .           .           .           .           .
     283           .        C017....................................
                   .           V
                   .           V
     285           .       RC017
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                 .           .
   291           .           .           018
                 .           .           .
                 .           .           .
   297        C018........................
                 .
                 .
   300           .          019
                 .           .
                 .           .
   306           .           .           020
                 .           .           .
                 .           .           .
   312           .          C020............
                 .           V
                 .           V
   314           .         RC020
                 .           .
                 .           .
   320           .           .           021
                 .           .           .
                 .           .           .
   326           .          C021............
                 .           .
                 .           .
   329           .           .           022
                 .           .           V
                 .           .           V
   335           .           .         LP022
                 .           .           .
                 .           .           .
   343           .           .           .           023
                 .           .           .           V
                 .           .           .           V
   349           .           .           .         LP023
                 .           .           .           .
                 .           .           .           .
   357           .           .          C023............
                 .           .           V
                 .           .           V
   359           .           .        RLPC23
                 .           .           .
                 .           .           .
   364           .           .           .           024
                 .           .           .           .
                 .           .           .           .
   370           .           .          C024............
                 .           .           V
                 .           .           V
   372           .           .        LPC024
                 .           .           V
                 .           .           V
   379           .           .        RLPC24
                 .           .           .
                 .           .           .
   385           .           .           .           025
                 .           .           .           .
                 .           .           .           .
   391           .           .          C025............
                 .           .           .
                 .           .           .
   394           .           .           .           026
                 .           .           .           V
                 .           .           .           V
   400           .           .           .         LP026
                 .           .           .           V
                 .           .           .           V
   407           .           .           .        RLP026
                 .           .           .           .
                 .           .           .           .
   412           .           .           .           .           028
                 .           .           .           .           V
                 .           .           .           .           V
   418           .           .           .           .         LP028
                 .           .           .           .           .
                 .           .           .           .           .
   426           .           .           .           .           .           030
                 .           .           .           .           .           V
                 .           .           .           .           .           V
   432           .           .           .           .           .         LP030
                 .           .           .           .           .           .
                 .           .           .           .           .           .
   440           .           .           .           .           .           .           029
                 .           .           .           .           .           .           .
                 .           .           .           .           .           .           .
   446           .           .           .           .          C029........................
                 .           .           .           .           V
                 .           .           .           .           V
   448           .           .           .           .        LPC029
                 .           .           .           .           .
                 .           .           .           .           .
   456           .           .           .           .           .           027
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               .           .           .           .           .           .           .
462            .           .           .           .           .           .         031
               .           .           .           .           .           .           .
               .           .           .           .           .           .           .
468            .           .           .           .        C031........................
               .           .           .           .           V
               .           .           .           .           V
470            .           .           .           .       RC031
               .           .           .           .           .
               .           .           .           .           .
476            .           .           .           .           .         032
               .           .           .           .           .           .
               .           .           .           .           .           .
482            .           .           .           .        C032............
               .           .           .           .           V
               .           .           .           .           V
484            .           .           .           .      LPC032
               .           .           .           .           V
               .           .           .           .           V
492            .           .           .           .      RLPC32
               .           .           .           .           .
               .           .           .           .           .
498            .           .           .           .           .         033
               .           .           .           .           .           .
               .           .           .           .           .           .
504            .           .           .        C033........................
               .           .           .           .
               .           .           .           .
506            .           .           .           .         034
               .           .           .           .           V
               .           .           .           .           V
512            .           .           .           .        R034
               .           .           .           .           .
               .           .           .           .           .
517            .           .           .           .           .         035
               .           .           .           .           .           .
               .           .           .           .           .           .
523            .           .           .           .           .           .         036
               .           .           .           .           .           .           .
               .           .           .           .           .           .           .
529            .           .           .        C036....................................
               .           .           .           .
               .           .           .           .
532            .           .           .           .         037
               .           .           .           .           .
               .           .           .           .           .
538         C037................................................
               V
               V
542        DET#1
               V
               V
556        DET#2
               .
               .
573            .------->    OVER
571       DDET#2
               V
               V
576       RDET#2
               .
               .
582            .         038
               .           V
               .           V
588            .       LP038
               .           .
               .           .
596            .           .         040
               .           .           .
               .           .           .
602            .        C040............
               .           V
               .           V
604            .       LP040
               .           V
               .           V
612            .      RLP040
               .           .
               .           .
617            .           .         042
               .           .           .
               .           .           .
623         C042........................
               .
               .
626            .         039
               .           V
               .           V
632            .       LP039
               .           .
               .           .
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640           .           .         041
              .           .           .
              .           .           .
646           .        C041............
              .           V
              .           V
648           .       LP041
              .           V
              .           V
656           .      RLP041
              .           .
              .           .
661           .           .         043
              .           .           .
              .           .           .
667           .        C043............
              .           .
              .           .
670        COMB............
              V
              V
674        RCF1
              .
              .
679           .         CF1
              .           .
              .           .
685        CCF1............
              .
              .
689           .           .<-------     OVER
687           .      ODET#2
              .           V
              .           V
690           .       RCF2A
              .           .
              .           .
695           .           .        OFF1
              .           .           V
              .           .           V
701           .           .       RCF2B
              .           .           .
              .           .           .
706           .           .           .         CF2
              .           .           .           .
              .           .           .           .
712           .       CCF2A........................
              .           .
              .           .
714       CCF2B............
              V
              V
716        RCF3
              .
              .
721           .         CF3
              .           .
              .           .
727        CCF3............
              .
              .
729           .        OFF2
              .           V
              .           V
735           .       RCF4A
              .           .
              .           .
740           .           .        OFF3
              .           .           V
              .           .           V
746           .           .       RCF4B
              .           .           .
              .           .           .
751           .           .           .         CF4
              .           .           .           .
              .           .           .           .
757           .        CCF4........................
              .           .
              .           .
759           .           .        OFF4
              .           .           V
              .           .           V
765           .           .        RCF5
              .           .           .
              .           .           .
770           .           .           .         CF5
              .           .           .           .
              .           .           .           .
776           .           .        CCF5............
              .           .           .
              .           .           .
778           .           .           .        OFF5
              .           .           .           V
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                                             V
  784     .          .          .          RCF6
          .          .          .           .
          .          .          .           .
  789     .          .          .           .       .  CF6
          .          .          .           .          .
          .          .          .           .          .
  795     .          .          .          CCF6...........

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1**************************************                    **************************************
*                                     *                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *  U.S. ARMY CORPS OF ENGINEERS      *
*            JUN   1998               *                    *  HYDROLOGIC ENGINEERING CENTER     *
*          VERSION 4.1                *                    *        609 SECOND STREET           *
*                                     *                    *     DAVIS, CALIFORNIA 95616        *
*  RUN DATE   02JUN14  TIME  14:32:05 *                    *         (916) 756-1104             *
*                                     *                    *                                    *
**************************************                     **************************************


                              Cavalliere Flats Rezoning
                              City of Scottsdale
                              Prepared by: Kimley-Horn and Associates, Inc.

                              Existing Conditions model
                              10-year, 6-hour Storm event

                              Based on Troon North Park Model:

                                 PROJECT NAME: TROON NORTH PARK                    JOB#: 236-08
                                 PREPARED FOR: CITY OF SCOTTSDALE
                                 PREPARED BY : ARGUS CONSULTING, P.C.

                                 FILE NAME    : TNP10YR.DAT
                                 STORM EVENT  : 10-YR/6-HR
                                 Unit Hydrograph: Clark
                                 01/24/2011

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

     IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE    6JUN99  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE   12JUN99  ENDING DATE
                     NDTIME       2235  ENDING TIME
                      ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE  166.58 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
  -----DSS---ZOPEN:  Existing File Opened,  File: 01-10.DSS
                     Unit:  71;  DSS Version: 6-JG
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/INFLOW/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#1/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   11:  /TROON/DET#2/FLOW/12JUN1999/5MIN//
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-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C042/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/C043/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    3:  /PVISTA/COMB/FLOW/12JUN1999/5MIN//
1
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	001	83.	4.17	9.	2.	1.	.11		
+	HYDROGRAPH AT	002	11.	4.17	1.	0.	0.	.02		
+	ROUTED TO	LP002	11.	4.17	2.	0.	0.	.02		
+									2723.63	4.17
+	2 COMBINED AT	C001	94.	4.17	11.	3.	1.	.13		
+	ROUTED TO	LPC001	92.	4.17	11.	3.	1.	.13		
+									2717.03	4.17
+	ROUTED TO	RLPC01	88.	4.25	11.	3.	1.	.13		
+									91.70	4.25
+	HYDROGRAPH AT	007	15.	4.08	2.	1.	0.	.02		
+	2 COMBINED AT	C007	100.	4.25	13.	3.	1.	.15		
+	ROUTED TO	LPC007	100.	4.25	13.	3.	1.	.15		
+									72.00	4.25
+	HYDROGRAPH AT	003	16.	4.08	1.	0.	0.	.02		
+	ROUTED TO	R003	16.	4.08	1.	0.	0.	.02		
+									90.69	4.08
+	HYDROGRAPH AT	005	7.	4.08	1.	0.	0.	.01		
+	2 COMBINED AT	C005	23.	4.08	2.	1.	0.	.02		
+	ROUTED TO	RC005	22.	4.08	2.	1.	0.	.02		
+									90.85	4.08
+	ROUTED TO	LPC005	22.	4.17	2.	1.	0.	.02		
+									84.76	4.17
+	HYDROGRAPH AT	004	11.	4.08	1.	0.	0.	.01		
+	ROUTED TO	R004	10.	4.17	1.	0.	0.	.01		
+									90.56	4.17
	HYDROGRAPH AT									

+		006	16.	4.08	2.	0.	0.	.01		
	2 COMBINED AT									
+		C006	25.	4.08	3.	1.	0.	.03		
	ROUTED TO									
+		LPC006	24.	4.17	3.	1.	0.	.03		
+									82.49	4.17
	HYDROGRAPH AT									
+		009	7.	4.08	1.	0.	0.	.01		
	3 COMBINED AT									
+		C009	52.	4.17	6.	1.	0.	.06		
	ROUTED TO									
+		LPC009	52.	4.17	6.	1.	0.	.06		
+									77.35	4.17
	HYDROGRAPH AT									
+		012	4.	4.00	0.	0.	0.	.00		
	2 COMBINED AT									
+		C012	56.	4.17	6.	2.	1.	.06		
	ROUTED TO									
+		LPC012	56.	4.17	6.	2.	1.	.06		
+									70.03	4.17
	HYDROGRAPH AT									
+		008	2.	4.08	0.	0.	0.	.00		
	HYDROGRAPH AT									
+		010	3.	4.08	0.	0.	0.	.00		
	2 COMBINED AT									
+		C010	5.	4.08	1.	0.	0.	.01		
	ROUTED TO									
+		RC010	5.	4.08	1.	0.	0.	.01		
+									90.18	4.08
	HYDROGRAPH AT									
+		011	5.	4.08	1.	0.	0.	.00		
	2 COMBINED AT									
+		C011	10.	4.08	1.	0.	0.	.01		
	3 COMBINED AT									
+		C013I	160.	4.25	21.	5.	2.	.22		
	ROUTED TO									
+		LPC13I	159.	4.25	21.	5.	2.	.22		
+									64.15	4.25
	HYDROGRAPH AT									
+		013	39.	4.08	5.	1.	0.	.04		
	2 COMBINED AT									
+		C013	190.	4.25	25.	6.	2.	.26		
	ROUTED TO									
+		LPC013	191.	4.25	25.	6.	2.	.26		
+									59.51	4.25
	ROUTED TO									
+		RLPC13	185.	4.33	25.	6.	2.	.26		
+									91.85	4.33
	HYDROGRAPH AT									
+		014	19.	4.08	2.	1.	0.	.02		
	ROUTED TO									
+		LP014	20.	4.08	2.	1.	0.	.02		
+									66.81	4.08
	ROUTED TO									
+		RLP014	17.	4.17	2.	1.	0.	.02		
+									90.73	4.17
	HYDROGRAPH AT									
+		016	31.	4.08	3.	1.	0.	.03		
	ROUTED TO									
+		LP016	28.	4.17	2.	1.	0.	.03		
+									43.15	4.17
	ROUTED TO									
+		RLP016	26.	4.25	2.	1.	0.	.03		
+									91.04	4.25
	HYDROGRAPH AT									
+		015	58.	4.08	7.	2.	1.	.06		

+ HYDROGRAPH AT	017	15.	4.08	2.	0.	0.	.02		
+ DIVERSION TO	DR017	15.	.00	2.	0.	0.	.02		
+ HYDROGRAPH AT	DV017	0.	.00	0.	0.	0.	.02		
+ 4 COMBINED AT	C017	97.	4.17	11.	3.	1.	.13		
+ ROUTED TO +	RC017	94.	4.17	11.	3.	1.	.13	91.24	4.17
+ HYDROGRAPH AT	018	49.	4.08	7.	2.	1.	.05		
+ 3 COMBINED AT	C018	317.	4.25	43.	11.	4.	.44		
+ HYDROGRAPH AT	019	59.	4.08	8.	2.	1.	.05		
+ HYDROGRAPH AT	020	9.	4.17	2.	0.	0.	.02		
+ 2 COMBINED AT	C020	68.	4.08	10.	2.	1.	.07		
+ ROUTED TO +	RC020	65.	4.17	10.	2.	1.	.07	91.42	4.17
+ HYDROGRAPH AT	021	27.	4.08	4.	1.	0.	.02		
+ 2 COMBINED AT	C021	92.	4.08	13.	3.	1.	.09		
+ HYDROGRAPH AT	022	48.	4.17	6.	2.	1.	.07		
+ ROUTED TO +	LP022	48.	4.17	6.	2.	1.	.07	73.00	4.17
+ HYDROGRAPH AT	023	59.	4.08	7.	2.	1.	.06		
+ ROUTED TO +	LP023	54.	4.17	7.	2.	1.	.06	75.17	4.17
+ 2 COMBINED AT	C023	102.	4.17	13.	3.	1.	.13		
+ ROUTED TO +	RLPC23	101.	4.25	13.	3.	1.	.13	91.87	4.25
+ HYDROGRAPH AT	024	17.	4.08	2.	1.	0.	.02		
+ 2 COMBINED AT	C024	114.	4.25	15.	4.	1.	.15		
+ ROUTED TO +	LPC024	110.	4.25	14.	4.	1.	.15	48.31	4.25
+ ROUTED TO +	RLPC24	113.	4.33	14.	4.	1.	.15	91.13	4.33
+ HYDROGRAPH AT	025	32.	4.08	5.	1.	0.	.03		
+ 2 COMBINED AT	C025	133.	4.33	19.	5.	2.	.18		
+ HYDROGRAPH AT	026	37.	4.08	4.	1.	0.	.04		
+ ROUTED TO +	LP026	36.	4.08	3.	1.	0.	.04	2702.46	4.08
+ ROUTED TO +	RLP026	32.	4.33	3.	1.	0.	.04	91.04	4.33

+	HYDROGRAPH AT	028	5.	4.00	0.	0.	0.	.00		
+	ROUTED TO	LP028	0.	.00	0.	0.	0.	.00	30.19	6.75
+	HYDROGRAPH AT	030	2.	4.00	0.	0.	0.	.00		
+	ROUTED TO	LP030	0.	.00	0.	0.	0.	.00	15.54	7.00
+	HYDROGRAPH AT	029	4.	4.08	0.	0.	0.	.00		
+	3 COMBINED AT	C029	4.	4.08	0.	0.	0.	.01		
+	ROUTED TO	LPC029	4.	4.08	0.	0.	0.	.01	1.66	4.08
+	HYDROGRAPH AT	027	20.	4.08	2.	0.	0.	.02		
+	HYDROGRAPH AT	031	10.	4.00	1.	0.	0.	.01		
+	3 COMBINED AT	C031	35.	4.08	3.	1.	0.	.05		
+	ROUTED TO	RC031	34.	4.08	3.	1.	0.	.05	90.81	4.08
+	HYDROGRAPH AT	032	13.	4.08	2.	0.	0.	.01		
+	2 COMBINED AT	C032	47.	4.08	5.	1.	0.	.06		
+	ROUTED TO	LPC032	45.	4.17	5.	1.	0.	.06	79.94	4.17
+	ROUTED TO	RLPC32	43.	4.33	5.	1.	0.	.06	90.91	4.33
+	HYDROGRAPH AT	033	137.	4.17	19.	5.	2.	.15		
+	3 COMBINED AT	C033	191.	4.25	27.	7.	2.	.25		
+	HYDROGRAPH AT	034	82.	4.08	8.	2.	1.	.09		
+	ROUTED TO	R034	72.	4.17	8.	2.	1.	.09	91.11	4.17
+	HYDROGRAPH AT	035	22.	4.08	2.	0.	0.	.02		
+	HYDROGRAPH AT	036	9.	4.00	1.	0.	0.	.01		
+	4 COMBINED AT	C036	281.	4.25	37.	9.	3.	.37		
+	HYDROGRAPH AT	037	45.	4.00	4.	1.	0.	.04		
+	5 COMBINED AT	C037	824.	4.25	116.	29.	10.	1.12		
+	ROUTED TO	DET#1	446.	4.58	116.	29.	10.	1.12	2606.42	4.58
+	ROUTED TO	DET#2	303.	5.33	115.	29.	10.	1.12	2603.18	5.33
+	DIVERSION TO	OVER	0.	5.33	0.	0.	0.	1.12		
+	HYDROGRAPH AT	DDET#2	303.	5.33	115.	29.	10.	1.12		

+	ROUTED TO	RDET#2	303.	5.33	115.	29.	10.	1.12		
+									12.87	5.33
+	HYDROGRAPH AT	038	43.	4.08	5.	1.	0.	.05		
+	ROUTED TO	LP038	43.	4.08	5.	1.	0.	.05		
+									26.21	4.08
+	HYDROGRAPH AT	040	21.	4.08	3.	1.	0.	.02		
+	2 COMBINED AT	C040	64.	4.08	8.	2.	1.	.06		
+	ROUTED TO	LP040	64.	4.08	8.	2.	1.	.06		
+									8.48	4.08
+	ROUTED TO	RLP040	61.	4.17	8.	2.	1.	.06		
+									11.02	4.17
+	HYDROGRAPH AT	042	14.	4.17	2.	1.	0.	.02		
+	3 COMBINED AT	C042	308.	5.25	125.	32.	11.	1.20		
+	HYDROGRAPH AT	039	34.	4.08	5.	1.	0.	.04		
+	ROUTED TO	LP039	34.	4.08	5.	1.	0.	.04		
+									18.38	4.08
+	HYDROGRAPH AT	041	9.	4.08	1.	0.	0.	.01		
+	2 COMBINED AT	C041	43.	4.08	6.	2.	1.	.05		
+	ROUTED TO	LP041	43.	4.08	6.	2.	1.	.05		
+									8.82	4.08
+	ROUTED TO	RLP041	41.	4.17	6.	2.	1.	.05		
+									10.99	4.17
+	HYDROGRAPH AT	043	6.	4.08	1.	0.	0.	.01		
+	2 COMBINED AT	C043	47.	4.17	7.	2.	1.	.05		
+	2 COMBINED AT	COMB	313.	5.17	132.	33.	11.	1.25		
+	ROUTED TO	RCF1	313.	5.17	132.	33.	11.	1.25		
+									2.55	5.17
+	HYDROGRAPH AT	CF1	10.	4.00	1.	0.	0.	.01		
+	2 COMBINED AT	CCF1	314.	5.17	134.	34.	11.	1.26		
+	HYDROGRAPH AT	ODET#2	0.	.00	0.	0.	0.	.00		
+	ROUTED TO	RCF2A	0.	.00	0.	0.	0.	.00		
+	HYDROGRAPH AT	OFF1	210.	4.33	27.	7.	2.	.31		
+	ROUTED TO	RCF2B	211.	4.33	27.	7.	2.	.31		
+									.69	4.33
+	HYDROGRAPH AT	CF2	14.	4.08	1.	0.	0.	.01		
+	3 COMBINED AT	CCF2A	217.	4.33	28.	7.	2.	.32		
+	2 COMBINED AT	CCF2B	517.	4.33	161.	41.	14.	1.58		

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        ROUTED TO
+                      RCF3      515.    4.33      161.      41.      14.     1.58
+                                                                                     2.36      4.33

        HYDROGRAPH AT
+                      CF3        34.    4.08        4.       1.       0.      .03

        2 COMBINED AT
+                      CCF3      531.    4.33      165.      42.      14.     1.61

        HYDROGRAPH AT
+                      OFF2       11.    4.08        1.       0.       0.      .01

        ROUTED TO
+                      RCF4A      10.    4.17        1.       0.       0.      .01
+                                                                                      .31      4.17

        HYDROGRAPH AT
+                      OFF3        5.    4.17        1.       0.       0.      .01

        ROUTED TO
+                      RCF4B       5.    4.17        1.       0.       0.      .01
+                                                                                      .20      4.17

        HYDROGRAPH AT
+                      CF4        12.    4.17        2.       0.       0.      .02

        3 COMBINED AT
+                      CCF4       26.    4.17        3.       1.       0.      .04

        HYDROGRAPH AT
+                      OFF4       51.    4.17        6.       1.       0.      .06

        ROUTED TO
+                      RCF5       50.    4.17        6.       1.       0.      .06
+                                                                                      .62      4.17

        HYDROGRAPH AT
+                      CF5         2.    4.08        0.       0.       0.      .00

        2 COMBINED AT
+                      CCF5       51.    4.17        6.       1.       0.      .06

        HYDROGRAPH AT
+                      OFF5        4.    4.25        0.       0.       0.      .01

        ROUTED TO
+                      RCF6        4.    4.25        0.       0.       0.      .01
+                                                                                      .22      4.25

        HYDROGRAPH AT
+                      CF6         1.    4.08        0.       0.       0.      .00

        2 COMBINED AT
+                      CCF6        4.    4.17        0.       0.       0.      .01
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP002
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

    PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION        2722.00          2725.00           2725.00
                              STORAGE              0.               0.                0.
                              OUTFLOW              0.              30.               30.

              RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                OF     RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
               PMF      W.S.ELEV    OVER DAM     AC-FT       CFS        HOURS       HOURS       HOURS

              1.00      2723.63        .00         0.         11.        .00         4.17         .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC001
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

    PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION        2713.00          2717.00           2717.00
                              STORAGE              0.               0.                0.
                              OUTFLOW              0.              90.               90.

              RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                OF     RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
               PMF      W.S.ELEV    OVER DAM     AC-FT       CFS        HOURS       HOURS       HOURS

              1.00      2717.03        .03         0.         92.        .08         4.17         .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC007
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

    PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION          68.00            74.00             74.00
                              STORAGE              0.               0.                0.
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                          OUTFLOW            0.            143.           143.

                  RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF    TIME OF
                    OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF    W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS      HOURS      HOURS

                  1.00      72.00       .00         0.       100.        .00        4.25        .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC005
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                          ELEVATION           83.00            88.00           88.00
                          STORAGE               0.               0.              0.
                          OUTFLOW               0.              62.             62.

                  RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF    TIME OF
                    OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF    W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS      HOURS      HOURS

                  1.00      84.76       .00         0.        22.        .00        4.17        .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC006
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                          ELEVATION           80.00            86.00           86.00
                          STORAGE               0.               1.              1.
                          OUTFLOW               0.              51.             51.

                  RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF    TIME OF
                    OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF    W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS      HOURS      HOURS

                  1.00      82.49       .00         0.        24.        .00        4.17        .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC009
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                          ELEVATION           75.00            80.00           80.00
                          STORAGE               0.               1.              1.
                          OUTFLOW               0.             124.            124.

                  RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF    TIME OF
                    OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF    W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS      HOURS      HOURS

                  1.00      77.35       .00         0.        52.        .00        4.17        .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC012
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                          ELEVATION           67.50            73.00           73.00
                          STORAGE               0.               0.              0.
                          OUTFLOW               0.             133.            133.

                  RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF    TIME OF
                    OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF    W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS      HOURS      HOURS

                  1.00      70.03       .00         0.        56.        .00        4.17        .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC13I
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                          ELEVATION           61.00            66.00           66.00
                          STORAGE               0.               1.              1.
                          OUTFLOW               0.             266.            266.

                  RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF    TIME OF
                    OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF    W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS      HOURS      HOURS

                  1.00      64.15       .00         0.       159.        .00        4.25        .00
1                         SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC013
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                          ELEVATION           55.80            61.00           61.00
                          STORAGE               0.               0.              0.
                          OUTFLOW               0.             272.            272.
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          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS

          1.00      59.51       .00         0.       191.       .00        4.25         .00
1                SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP014
              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............                INITIAL VALUE      SPILLWAY CREST     TOP OF DAM
                        ELEVATION         64.50             70.00             70.00
                        STORAGE              0.                0.                0.
                        OUTFLOW              0.               48.               48.

          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS

          1.00      66.81       .00         0.        20.       .00        4.08         .00
1                SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP022
              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............                INITIAL VALUE      SPILLWAY CREST     TOP OF DAM
                        ELEVATION         71.00             77.00             77.00
                        STORAGE              0.                0.                0.
                        OUTFLOW              0.              127.              127.

          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS

          1.00      73.00       .00         0.        48.       .00        4.17         .00
1                SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP023
              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............                INITIAL VALUE      SPILLWAY CREST     TOP OF DAM
                        ELEVATION         73.00             77.00             77.00
                        STORAGE              0.                1.                1.
                        OUTFLOW              0.              113.              113.

          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS

          1.00      75.17       .00         0.        54.       .00        4.17         .00
1                SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP028
              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............                INITIAL VALUE      SPILLWAY CREST     TOP OF DAM
                        ELEVATION         28.00             32.00             32.00
                        STORAGE              0.                1.                1.
                        OUTFLOW              0.                0.                0.

          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS

          1.00      30.19       .00         0.         0.       .00         .00         .00
1                SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP030
              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............                INITIAL VALUE      SPILLWAY CREST     TOP OF DAM
                        ELEVATION         11.00             16.00             16.00
                        STORAGE              0.                0.                0.
                        OUTFLOW              0.                0.                0.

          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS

          1.00      15.54       .00         0.         0.       .00         .00         .00
1                SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC029
              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............                INITIAL VALUE      SPILLWAY CREST     TOP OF DAM
                        ELEVATION          1.00              8.00              8.00
                        STORAGE              0.                0.                0.
                        OUTFLOW              0.               38.               38.

          RATIO    MAXIMUM    MAXIMUM    MAXIMUM    MAXIMUM   DURATION    TIME OF     TIME OF
            OF    RESERVOIR    DEPTH     STORAGE    OUTFLOW   OVER TOP  MAX OUTFLOW   FAILURE
           PMF     W.S.ELEV  OVER DAM     AC-FT       CFS      HOURS      HOURS       HOURS
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                1.00        1.66        .00         0.        4.       .00        4.08          .00
1                            SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC032
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


   PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                            ELEVATION          77.00            81.00           81.00
                            STORAGE               0.               0.              0.
                            OUTFLOW               0.              63.             63.


               RATIO      MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF       RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

                1.00       79.94        .00         0.       45.       .00        4.17          .00
1                            SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    DET#2
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


   PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                            ELEVATION        2590.30          2607.00         2607.00
                            STORAGE               0.              29.             29.
                            OUTFLOW               0.             378.            378.


               RATIO      MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF       RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

                1.00     2603.18        .00        18.      303.       .00        5.33          .00
1                            SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP038
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


   PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                            ELEVATION          24.60            29.00           29.00
                            STORAGE               0.               0.              0.
                            OUTFLOW               0.             165.            165.


               RATIO      MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF       RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

                1.00       26.21        .00         0.       43.       .00        4.08          .00
1                            SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP040
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


   PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                            ELEVATION           6.60            11.00           11.00
                            STORAGE               0.               0.              0.
                            OUTFLOW               0.             165.            165.


               RATIO      MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF       RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

                1.00        8.48        .00         0.       64.       .00        4.08          .00
1                            SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP039
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


   PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                            ELEVATION          17.00            22.00           22.00
                            STORAGE               0.               0.              0.
                            OUTFLOW               0.             135.            135.


               RATIO      MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF       RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

                1.00       18.38        .00         0.       34.       .00        4.08          .00
1                            SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP041
                       (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


   PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                            ELEVATION           7.00            11.00           11.00
                            STORAGE               0.               0.              0.
                            OUTFLOW               0.             113.            113.


               RATIO      MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF       RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW    FAILURE
                PMF       W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS        HOURS

                1.00        8.82        .00         0.       43.       .00        4.08          .00
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*** NORMAL END OF HEC-1 ***


    -----DSS---ZCLOSE Unit:  71,   File: 01-10.DSS
                Pointer Utilization:   .27
                Number of Records:      48
                File Size:     92.1  Kbytes
                Percent Inactive:     .0
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1***************************************                          ***************************************
 *                                     *                          *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                          *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998              *                          *   HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                *                          *        609 SECOND STREET            *
 *                                     *                          *     DAVIS, CALIFORNIA 95616         *
 * RUN DATE   02JUN14  TIME  14:32:22  *                          *        (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

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

            1         ID    Cavalliere Flats Rezoning
            2         ID    City of Scottsdale
            3         ID    Prepared by: Kimley-Horn and Associates, Inc.
            4         ID
            5         ID    Existing Conditions model
            6         ID    100-year, 6-hour Storm event
            7         ID
            8         ID    Based on Troon North Park Model:
            9         ID
           10         ID        PROJECT NAME: TROON NORTH PARK                         JOB#: 236-08
           11         ID        PREPARED FOR: CITY OF SCOTTSDALE
           12         ID        PREPARED BY : ARGUS CONSULTING, P.C.
           13         ID
           14         ID        FILE NAME   : TNP100YR.DAT
           15         ID        STORM EVENT : 100-YR/6-HR
           16         ID        Unit Hydrograph: Clark
           17         ID        01/24/2011
                      *
                      *
                      *
                      *
           18         IT       5 06JUN99    0000    2000
           19         IN      15
           20         IO       5
                      *DIAGRAM
                      *
                      *

           21         KK     001   BASIN
           22         BA   0.112
           23         PB   3.136
           24         PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.075
           25         PC   0.087   0.100   0.119   0.151   0.235   0.415   0.762   0.873   0.915   0.944
           26         PC   0.956   0.967   0.979   0.989   1.000
           27         LG    0.30    0.25    6.00    0.18       3
           28         UC   0.261   0.233
           29         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
           30         UA     100
                      *

           31         KK     002   BASIN
           32         BA  0.0167
           33         LG    0.30    0.25    6.00    0.18       7
           34         UC   0.201   0.303
           35         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
           36         UA     100
                      *

           37         KK   LP002   ROUTE INFLOW THRU STORAGE AREA
           38         KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
           39         KM           LOW FLOW OUTLET = 30" RCP
           40         RS       1    STOR     0.0
           41         SA    .003    .005    .026    .059
           42         SQ       0       5      15      30
           43         SE  2722.0  2723.0  2724.0  2725.0
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1                                                    HEC-1 INPUT                                                   PAGE  2

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

  44           ST  2725.0      40     2.7     1.5
               *

  45           KK    C001 COMBINE HYDROGRAPHS FROM SUB 001 AND LPC002
  46           HC       2
               *

  47           KK  LPC001   ROUTE INFLOW THRU STORAGE AREA
  48           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  49           KM           LOW FLOW OUTLET = OPEN SECTION BETWEEN BERM AND WALL
  50           RS       1    STOR     0.0
  51           SA    .001    .004    .013    .104    .150
  52           SQ       0     6.5      23      50      90
  53           SE  2713.0  2714.0  2715.0  2716.0  2717.0
  54           ST  2717.0      45     2.7     1.5
               *

  55           KK  RLPC01   ROUTE FLOW THRU SUB 007.
  56           RS       1    FLOW       0
  57           RC   0.070   0.050   0.070    1736   0.025
  58           RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
  59           RY     100    95.5    94.5      90      90    94.5    95.5     100
               *

  60           KK     007   BASIN
  61           BA   0.018
  62           LG    0.27    0.25    6.00    0.20      25
  63           UC   0.137   0.167
  64           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  65           UA     100
               *

  66           KK    C007 COMBINE HYDROGRPAHS FROM SUB 007 AND RLPC01
  67           HC       2
               *

  68           KK  LPC007   ROUTE INFLOW THRU STORAGE AREA
  69           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  70           KM           LOW FLOW OUTLET - 2-36" RCP
  71           RS       1    STOR     0.0
  72           SA    .001    .002    .004    .025    .040    .060    .100
  73           SQ       0      18      35      70     100     125     143
  74           SE    68.0    69.0    70.0    71.0    72.0    73.0    74.0
  75           ST    74.0      45     2.7     1.5
               *

  76           KK     003   BASIN
  77           BA   0.018
  78           LG    0.30    0.25    6.00    0.18       2
  79           UC   0.156   0.173
  80           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  81           UA     100
               *
1                                                    HEC-1 INPUT                                                   PAGE  3

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


  82           KK    R003   ROUTE FLOW THRU SUB 005
  83           RS       1    FLOW       0
  84           RC   0.070   0.050   0.070     470   0.023
  85           RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
  86           RY     100    92.5    91.5      90      90    91.5    92.5     100
               *

  87           KK     005   BASIN
  88           BA   0.007
  89           LG    0.27    0.25    6.00    0.20      23
  90           UC   0.134   0.162
  91           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  92           UA     100
               *

  93           KK    C005 COMBINE HYDROGRPAHS FROM SUB 005 AND R003
  94           HC       2
               *

  95           KK   RC005   ROUTE FLOW THRU SUB 006
  96           RS       1    FLOW       0
  97           RC   0.070   0.050   0.070     450   0.022
  98           RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
  99           RY     100    92.5    91.5      90      90    91.5    92.5     100
               *

 100           KK  LPC005   ROUTE INFLOW THRU STORAGE AREA
 101           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 102           KM           LOW FLOW OUTLET = 2-24" RCP
 103           RS       1    STOR       0
 104           SA    .001    .002    .030    .090    .190    .271
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 105           SQ       0      10      26      42      52      62
 106           SE    83.0    84.0    85.0    86.0    87.0    88.0
 107           ST    88.0      45     2.7     1.5
               *

 108           KK     004   BASIN
 109           BA   0.013
 110           LG    0.30    0.25    6.00    0.18       3
 111           UC   0.167   0.199
 112           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 113           UA     100
               *

 114           KK    R004   ROUTE FLOW THRU SUB 006
 115           RS       1    FLOW       0
 116           RC   0.070   0.050   0.070     732   0.024
 117           RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
 118           RY     100    92.5    91.5      90      90    91.5    92.5     100
               *
1                                        HEC-1 INPUT                                         PAGE  4

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


 119           KK     006   BASIN
 120           BA   0.015
 121           LG    0.27    0.25    6.00    0.20      22
 122           UC   0.153   0.150
 123           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 124           UA     100
               *

 125           KK    C006 COMBINE HYDROGRAPHS FROM SUB 006 AND R004
 126           HC       2
               *

 127           KK  LPC006   ROUTE INFLOW THRU STORAGE AREA
 128           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 129           KM           LOW FLOW OUTLET = 30" RCP
 130           RS       1    STOR       0
 131           SA    .001    .007    .035    .070    .114    .171    .247
 132           SQ       0       6      18      30      38      45      51
 133           SE    80.0    81.0    82.0    83.0    84.0    85.0    86.0
 134           ST      86      45     2.7     1.5
               *

 135           KK     009   BASIN
 136           BA   0.007
 137           LG    0.27    0.25    6.00    0.20      25
 138           UC   0.137   0.167
 139           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 140           UA     100
               *

 141           KK    C009 COMBINE HYDROGRAPHS FROM SUB 009, LPC05, AND LPC06
 142           HC       3
               *

 143           KK  LPC009   ROUTE INFLOW THRU STORAGE AREA
 144           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 145           KM           LOW FLOW OUTLET = 2-36" RCP
 146           RS       1    STOR       0
 147           SA    .001    .010    .050    .107    .207    .305
 148           SQ       0      18      40      75     105     124
 149           SE    75.0    76.0    77.0    78.0    79.0    80.0
 150           ST    80.0      45     2.7     1.5
               *

 151           KK     012   BASIN
 152           BA   0.004
 153           LG    0.26    0.25    6.00    0.20      27
 154           UC   0.114   0.150
 155           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 156           UA     100
               *
1                                        HEC-1 INPUT                                         PAGE  5

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


 157           KK    C012 COMBINE HYDROGRAPHS SUB 012 AND LPC009
 158           HC       2
               *

 159           KK  LPC012   ROUTE INFLOW THRU STORAGE AREA
 160           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 161           KM           LOW FLOW OUTLET = 2-36" RCP
 162           RS       1    STOR       0
 163           SA    .001    .004    .021    .049    .084    .125    .180
 164           SQ       0      10      30      55      90     110     133
 165           SE    67.5    68.0    69.0    70.0    71.0    72.0    73.0
 166           ST    73.0      45     2.7     1.5
               *
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 167           KK     008   BASIN
 168           BA   0.003
 169           LG    0.27    0.25    6.00    0.20      25
 170           UC   0.142   0.295
 171           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 172           UA     100
               *

 173           KK     010   BASIN
 174           BA   0.003
 175           LG    0.27    0.25    6.00    0.20      19
 176           UC   0.121   0.166
 177           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 178           UA     100
               *

 179           KK    C010 COMBINE HYDROGRAPHS FROM SUB 008 AND SUB 010
 180           HC       2
               *

 181           KK   RC010   ROUTE FLOW THRU SUB 011
 182           RS       1    FLOW       0
 183           RC   0.070   0.050   0.070     390   0.020
 184           RX    1000    1001    1039    1045    1055    1061    1099    1100
 185           RY     100      93      92      90      90      92      93     100
               *

 186           KK     011   BASIN
 187           BA   0.005
 188           LG    0.26    0.25    6.00    0.20      25
 189           UC   0.132   0.157
 190           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 191           UA     100
               *
1                                         HEC-1 INPUT                                                PAGE  6

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

 192           KK    C011 COMBINE HYDROGRAPHS FROM SUB 011 AND RC010
 193           HC       2
               *

 194           KK   C013I COMBINE HYDROGRAPHS C011, LP012 AND LPC007
 195           HC       3
               *

 196           KK  LPC13I   ROUTE INFLOW THRU STORAGE AREA
 197           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 198           KM           LOW FLOW OUTLET = 10'w x 3'h RCB
 199           RS       1    STOR       0
 200           SA    .001    .005    .029    .082    .216    .432
 201           SQ       0      40      90     150     210     266
 202           SE    61.0    62.0    63.0    64.0    65.0    66.0
 203           ST    66.0      45     2.7     1.5
               *

 204           KK     013   BASIN
 205           BA   0.041
 206           LG    0.26    0.25    6.00    0.20      27
 207           UC   0.201   0.196
 208           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 209           UA     100
               *

 210           KK    C013 COMBINE HYDROGRAPHS FROM SUB 013 AND LPC13I
 211           HC       2
               *

 212           KK  LPC013   ROUTE INFLOW THRU STORAGE AREA
 213           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 214           KM           LOW FLOW OUTLET = 10'w x 3'h RCB
 215           RS       1    STOR       0
 216           SA    .001    .003    .005    .024    .100    .355
 217           SQ       0      40     100     160     220     272
 218           SE    55.8    57.0    58.0    59.0    60.0    61.0
 219           ST    61.0      45     2.7     1.5
               *

 220           KK  RLPC13   ROUTE FLOW THRU SUB 018
 221           RS       1    FLOW       0
 222           RC   0.045   0.040   0.045    2178   0.020
 223           RX    1000    1001    1010    1022    1032    1044    1053    1054
 224           RY    95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
               *

 225           KK     014   BASIN
 226           BA   0.018
 227           LG    0.26    0.25    6.00    0.20      25
 228           UC   0.155   0.137
 229           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 230           UA     100
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1                                           HEC-1 INPUT                                                PAGE  7

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

  231          KK   LP014   ROUTE INFLOW THRU STORAGE AREA
  232          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  233          KM           LOW FLOW OUTLET - 30" RCP
  234          RS        1   STOR       0
  235          SA     .001   .002    .003    .014    .054    .117
  236          SQ        0     10      22      33      42      48
  237          SE     64.5   66.0      67      68      69    70.0
  238          ST     70.0     45     2.7     1.5
               *

  239          KK   RLP014  ROUTE FLOW THRU SUB 015
  240          RS        1   FLOW       0
  241          RC    0.070  0.050   0.070    1764   0.021
  242          RX     1000   1001  1045.5    1050    1055  1059.5    1099    1100
  243          RY      100   92.5    91.5      90      90    91.5    92.5     100
               *

  244          KK      016  BASIN
  245          BA    0.031
  246          LG     0.28   0.25    6.00    0.22      19
  247          UC    0.174  0.143
  248          UA        0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  249          UA      100
               *

  250          KK    LP016  ROUTE INFLOW THRU STORAGE AREA
  251          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  252          KM           LOW FLOW OUTLET = NONE
  253          RS        1   STOR       0
  254          SA    .0891   .939   1.154
  255          SQ        0      0     185
  256          SE     42.0   43.0    44.0
               *

  257          KK   RLP016  ROUTE FLOW THRU SUB 015
  258          RS        1   FLOW       0
  259          RC    0.070  0.050   0.070     730   0.016
  260          RX     1000   1001  1045.5    1050    1055  1059.5    1099    1100
  261          RY      100   92.5    91.5      90      90    91.5    92.5     100
               *

  262          KK      015  BASIN
  263          BA    0.060
  264          LG     0.28   0.25    6.00    0.20      30
  265          UC    0.220  0.194
  266          UA        0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  267          UA      100
               *
1                                           HEC-1 INPUT                                                PAGE  8

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

  268          KK      017  BASIN
  269          BA    0.017
  270          LG     0.28   0.25    6.00    0.23      28
  271          UC    0.170  0.233
  272          UA        0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  273          UA      100
               *

  274          KK    DV017   SPLIT HYDROGRAPH SB017. THAT PORTION INTERCEPTED BY DOUBLE CATCH
  275          KM            BASIN AND STORM DRAIN @ INTERSECTION OF 108TH WY AND GRAYTHORN DR
  276          KM            IS DIVERTED FROM PRE-DEVELOPED FLOW PATH TO SB065. FLOW-BY
  277          KM            HYDROGRAPH WILL BE LABELED "DR140" WHICH WILL BE RETRIEVED LATER
  278          KM            AND ROUTED THRU SB145 AS "RR145". DI-DQ RECORD IS FROM GILBERTSON
  279          KM            AND ASSOC PARCEL "J" HEC-1 MODEL 90092100.DAT DATED 01-29-96.
  280          DT    DR017
               *           KK  DIV1
               *           KM DIVERT 32 CFS TO CP2I
               *           DT  DIVI
  281          DI        0     32      45     100
  282          DQ        0     32      32      32
               *

  283          KK     C017 COMBINE HYDROGRAPHS FROM DV017, SUB 015, RLP016 AND RLP014
  284          HC        4
               *

  285          KK    RC017   "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL TO REFLECT
  286          KM            ANTICIPATED DEVELOPMENT.
  287          RS        1   FLOW       0
  288          RC    0.070  0.040   0.070     690   0.011
  289          RX     1000   1001  1025.0    1040    1055  1070.0    1099    1100
  290          RY      100   97.0    95.0      90      90    95.0    97.0     100
               *
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```
 291          KK     018   BASIN
 292          BA   0.050
 293          LG    0.22    0.21    6.40    0.18      33
 294          UC   0.223   0.219
 295          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 296          UA     100
              *

 297          KK    C018 COMBINE HYDROGRAPHS FROM SUB 018, RC017 AND RLPC13
 298          KM    THIS IS TNP INFLOW FROM ALMA SCHOOL RD. CULVERT
 299          HC       3
              *

 300          KK     019   BASIN
 301          BA   0.050
 302          LG    0.26    0.25    6.00    0.20      57
 303          UC   0.195   0.172
 304          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 305          UA     100
              *
1                                    HEC-1 INPUT                                             PAGE 9

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

 306          KK     020   BASIN
 307          BA   0.016
 308          LG    0.28    0.25    6.00    0.20      18
 309          UC   0.231   0.427
 310          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 311          UA     100
              *

 312          KK    C020 COMBINE HYDROGRAPHS FROM SUB 019 AND SUB 020
 313          HC       2
              *

 314          KK   RC020     NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
 315          KM                    TO REFLECT EXISTING DEVELOPMENT.
 316          RS       1    FLOW       0
 317          RC   0.070   0.040   0.070     880   0.018
 318          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
 319          RY     100    95.5    94.5      90      90    94.5    95.5     100
              *

 320          KK     021   BASIN
 321          BA   0.024
 322          LG    0.26    0.25    6.00    0.20      56
 323          UC   0.184   0.200
 324          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 325          UA     100
              *

 326          KK    C021 COMBINE HYDROGRAPHS FROM SUB 021 AND RC020
 327          KM          THIS IS TNP INFLOW FROM C021
 328          HC       2
              *

 329          KK     022   BASIN
 330          BA   0.067
 331          LG    0.29    0.25    6.00    0.19      10
 332          UC   0.244   0.272
 333          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 334          UA     100
              *

 335          KK   LP022   ROUTE INFLOW THRU STORAGE AREA
 336          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 337          KM           LOW FLOW OUTLET = 4-24" RCP
 338          RS       1    STOR       0
 339          SA    .001    .004    .009    .011    .013    .060    .140
 340          SQ       0      17    48.5    79.5    97.0     113     127
 341          SE    71.0    72.0    73.0    74.0    75.0    76.0    77.0
 342          ST    77.0      45     2.7     1.5
              *
                                     HEC-1 INPUT                                             PAGE 10

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

 343          KK     023   BASIN
 344          BA   0.065
 345          LG    0.27    0.25    6.00    0.20      22
 346          UC   0.216   0.198
 347          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 348          UA     100
              *

 349          KK   LP023   ROUTE INFLOW THRU STORAGE AREA
 350          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 351          KM           LOW FLOW OUTLET = 3-30" RCP
 352          RS       1    STOR       0
 353          SA    .001    .052    .288    .518    .751
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 354        SQ       0      15      48      84     113
 355        SE    73.0    74.0    75.0    76.0    77.0
 356        ST    77.0      45     2.7     1.5
            *

 357        KK    C023 COMBINE HYDROGRAPHS FROM LP022 AND LP023
 358        HC       2
            *

 359        KK  RLPC23
 360        RS       2    FLOW       0
 361        RC   0.070   0.050   0.070    1235   0.022
 362        RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
 363        RY     100    95.5    94.5      90      90    94.5    95.5     100
            *

 364        KK     024   BASIN
 365        BA   0.017
 366        LG    0.28    0.25    6.00    0.19      35
 367        UC   0.173   0.189
 368        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 369        UA     100
            *

 370        KK    C024 COMBINE HYDROGRAPHS FROM SUB 024 AND RLPC23
 371        HC       2
            *

 372        KK  LPC024   ROUTE INFLOW THRU STORAGE AREA
 373        KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 374        KM           LOW FLOW OUTLET = NONE
 375        RS       1    STOR       0
 376        SA    .108    .346    .566    .815    1.05
 377        SQ       0       0       0      56     230
 378        SE    45.0    46.0    47.0    48.0    49.0
            *
1                                     HEC-1 INPUT                                                 PAGE 11

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

 379        KK  RLPC24    NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
 380        KM                  TO REFLECT EXISTING DEVELOPMENT.
 381        RS       3    FLOW       0
 382        RC   0.070   0.040   0.070    1244   0.022
 383        RX    1000    1001  1022.0    1040    1055  1073.0    1099    1100
 384        RY     100    99.0    96.0      90      90    96.0    99.0     100
            *

 385        KK     025   BASIN
 386        BA   0.029
 387        LG    0.26    0.25    6.00    0.20      57
 388        UC   0.186   0.211
 389        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 390        UA     100
            *

 391        KK    C025 COMBINE HYDROGRAPHS FROM SUB 025 AND RR
 392        KM         THIS TNP INFLOW FROM C025
 393        HC       2
            *

 394        KK     026   BASIN
 395        BA   0.039
 396        LG    0.28    0.25    6.00    0.19      11
 397        UC   0.177   0.168
 398        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 399        UA     100
            *

 400        KK   LP026   ROUTE INFLOW THRU STORAGE AREA
 401        KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 402        KM           LOW FLOW OUTLET = NONE
 403        RS       1    STOR       0
 404        SA    .142    .186    .210    .238
 405        SQ       0       0       0      78
 406        SE  2700.0  2701.0  2702.0  2703.0
            *

 407        KK  RLP026
 408        RS       4    FLOW       0
 409        RC   0.070   0.050   0.070    2870   0.024
 410        RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
 411        RY     100    92.5    91.5      90      90    91.5    92.5     100
            *

 412        KK     028   BASIN
 413        BA   0.004
 414        LG    0.30    0.25    6.00    0.20       9
 415        UC   0.092   0.096
 416        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 417        UA     100
            *
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 418           KK   LP028   ROUTE INFLOW THRU STORAGE AREA
 419           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 420           KM           LOW FLOW OUTLET = NONE
 421           RS       1    STOR       0
 422           SA    .020    .067    .124    .181    .275
 423           SQ       0       0       0       0       0
 424           SE    28.0    29.0    30.0    31.0    32.0
 425           ST    32.0      41     2.7     1.5
               *

 426           KK     030   BASIN
 427           BA   0.002
 428           LG    0.28    0.25    6.00    0.19      16
 429           UC   0.092   0.132
 430           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 431           UA     100
               *

 432           KK   LP030   ROUTE INFLOW THRU STORAGE AREA
 433           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 434           KM           LOW FLOW OUTLET = NONE
 435           RS       1    STOR       0
 436           SA    .001    .004    .013    .027    .046    .072
 437           SQ       0       0       0       0       0       0
 438           SE    11.0    12.0    13.0    14.0    15.0    16.0
 439           ST    16.0      45     2.7     1.5
               *

 440           KK     029   BASIN
 441           BA   0.005
 442           LG    0.28    0.25    6.00    0.19      13
 443           UC   0.135   0.218
 444           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 445           UA     100
               *

 446           KK     C029 COMBINE HYDROGRAPHS FROM SUB 029, LP028 AND LP029
 447           HC       3
               *

 448           KK  LPC029   ROUTE INFLOW THRU STORAGE AREA
 449           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 450           KM           LOW FLOW OUTLET = 24" RCP
 451           RS       1    STOR       0
 452           SA    .001    .002    .010    .039    .067    .100    .148
 453           SQ       0      13      20      26      31      35      38
 454           SE      01      03      04      05      06      07      08
 455           ST      08      40     2.7     1.5
               *
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 456           KK     027   BASIN
 457           BA   0.024
 458           LG    0.30    0.25    6.00    0.18       2
 459           UC   0.169   0.191
 460           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 461           UA     100
               *

 462           KK     031   BASIN
 463           BA   0.010
 464           LG    0.30    0.25    6.00    0.18       2
 465           UC   0.126   0.130
 466           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 467           UA     100
               *

 468           KK     C031 COMBINE HYDROGRAPHS FROM SUB 027, SUB 031 AND LPC029
 469           HC       3
               *

 470           KK   RC031
 471           KM          ROUTE FLOW THRU SUB 032
 472           RS       4    FLOW       0
 473           RC   0.070   0.050   0.070     894   0.019
 474           RX    1000    1001    1039    1045    1055    1061    1099    1100
 475           RY     100      93      92      90      90      92      93     100
               *

 476           KK     032   BASIN
 477           BA   0.014
 478           LG    0.27    0.25    6.00    0.20      21
 479           UC   0.161   0.201
 480           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 481           UA     100
```

```
                  *

    482           KK    C032 COMBINE HYDROGRAPHS FROM SUB C32 AND RC031
    483           HC       2
                  *

    484           KK  LPC032   ROUTE INFLOW THRU STORAGE AREA
    485           KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
    486           KM           LOW FLOW OUTLET = 42" RCP
    487           RS       1    STOR      0
    488           SA    .001    .007    .070    .136    .270
    489           SQ       0      11      23      46      63
    490           SE    77.0    78.0    79.0    80.0    81.0
    491           ST    81.0      45     2.7     1.5
                  *
1                                        HEC-1 INPUT                                            PAGE 14

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


    492           KK  RLPC32
    493           KM          ROUTE FLOW THRU SUB 033
    494           RS       4    FLOW       0
    495           RC   0.070   0.050   0.070    2176   0.021
    496           RX    1000    1001    1039    1045    1055    1061    1099    1100
    497           RY     100      93      92      90      90      92      93     100
                  *

    498           KK     033   BASIN
    499           BA   0.147
    500           LG    0.27    0.25    6.00    0.20      36
    501           UC   0.270   0.216
    502           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
    503           UA     100
                  *

    504           KK    C033 COMBINE HYDROGRAPHS FROM SUB 033, RLPC32 AND RLP026
    505           HC       3
                  *

    506           KK     034   BASIN
    507           BA   0.093
    508           LG    0.30    0.25    6.00    0.18       1
    509           UC   0.206   0.169
    510           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
    511           UA     100
                  *

    512           KK    R034    ROUTE FLOW THRU SUB 035
    513           RS       1    FLOW       0
    514           RC   0.045   0.040   0.045    2178   0.020
    515           RX    1000    1001    1010    1022    1032    1044    1053    1054
    516           RY    95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
                  *

    517           KK     035   BASIN
    518           BA   0.022
    519           LG    0.30    0.23    6.20    0.17       5
    520           UC   0.144   0.145
    521           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
    522           UA     100
                  *

    523           KK     036   BASIN
    524           BA   0.008
    525           LG    0.29    0.23    6.20    0.18      23
    526           UC   0.110   0.127
    527           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
    528           UA     100
                  *
1                                        HEC-1 INPUT                                            PAGE 15

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

    529           KK    C036 COMBINE HYDROGRAPHS FROM SUB 035, SUB 036, C033 AND R034
    530           KM         THIS IS TNP INFLOW FROM C036
    531           HC       4
                  *

    532           KK     037   BASIN
    533           BA   0.041
    534           LG    0.30    0.23    6.20    0.17       1
    535           UC   0.143   0.108
    536           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
    537           UA     100
                  *

    538           KK    C037 COMBINE ALL HYDROGRAPHS
    539           KM         THIS REPRESENTS TOTAL INFLOW TO BASIN No.1
    540           HC       5
    541           ZW      A=TROON         B=INFLOW          C=FLOW
                  *
```

```
 542          KK   DET#1     ROUTE INFLOW THRU DET BASIN #1 (UPPER BASIN)
 543          KM             LOW FLOW OUTLET = 4-42" RCP
 544          KM             INLET INVERT ELEV = 2598.80
 545          KM             OUTLET INVERT ELEV = 2592.0
 546          KM             SPILLWAY ELEV = 2610.0
 547          KM             WEIR LENGTH = 50'
 548          RS       1     STOR     0.0
 549          SA   0.023     0.11     0.49     1.23     3.50     4.00     4.24     4.57     4.85     5.33
 550          SA    5.95     6.67     7.80     8.95
 551          SQ       0       45    103.5      185      264    328.5      382    428.5      470      507
 552          SQ     543      575      725      999
 553          SE    2599     2600     2601     2602     2603     2604     2605     2606     2607     2608
 554          SE    2609     2610     2611     2612
 555          ZW       A=TROON        B=DET#1          C=FLOW
              *

 556          KK   DET#2     ROUTE INFLOW THRU DET BASIN #2 (LOWER BASIN)
 557          KM             LOW FLOW OUTLET = 1-60" RCP
 558          KM             INLET INVERT ELEV = 2590.36
 559          KM             OUTLET INVERT ELEV = 2589.95
 560          KM             SPILLWAY ELEV = 2607.0
 561          KM             WEIR LENGTH = 35'
 562          RS       1     STOR     0.0
 563          SA   0.023    0.048    0.496    0.876     1.12     1.28     1.41     1.56     1.70     1.82
 564          SA    1.93     2.04     2.36     2.49     2.61     2.77     2.93     3.26
 565          SQ       0     11.5       29       47       78    112.5      148      177      204      226
 566          SQ     248      266      283    300.5      315      330      345      378
 567          SE  2590.3     2591     2592     2593     2594     2595     2596     2597     2598     2599
 568          SE    2600     2601     2602     2603     2604     2605     2606     2607
 569          ST    2607       35      3.0      1.5
 570          ZW       A=TROON        B=DET#2          C=FLOW
              *
              *  ****************************************************************************
              *  ******************                                       ******************
              *  ******************  START CAVALLIERE FLATS MODEL CHANGES  ******************
              *  ******************                                       ******************
              *  ****************************************************************************
              *
1                                          HEC-1 INPUT                                               PAGE 16

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


 571          KK  DDET#2
 572          KM   Outlet channel capacity is 348 cfs. Divert overtopping flow.
 573          DT    OVER
 574          DI       0      348    348.1    10000
 575          DQ       0        0      0.1     9652
              *
              *  ****************************************************************************
              *  ******************                                       ******************
              *  ******************   END CAVALLIERE FLATS MODEL CHANGES   ******************
              *  ******************                                       ******************
              *  ****************************************************************************
              *

 576          KK  RDET#2     ROUTE FLOW THRU SUB 042
 577          KM             OUTLET CHANNEL TROON NORTH PARK BASIN
 578          RS       1     FLOW        0
 579          RC   0.040    0.035    0.040      594    0.010
 580          RX     990      992      994     1000     1010     1016     1018     1020
 581          RY    14.0     13.5     13.0     10.0     10.0     13.0     13.5     14.0
              *
              *  ****************************************************************************
              *  ****************************************************************************
              *                     STARTS DOWNSTREAM OFFSITE AREAS MODEL
              *
              *  ****************************************************************************
              *  ****************************************************************************
              *

 582          KK     038    BASIN
 583          BA   0.047
 584          LG    0.28     0.25     6.00     0.21       26
 585          UC   0.234    0.266
 586          UA       0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
 587          UA     100
              *

 588          KK   LP038    ROUTE INFLOW THRU STORAGE AREA
 589          KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 590          KM            LOW FLOW OUTLET = 3-36" RCP
 591          RS       1     STOR        0
 592          SA    .001     .007     .047     .086     .160
 593          SQ       0       33       82      132      165
 594          SE    24.6     26.0     27.0     28.0     29.0
 595          ST    29.0       45      2.7      1.5
              *

 596          KK     040    BASIN
 597          BA   0.018
 598          LG    0.26     0.25     6.00     0.20       49
```

```
 599          UC    0.184   0.202
 600          UA      0       5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 601          UA    100
              *
1                                        HEC-1 INPUT                                                PAGE 17

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

 602          KK    C040 COMBINE HYDROGRAPHS FROM SUB 040 AND LP038
 603          HC      2
              *

 604          KK   LP040    ROUTE INFLOW THRU STORAGE AREA
 605          KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 606          KM            LOW FLOW OUTLET = 3-36" RCP
 607          RS      1      STOR       0
 608          SA   .001      .024    .077    .127
 609          SQ      0        82     132     165
 610          SE   06.6      09.0    10.0    11.0
 611          ST   11.0        45     2.7     1.5
              *

 612          KK  RLP040     ROUTE FLOW THRU SUB 042
 613          RS      1      FLOW       0
 614          RC  0.045     0.040   0.045     927   0.016
 615          RX    990       992     994    1000    1012    1018    1020    1022
 616          RY   13.2      13.1    13.0    10.0    10.0    13.0    13.1    13.2
              *

 617          KK    042     BASIN
 618          BA  0.020
 619          LG   0.27      0.25    6.00    0.20      20
 620          UC  0.289     0.433
 621          UA      0       5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 622          UA    100
              *

 623          KK    C042 COMBINE HYDROGRAPHS FROM RDET#2, SUB 042 AND RLP040
 624          HC      3
 625          ZW      A-PVISTA        B=C042          C-FLOW
              *

 626          KK    039     BASIN
 627          BA  0.035
 628          LG   0.26      0.25    6.00    0.20      39
 629          UC  0.225     0.292
 630          UA      0       5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 631          UA    100
              *

 632          KK  LP039     ROUTE INFLOW THRU STORAGE AREA
 633          KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 634          KM            LOW FLOW OUTLET = 3-30" RCP
 635          RS      1      STOR       0
 636          SA   .001      .007    .015    .024    .037
 637          SQ      0        49      84     112     135
 638          SE   17.0      19.0    20.0    21.0    22.0
 639          ST   22.0        45     2.7     1.5
              *
1                                        HEC-1 INPUT                                                PAGE 18

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

 640          KK    041     BASIN
 641          BA  0.011
 642          LG   0.28      0.25    6.00    0.19      33
 643          UC  0.231     0.353
 644          UA      0       5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 645          UA    100
              *

 646          KK    C041 COMBINE HYDROGRAPHS FROM SUB 041 AND LP039
 647          HC      2
              *

 648          KK  LP041     ROUTE INFLOW THRU STORAGE AREA
 649          KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 650          KM            LOW FLOW OUTLET = 3-30" RCP
 651          RS      1      STOR       0
 652          SA   .001      .020    .039    .072    .104
 653          SQ      0        14      49      84     113
 654          SE   07.0      08.0    09.0    10.0    11.0
 655          ST   11.0        45     2.7     1.5
              *

 656          KK  RLP041     ROUTE FLOW THRU SUB 041/042
 657          RS      1      FLOW       0
 658          RC  0.045     0.040   0.045    1314   0.017
 659          RX    990       992     994    1000    1008    1014    1016    1018
 660          RY   13.2      13.1    13.0    10.0    10.0    13.0    13.1    13.2
              *
```

```
 661          KK     043   BASIN
 662          BA   0.008
 663          LG    0.26    0.25    6.00    0.20      29
 664          UC   0.183   0.290
 665          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 666          UA     100
              *

 667          KK    C043 COMBINE HYDROGRAPHS FROM SUB 043 AND RLP041
 668          HC       2
 669          ZW       A=PVISTA       B=C043         C=FLOW
              *

 670          KK    COMB COMBINE HYDROGRAPHS FROM C042 AND C043
 671          KM         THIS REPRESENTS COMBINED FLOWS AT PINNACLE VISTA ROAD
 672          HC       2
 673          ZW       A=PVISTA       B=COMB         C=FLOW
              *
              *  ***************************************************************************
              *  ******************                                      *******************
              *  ******************  START CAVALLIERE FLATS MODEL CHANGES  *******************
              *  ******************                                      *******************
              *  ***************************************************************************
              *
              *
```



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

 674          KK    RCF1   ROUTE
 675          RS       1    FLOW
 676          RC   0.035   0.035   0.035     690  0.0200    0.00
 677          RX    0.00   30.00   67.50   72.50   77.50   82.50  120.00  150.00
 678          RY    3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
              *

 679          KK     CF1   BASIN
 680          BA   0.009
 681          LG    0.22    0.25    5.85    0.22      37
 682          UC   0.128   0.152
 683          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 684          UA     100
              *

 685          KK    CCF1 COMBINE
 686          HC       2
              *

 687          KK  ODET#2
 688          KM  Retrieve flow overtopping Troon North Park Basin outlet channel
 689          DR    OVER
              *

 690          KK   RCF2A   ROUTE
 691          RS       1    FLOW
 692          RC   0.035   0.035   0.035     990  0.0200    0.00
 693          RX    0.00   20.00   40.00   45.00   55.00   60.00   80.00  100.00
 694          RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
              *

 695          KK    OFF1   BASIN
 696          BA   0.307
 697          LG    0.32    0.31    6.00    0.17       9
 698          UC   0.356   0.267
 699          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 700          UA     100
              *

 701          KK   RCF2B   ROUTE
 702          RS       1    FLOW
 703          RC   0.035   0.035   0.035     530  0.0270    0.00
 704          RX    0.00   15.00   30.00   35.00   90.00   95.00  110.00  125.00
 705          RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
              *

 706          KK     CF2   BASIN
 707          BA   0.014
 708          LG    0.30    0.25    5.85    0.18       9
 709          UC   0.144   0.141
 710          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 711          UA     100
              *
```



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

 712          KK   CCF2A COMBINE
 713          HC       3
              *
```

```
714         KK   CCF2B COMBINE
715         HC       2
            *

716         KK    RCF3   ROUTE
717         RS       1    FLOW
718         RC   0.035   0.035   0.035     795  0.0380    0.00
719         RX    0.00   35.00   80.50  100.00  106.00  125.50  565.00  600.00
720         RY    5.00    4.00    3.00    0.00    0.00    3.00    4.00    5.00
            *

721         KK     CF3   BASIN
722         BA   0.030
723         LG    0.21    0.31    5.71    0.25      48
724         UC   0.171   0.139
725         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
726         UA     100
            *

727         KK    CCF3 COMBINE
728         HC       2
            *

729         KK    OFF2   BASIN
730         BA   0.011
731         LG    0.30    0.25    6.00    0.17       6
732         UC   0.135   0.161
733         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
734         UA     100
            *

735         KK   RCF4A   ROUTE
736         RS       1    FLOW
737         RC   0.035   0.035   0.035    1230  0.0250    0.00
738         RX    0.00   25.00   50.00   55.00   65.00   70.00   95.00  120.00
739         RY    3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
            *

740         KK    OFF3   BASIN
741         BA   0.007
742         LG    0.33    0.34    6.00    0.17       3
743         UC   0.171   0.262
744         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
745         UA     100
            *
                                       HEC-1 INPUT                                            PAGE 21

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


746         KK   RCF4B   ROUTE
747         RS       1    FLOW
748         RC   0.035   0.035   0.035     410  0.0220    0.00
749         RX    0.00   25.00   50.00   55.00   65.00   70.00   95.00  120.00
750         RY    3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
            *

751         KK     CF4   BASIN
752         BA   0.017
753         LG    0.27    0.32    5.71    0.22      24
754         UC   0.220   0.303
755         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
756         UA     100
            *

757         KK    CCF4 COMBINE
758         HC       3
            *

759         KK    OFF4   BASIN
760         BA   0.061
761         LG    0.32    0.32    6.00    0.17      12
762         UC   0.216   0.200
763         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
764         UA     100
            *

765         KK    RCF5   ROUTE
766         RS       1    FLOW
767         RC   0.035   0.035   0.035     270  0.0300    0.00
768         RX    0.00   50.00  100.00  105.00  115.00  120.00  170.00  220.00
769         RY    1.00    0.75    0.50    0.00    0.00    0.50    0.75    1.00
            *

770         KK     CF5   BASIN
771         BA   0.002
772         LG    0.35    0.39    5.71    0.20       0
773         UC   0.115   0.123
774         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
775         UA     100
            *

776         KK    CCF5 COMBINE
```

```
         777          HC        2
                      *

         778          KK     OFF5    BASIN
         779          BA    0.009
         780          LG     0.35     0.35     4.65     0.33        2
         781          UC    0.219    0.342
         782          UA        0      3.0      5.0      8.0     12.0     20.0     43.0     75.0     90.0     96.0
         783          UA      100
                      *
1                                                     HEC-1 INPUT                                                    PAGE 22

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


         784          KK     RCF6    ROUTE
         785          RS        1     FLOW
         786          RC    0.035    0.035    0.035      260   0.0350     0.00
         787          RX     0.00    50.00   100.00   105.00   110.00   115.00   165.00   215.00
         788          RY     3.00     2.50     2.00     0.00     0.00     2.00     2.50     3.00
                      *

         789          KK      CF6    BASIN
         790          BA    0.001
         791          LG     0.35     0.35     3.75     0.54        0
         792          UC    0.121    0.165
         793          UA        0      3.0      5.0      8.0     12.0     20.0     43.0     75.0     90.0     96.0
         794          UA      100
                      *

         795          KK     CCF6 COMBINE
         796          HC        2
                      *
         797          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    21        001
               .
               .
    31         .          002
               .           V
               .           V
    37         .        LPC002
               .           .
               .           .
    45       C001...........
               V
               V
    47      LPC001
               V
               V
    55      RLPC01
               .
               .
    60         .          007
               .           .
               .           .
    66       C007...........
               V
               V
    68      LPC007
               .
               .
    76         .          003
               .           V
               .           V
    82         .         R003
               .           .
               .           .
    87         .           .          005
               .           .           .
               .           .           .
    93         .         C005...........
               .           V
               .           V
    95         .        RC005
               .           V
               .           V
   100         .       LPC005
               .           .
               .           .
   108         .           .          004
               .           .           V
               .           .           V
   114         .           .         R004
               .           .           .
               .           .           .
   119         .           .           .          006
```

```
                .            .            .            .
                .            .            .            .
 125            .            .          C006............
                .            .            V
                .            .            V
 127            .            .        LPC006
                .            .            .
                .            .            .
 135            .            .            .           009
                .            .            .            .
                .            .            .            .
 141            .          C009.........................
                .            V
                .            V
 143            .        LPC009
                .            .
                .            .
 151            .            .           012
                .            .            .
                .            .            .
 157            .          C012............
                .            V
                .            V
 159            .        LPC012
                .            .
                .            .
 167            .            .           008
                .            .            .
                .            .            .
 173            .            .            .           010
                .            .            .            .
                .            .            .            .
 179            .            .          C010............
                .            .            V
                .            .            V
 181            .            .         RC010
                .            .            .
                .            .            .
 186            .            .            .           011
                .            .            .            .
                .            .            .            .
 192            .            .          C011............
                .            .            .
                .            .            .
 194          C013I.........................
                V
                V
 196         LPC13I
                .
                .
 204            .           013
                .            .
                .            .
 210           C013............
                V
                V
 212         LPC013
                V
                V
 220         RLPC13
                .
                .
 225            .           014
                .            V
                .            V
 231            .         LP014
                .            V
                .            V
 239            .        RLP014
                .            .
                .            .
 244            .            .           016
                .            .            V
                .            .            V
 250            .            .         LP016
                .            .            V
                .            .            V
 257            .            .        RLP016
                .            .            .
                .            .            .
 262            .            .            .           015
                .            .            .            .
                .            .            .            .
 268            .            .            .            .           017
                .            .            .            .            .
                .            .            .            .            .
 280            .            .            .            .            .------->   DR017
 274            .            .            .            .          DV017
                .            .            .            .            .
                .            .            .            .            .
 283            .          C017....................................
                .            V
                .            V
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285         .     RC017
            .         .
            .         .
291         .         .       018
            .         .         .
            .         .         .
297      C018....................
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300         .       019
            .         .
            .         .
306         .         .       020
            .         .         .
            .         .         .
312         .      C020..........
            .         V
            .         V
314         .     RC020
            .         .
            .         .
320         .         .       021
            .         .         .
            .         .         .
326         .      C021..........
            .         .
            .         .
329         .         .       022
            .         .         V
            .         .         V
335         .         .     LP022
            .         .         .
            .         .         .
343         .         .         .       023
            .         .         .         V
            .         .         .         V
349         .         .         .     LP023
            .         .         .         .
            .         .         .         .
357         .         .      C023..........
            .         .         V
            .         .         V
359         .         .    RLPC23
            .         .         .
            .         .         .
364         .         .         .       024
            .         .         .         .
            .         .         .         .
370         .         .      C024..........
            .         .         V
            .         .         V
372         .         .    LPC024
            .         .         V
            .         .         V
379         .         .    RLPC24
            .         .         .
            .         .         .
385         .         .         .       025
            .         .         .         .
            .         .         .         .
391         .         .      C025..........
            .         .         .
            .         .         .
394         .         .         .       026
            .         .         .         V
            .         .         .         V
400         .         .         .     LP026
            .         .         .         V
            .         .         .         V
407         .         .         .    RLP026
            .         .         .         .
            .         .         .         .
412         .         .         .         .       028
            .         .         .         .         V
            .         .         .         .         V
418         .         .         .         .     LP028
            .         .         .         .         .
            .         .         .         .         .
426         .         .         .         .         .       030
            .         .         .         .         .         V
            .         .         .         .         .         V
432         .         .         .         .         .     LP030
            .         .         .         .         .         .
            .         .         .         .         .         .
440         .         .         .         .         .         .       029
            .         .         .         .         .         .         .
            .         .         .         .         .         .         .
446         .         .         .         .      C029....................
            .         .         .         .         V
            .         .         .         .         V
448         .         .         .         .    LPC029
            .         .         .         .         .
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456           .           .           .           .           .         027
              .           .           .           .           .           .
              .           .           .           .           .           .
462           .           .           .           .           .           .         031
              .           .           .           .           .           .           .
              .           .           .           .           .           .           .
468           .           .           .           .        C031........................
              .           .           .           .           V
              .           .           .           .           V
470           .           .           .           .       RC031
              .           .           .           .           .
              .           .           .           .           .
476           .           .           .           .           .         032
              .           .           .           .           .           .
              .           .           .           .           .           .
482           .           .           .           .        C032............
              .           .           .           .           V
              .           .           .           .           V
484           .           .           .           .      LPC032
              .           .           .           .           V
              .           .           .           .           V
492           .           .           .           .      RLPC32
              .           .           .           .           .
              .           .           .           .           .
498           .           .           .           .           .         033
              .           .           .           .           .           .
              .           .           .           .           .           .
504           .           .           .        C033........................
              .           .           .           .
              .           .           .           .
506           .           .           .           .         034
              .           .           .           .           V
              .           .           .           .           V
512           .           .           .           .        R034
              .           .           .           .           .
              .           .           .           .           .
517           .           .           .           .           .         035
              .           .           .           .           .           .
              .           .           .           .           .           .
523           .           .           .           .           .           .         036
              .           .           .           .           .           .           .
              .           .           .           .           .           .           .
529           .           .           .        C036....................................
              .           .           .           .
              .           .           .           .
532           .           .           .           .         037
              .           .           .           .           .
              .           .           .           .           .
538        C037................................................
              V
              V
542       DET#1
              V
              V
556       DET#2
              .
              .
573           .------->    OVER
571      DDET#2
              V
              V
576      RDET#2
              .
              .
582           .         038
              .           V
              .           V
588           .       LP038
              .           .
              .           .
596           .           .         040
              .           .           .
              .           .           .
602           .        C040............
              .           V
              .           V
604           .       LP040
              .           V
              .           V
612           .      RLP040
              .           .
              .           .
617           .           .         042
              .           .           .
              .           .           .
623        C042........................
              .
              .
626           .         039
              .           V
              .           V
632           .       LP039
              .           .
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  640           .           .         041
                .           .           .
  646           .        C041............
                .           V
                .           V
  648           .       LP041
                .           V
                .           V
  656           .      RLP041
                .           .
  661           .           .         043
                .           .           .
  667           .        C043............
                .           .
  670        COMB............
                V
                V
  674        RCF1
                .
  679           .         CF1
                .           .
  685        CCF1............
                .
  689           .           .<-------    OVER
  687           .      ODET#2
                .           V
                .           V
  690           .       RCF2A
                .           .
  695           .           .        OFF1
                .           .           V
                .           .           V
  701           .           .       RCF2B
                .           .           .
  706           .           .           .          CF2
                .           .           .            .
  712           .       CCF2A........................
                .           .
  714       CCF2B............
                V
                V
  716        RCF3
                .
  721           .         CF3
                .           .
  727        CCF3............
                .
  729           .        OFF2
                .           V
                .           V
  735           .       RCF4A
                .           .
  740           .           .        OFF3
                .           .           V
                .           .           V
  746           .           .       RCF4B
                .           .           .
  751           .           .           .          CF4
                .           .           .            .
  757           .        CCF4........................
                .           .
  759           .           .        OFF4
                .           .           V
                .           .           V
  765           .           .        RCF5
                .           .           .
  770           .           .           .          CF5
                .           .           .            .
  776           .           .        CCF5............
                .           .           .
  778           .           .           .         OFF5
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                                                V
                .          .          .         V
   784          .          .          .       RCF6
                .          .          .         .
                .          .          .         .
   789          .          .          .         .          CF6
                .          .          .         .           .
                .          .          .         .           .
   795          .          .          .       CCF6...........

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1***************************************                              **************************************
 *                                      *                             *                                    *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                             *  U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                             *  HYDROLOGIC ENGINEERING CENTER     *
 *              VERSION 4.1             *                             *       609 SECOND STREET            *
 *                                      *                             *    DAVIS, CALIFORNIA 95616         *
 * RUN DATE   02JUN14  TIME  14:32:22   *                             *       (916) 756-1104               *
 *                                      *                             *                                    *
****************************************                              **************************************


                              Cavalliere Flats Rezoning
                              City of Scottsdale
                              Prepared by: Kimley-Horn and Associates, Inc.

                              Existing Conditions model
                              100-year, 6-hour Storm event

                              Based on Troon North Park Model:

                                  PROJECT NAME: TROON NORTH PARK                       JOB#: 236-08
                                  PREPARED FOR: CITY OF SCOTTSDALE
                                  PREPARED BY : ARGUS CONSULTING, P.C.

                                  FILE NAME   : TNP100YR.DAT
                                  STORM EVENT : 100-YR/6-HR
                                  Unit Hydrograph: Clark
                                  01/24/2011

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

     IT          HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     6JUN99  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE    12JUN99  ENDING DATE
                      NDTIME       2235  ENDING TIME
                       ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   166.58 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
   -----DSS---ZOPEN:  Existing File Opened,  File: 01-100.DSS
                      Unit:  71;  DSS Version: 6-JG
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/INFLOW/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/09JUN1999/5MIN//
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-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#1/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/11JUN1999/5MIN//
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-----DSS---ZWRITE Unit  71; Vers.   16:  /TROON/DET#2/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/09JUN1999/5MIN//
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-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C042/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/C043/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    8:  /PVISTA/COMB/FLOW/12JUN1999/5MIN//
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1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	001	185.	4.08	20.	5.	2.	.11		
+	HYDROGRAPH AT	002	25.	4.08	3.	1.	0.	.02		
+	ROUTED TO	LP002	24.	4.08	3.	1.	0.	.02		
+									2724.63	4.08
+	2 COMBINED AT	C001	209.	4.08	23.	6.	2.	.13		
+	ROUTED TO	LPC001	206.	4.08	23.	6.	2.	.13		
+									2717.79	4.08
+	ROUTED TO	RLPC01	200.	4.17	23.	6.	2.	.13		
+									92.53	4.17
+	HYDROGRAPH AT	C07	36.	4.00	4.	1.	0.	.02		
+	2 COMBINED AT	C007	226.	4.17	26.	7.	2.	.15		
+	ROUTED TO	LPC007	222.	4.08	26.	7.	2.	.15		
+									74.67	4.08
+	HYDROGRAPH AT	003	34.	4.00	3.	1.	0.	.02		
+	ROUTED TO	R003	34.	4.08	3.	1.	0.	.02		
+									91.08	4.08
+	HYDROGRAPH AT	005	14.	4.00	1.	0.	0.	.01		
+	2 COMBINED AT	C005	47.	4.08	5.	1.	0.	.02		
+	ROUTED TO	RC005	47.	4.08	5.	1.	0.	.02		
+									91.27	4.08
+	ROUTED TO	LPC005	44.	4.17	5.	1.	0.	.02		
+									86.16	4.17
+	HYDROGRAPH AT	004	23.	4.00	2.	1.	0.	.01		
+	ROUTED TO	R004	23.	4.08	2.	1.	0.	.01		
+									90.84	4.08

+	HYDROGRAPH AT	006	31.	4.00	3.	1.	0.	.01		
+	2 COMBINED AT	C006	52.	4.08	5.	1.	0.	.03		
+ +	ROUTED TO	LPC006	43.	4.17	5.	1.	0.	.03	84.78	4.17
+	HYDROGRAPH AT	009	14.	4.00	1.	0.	0.	.01		
+	3 COMBINED AT	C009	99.	4.08	11.	3.	1.	.06		
+ +	ROUTED TO	LPC009	96.	4.17	11.	3.	1.	.06	78.71	4.17
+	HYDROGRAPH AT	012	8.	4.00	1.	0.	0.	.00		
+	2 COMBINED AT	C012	102.	4.17	12.	3.	1.	.06		
+ +	ROUTED TO	LPC012	100.	4.25	12.	3.	1.	.06	71.49	4.25
+	HYDROGRAPH AT	008	5.	4.08	1.	0.	0.	.00		
+	HYDROGRAPH AT	010	6.	4.00	1.	0.	0.	.00		
+	2 COMBINED AT	C010	11.	4.00	1.	0.	0.	.01		
+ +	ROUTED TO	RC010	10.	4.08	1.	0.	0.	.01	90.36	4.08
+	HYDROGRAPH AT	011	10.	4.00	1.	0.	0.	.00		
+	2 COMBINED AT	C011	20.	4.08	2.	1.	0.	.01		
+	3 COMBINED AT	C013I	338.	4.17	41.	10.	3.	.22		
+ +	ROUTED TO	LPC13I	338.	4.17	41.	10.	3.	.22	66.51	4.17
+	HYDROGRAPH AT	013	76.	4.08	9.	2.	1.	.04		
+	2 COMBINED AT	C013	402.	4.17	49.	12.	4.	.26		
+ +	ROUTED TO	LPC013	392.	4.25	50.	12.	4.	.26	61.76	4.25
+ +	ROUTED TO	RLPC13	378.	4.25	50.	12.	4.	.26	92.68	4.25
+	HYDROGRAPH AT	014	38.	4.00	4.	1.	0.	.02		
+ +	ROUTED TO	LP014	37.	4.08	4.	1.	0.	.02	68.40	4.08
+ +	ROUTED TO	RLP014	33.	4.08	4.	1.	0.	.02	91.08	4.08
+	HYDROGRAPH AT	016	62.	4.00	6.	1.	0.	.03		
+ +	ROUTED TO	LP016	59.	4.08	5.	1.	0.	.03	43.32	4.08
+ +	ROUTED TO	RLP016	56.	4.17	5.	1.	0.	.03	91.51	4.17
	HYDROGRAPH AT									

	015	112.	4.08	13.	3.	1.	.06		
HYDROGRAPH AT	017	29.	4.08	4.	1.	0.	.02		
DIVERSION TO	DR017	29.	.00	4.	1.	0.	.02		
HYDROGRAPH AT	DV017	0.	.00	0.	0.	0.	.02		
4 COMBINED AT	C017	199.	4.08	22.	5.	2.	.13		
ROUTED TO	RC017	195.	4.08	22.	5.	2.	.13	91.87	4.08
HYDROGRAPH AT	018	92.	4.08	11.	3.	1.	.05		
3 COMBINED AT	C018	610.	4.17	83.	21.	7.	.44		
HYDROGRAPH AT	019	102.	4.00	13.	3.	1.	.05		
HYDROGRAPH AT	020	20.	4.08	3.	1.	0.	.02		
2 COMBINED AT	C020	122.	4.08	16.	4.	1.	.07		
ROUTED TO	RC020	122.	4.08	16.	4.	1.	.07	91.94	4.08
HYDROGRAPH AT	021	47.	4.08	6.	2.	1.	.02		
2 COMBINED AT	C021	169.	4.08	22.	6.	2.	.09		
HYDROGRAPH AT	022	105.	4.08	12.	3.	1.	.07		
ROUTED TO	LP022	104.	4.08	12.	3.	1.	.07	75.45	4.08
HYDROGRAPH AT	023	118.	4.08	13.	3.	1.	.06		
ROUTED TO	LP023	97.	4.17	13.	3.	1.	.06	76.45	4.17
2 COMBINED AT	C023	199.	4.17	25.	6.	2.	.13		
ROUTED TO	RLPC23	198.	4.17	25.	6.	2.	.13	92.60	4.17
HYDROGRAPH AT	024	33.	4.00	4.	1.	0.	.02		
2 COMBINED AT	C024	225.	4.17	29.	7.	2.	.15		
ROUTED TO	LPC024	218.	4.25	28.	7.	2.	.15	48.93	4.25
ROUTED TO	RLPC24	219.	4.25	28.	7.	2.	.15	91.65	4.25
HYDROGRAPH AT	025	56.	4.08	8.	2.	1.	.03		
2 COMBINED AT	C025	258.	4.25	36.	9.	3.	.18		
HYDROGRAPH AT	026	74.	4.00	7.	2.	1.	.04		
ROUTED TO	LP026	74.	4.08	7.	2.	1.	.04	2702.94	4.08
ROUTED TO	RLP026	68.	4.17	7.	2.	1.	.04		

								91.50	4.17
HYDROGRAPH AT	028	9.	4.00	1.	0.	0.	.00		
ROUTED TO	LP028	0.	.00	0.	0.	0.	.00	31.25	6.58
HYDROGRAPH AT	030	4.	4.00	0.	0.	0.	.00		
ROUTED TO	LP030	3.	4.17	0.	0.	0.	.00	16.08	4.17
HYDROGRAPH AT	029	9.	4.00	1.	0.	0.	.00		
3 COMBINED AT	C029	10.	4.17	1.	0.	0.	.01		
ROUTED TO	LPC029	10.	4.17	1.	0.	0.	.01	2.50	4.17
HYDROGRAPH AT	027	43.	4.00	4.	1.	0.	.02		
HYDROGRAPH AT	031	21.	4.00	2.	0.	0.	.01		
3 COMBINED AT	C031	73.	4.00	7.	2.	1.	.05		
ROUTED TO	RC031	73.	4.08	7.	2.	1.	.05	91.27	4.08
HYDROGRAPH AT	032	26.	4.00	3.	1.	0.	.01		
2 COMBINED AT	C032	99.	4.08	10.	2.	1.	.06		
ROUTED TO	LPC032	95.	4.08	10.	2.	1.	.06	81.36	4.08
ROUTED TO	RLPC32	91.	4.25	10.	2.	1.	.06	91.40	4.25
HYDROGRAPH AT	033	267.	4.08	33.	8.	3.	.15		
3 COMBINED AT	C033	400.	4.17	50.	12.	4.	.25		
HYDROGRAPH AT	034	170.	4.08	16.	4.	1.	.09		
ROUTED TO	R034	160.	4.08	16.	4.	1.	.09	91.72	4.08
HYDROGRAPH AT	035	45.	4.00	4.	1.	0.	.02		
HYDROGRAPH AT	036	18.	4.00	2.	0.	0.	.01		
4 COMBINED AT	C036	602.	4.08	71.	18.	6.	.37		
HYDROGRAPH AT	037	90.	4.00	7.	2.	1.	.04		
5 COMBINED AT	C037	1658.	4.17	219.	55.	18.	1.12		
ROUTED TO	DET#1	810.	4.50	219.	55.	18.	1.12	2611.31	4.50
ROUTED TO	DET#2	538.	5.17	216.	55.	18.	1.12	2608.11	5.17
DIVERSION TO	OVER	190.	4.67	28.	7.	2.	1.12		
HYDROGRAPH AT									

+	DDET#2	348.	4.67	187.	48.	16.	1.12		
ROUTED TO	RDET#2	349.	4.75	187.	48.	16.	1.12	13.07	4.75
HYDROGRAPH AT	038	77.	4.08	10.	2.	1.	.05		
ROUTED TO	LP038	76.	4.08	10.	2.	1.	.05	26.89	4.08
HYDROGRAPH AT	040	35.	4.08	4.	1.	0.	.02		
2 COMBINED AT	C040	111.	4.08	14.	4.	1.	.06		
ROUTED TO	LP040	110.	4.08	14.	4.	1.	.06	9.56	4.08
ROUTED TO	RLP040	107.	4.17	14.	4.	1.	.06	11.41	4.17
HYDROGRAPH AT	042	25.	4.17	4.	1.	0.	.02		
3 COMBINED AT	C042	386.	4.67	205.	52.	17.	1.20		
HYDROGRAPH AT	039	58.	4.08	8.	2.	1.	.04		
ROUTED TO	LP039	58.	4.08	8.	2.	1.	.04	19.26	4.08
HYDROGRAPH AT	041	16.	4.08	2.	1.	0.	.01		
2 COMBINED AT	C041	74.	4.08	11.	3.	1.	.05		
ROUTED TO	LP041	73.	4.08	11.	3.	1.	.05	9.68	4.08
ROUTED TO	RLP041	71.	4.17	11.	3.	1.	.05	11.35	4.17
HYDROGRAPH AT	043	13.	4.08	2.	0.	0.	.01		
2 COMBINED AT	C043	83.	4.17	12.	3.	1.	.05		
2 COMBINED AT	COMB	443.	4.25	217.	55.	18.	1.25		
ROUTED TO	RCF1	443.	4.25	217.	55.	18.	1.25	2.76	4.25
HYDROGRAPH AT	CF1	19.	4.00	2.	1.	0.	.01		
2 COMBINED AT	CCF1	453.	4.25	219.	56.	19.	1.26		
HYDROGRAPH AT	ODET#2	190.	5.17	28.	7.	2.	.00		
ROUTED TO	RCF2A	188.	5.17	28.	7.	2.	.00	1.47	5.17
HYDROGRAPH AT	OFF1	466.	4.25	55.	14.	5.	.31		
ROUTED TO	RCF2B	470.	4.25	55.	14.	5.	.31	1.10	4.25
HYDROGRAPH AT	CF2	29.	4.00	3.	1.	0.	.01		
3 COMBINED AT	CCF2A	484.	4.25	86.	21.	7.	.32		

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           2 COMBINED AT
+                         CCF2B      937.    4.25         304.       77.        26.       1.58

           ROUTED TO
+                         RCF3       937.    4.25         304.       77.        26.       1.58
+                                                                                                    3.03       4.25

           HYDROGRAPH AT
+                         CF3         64.    4.00           7.        2.         1.        .03

           2 COMBINED AT
+                         CCF3       971.    4.25         311.       79.        26.       1.61

           HYDROGRAPH AT
+                         OFF2        21.    4.08           2.        1.         0.        .01

           ROUTED TO
+                         RCF4A       20.    4.08           2.        1.         0.        .01
+                                                                                                     .47       4.08

           HYDROGRAPH AT
+                         OFF3        11.    4.08           1.        0.         0.        .01

           ROUTED TO
+                         RCF4B       11.    4.17           1.        0.         0.        .01
+                                                                                                     .34       4.17

           HYDROGRAPH AT
+                         CF4         25.    4.17           3.        1.         0.        .02

           3 COMBINED AT
+                         CCF4        56.    4.17           6.        2.         1.        .04

           HYDROGRAPH AT
+                         OFF4       109.    4.08          11.        3.         1.        .06

           ROUTED TO
+                         RCF5       107.    4.17          11.        3.         1.        .06
+                                                                                                     .79       4.17

           HYDROGRAPH AT
+                         CF5          4.    4.00           0.        0.         0.        .00

           2 COMBINED AT
+                         CCF5       109.    4.17          11.        3.         1.        .06

           HYDROGRAPH AT
+                         OFF5        11.    4.17           1.        0.         0.        .01

           ROUTED TO
+                         RCF6        11.    4.17           1.        0.         0.        .01
+                                                                                                     .43       4.17

           HYDROGRAPH AT
+                         CF6          1.    4.00           0.        0.         0.        .00

           2 COMBINED AT
+                         CCF6        12.    4.17           1.        0.         0.        .01
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LPO02
                            (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION         2722.00           2725.00          2725.00
                               STORAGE             0.                0.               0.
                               OUTFLOW             0.               30.              30.

                  RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF     TIME OF
                   OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF      W.S.ELEV    OVER DAM     AC-FT       CFS        HOURS      HOURS       HOURS

                  1.00      2724.63        .00         0.         24.        .00        4.08        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LPC001
                            (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                              ELEVATION         2713.00           2717.00          2717.00
                               STORAGE             0.                0.               0.
                               OUTFLOW             0.               90.              90.

                  RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION    TIME OF     TIME OF
                   OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP  MAX OUTFLOW  FAILURE
                   PMF      W.S.ELEV    OVER DAM     AC-FT       CFS        HOURS      HOURS       HOURS

                  1.00      2717.79        .79         0.        206.        .58        4.08        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LPC007
                            (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
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                         ELEVATION          68.00               74.00               74.00
                         STORAGE               0.                  0.                  0.
                         OUTFLOW               0.                143.                143.

                  RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM      AC-FT        CFS        HOURS       HOURS       HOURS

                  1.00        74.67         .67          0.        222.         .50        4.08         .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC005
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

        PLAN  1 ..............            INITIAL VALUE      SPILLWAY CREST      TOP OF DAM
                         ELEVATION          83.00               88.00               88.00
                         STORAGE               0.                  0.                  0.
                         OUTFLOW               0.                 62.                 62.

                  RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM      AC-FT        CFS        HOURS       HOURS       HOURS

                  1.00        86.16         .00          0.         44.         .00        4.17         .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC006
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

        PLAN  1 ..............            INITIAL VALUE      SPILLWAY CREST      TOP OF DAM
                         ELEVATION          80.00               86.00               86.00
                         STORAGE               0.                  1.                  1.
                         OUTFLOW               0.                 51.                 51.

                  RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM      AC-FT        CFS        HOURS       HOURS       HOURS

                  1.00        84.78         .00          0.         43.         .00        4.17         .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC009
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

        PLAN  1 ..............            INITIAL VALUE      SPILLWAY CREST      TOP OF DAM
                         ELEVATION          75.00               80.00               80.00
                         STORAGE               0.                  1.                  1.
                         OUTFLOW               0.                124.                124.

                  RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM      AC-FT        CFS        HOURS       HOURS       HOURS

                  1.00        78.71         .00          0.         96.         .00        4.17         .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC012
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

        PLAN  1 ..............            INITIAL VALUE      SPILLWAY CREST      TOP OF DAM
                         ELEVATION          67.50               73.00               73.00
                         STORAGE               0.                  0.                  0.
                         OUTFLOW               0.                133.                133.

                  RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM      AC-FT        CFS        HOURS       HOURS       HOURS

                  1.00        71.49         .00          0.        100.         .00        4.25         .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC13I
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

        PLAN  1 ..............            INITIAL VALUE      SPILLWAY CREST      TOP OF DAM
                         ELEVATION          61.00               66.00               66.00
                         STORAGE               0.                  1.                  1.
                         OUTFLOW               0.                266.                266.

                  RATIO     MAXIMUM      MAXIMUM     MAXIMUM     MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH      STORAGE     OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM      AC-FT        CFS        HOURS       HOURS       HOURS

                  1.00        66.51         .51          1.        338.         .33        4.17         .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC013
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

        PLAN  1 ..............            INITIAL VALUE      SPILLWAY CREST      TOP OF DAM
                         ELEVATION          55.80               61.00               61.00
                         STORAGE               0.                  0.                  0.
                         OUTFLOW               0.                272.                272.
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              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
               OF     RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
              PMF      W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS       HOURS

              1.00      61.76        .76        1.       392.       .42       4.25        .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP014
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ..............               INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                        ELEVATION           64.50             70.00            70.00
                        STORAGE                0.                0.               0.
                        OUTFLOW                0.               48.              48.


              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
               OF     RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
              PMF      W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS       HOURS

              1.00      68.40        .00        0.        37.       .00       4.08        .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP022
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ..............               INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                        ELEVATION           71.00             77.00            77.00
                        STORAGE                0.                0.               0.
                        OUTFLOW                0.              127.             127.


              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
               OF     RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
              PMF      W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS       HOURS

              1.00      75.45        .00        0.       104.       .00       4.08        .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP023
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ..............               INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                        ELEVATION           73.00             77.00            77.00
                        STORAGE                0.                1.               1.
                        OUTFLOW                0.              113.             113.


              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
               OF     RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
              PMF      W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS       HOURS

              1.00      76.45        .00        1.        97.       .00       4.17        .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP028
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ..............               INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                        ELEVATION           28.00             32.00            32.00
                        STORAGE                0.                1.               1.
                        OUTFLOW                0.                0.               0.


              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
               OF     RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
              PMF      W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS       HOURS

              1.00      31.25        .00        0.         0.       .00        .00        .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP030
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ..............               INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                        ELEVATION           11.00             16.00            16.00
                        STORAGE                0.                0.               0.
                        OUTFLOW                0.                0.               0.


              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
               OF     RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
              PMF      W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS       HOURS

              1.00      16.08        .08        0.         3.    162.50       4.17        .00
1                          SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   LPC029
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ..............               INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                        ELEVATION            1.00              8.00             8.00
                        STORAGE                0.                0.               0.
                        OUTFLOW                0.               38.              38.


              RATIO    MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
```

OF PMF	RESERVOIR W.S.ELEV	DEPTH OVER DAM	STORAGE AC-FT	OUTFLOW CFS	OVER TOP HOURS	MAX OUTFLOW HOURS	FAILURE HOURS
1.00	2.50	.00	0.	10.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC032
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	77.00	81.00	81.00
STORAGE	0.	0.	0.
OUTFLOW	0.	63.	63.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	81.36	.36	0.	95.	.25	4.08	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DET#2
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2590.30	2607.00	2607.00
STORAGE	0.	29.	29.
OUTFLOW	0.	378.	378.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2608.11	1.11	33.	538.	1.33	5.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP038
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	24.60	29.00	29.00
STORAGE	0.	0.	0.
OUTFLOW	0.	165.	165.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	26.89	.00	0.	76.	.00	4.08	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP040
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	6.60	11.00	11.00
STORAGE	0.	0.	0.
OUTFLOW	0.	165.	165.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	9.56	.00	0.	110.	.00	4.08	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP039
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	17.00	22.00	22.00
STORAGE	0.	0.	0.
OUTFLOW	0.	135.	135.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	19.26	.00	0.	58.	.00	4.08	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP041
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	7.00	11.00	11.00
STORAGE	0.	0.	0.
OUTFLOW	0.	113.	113.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS

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               1.00          9.68          .00          0.         73.        .00          4.08          .00


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


   -----DSS---ZCLOSE Unit:  71,   File: 01-100.DSS
              Pointer Utilization:   .27
              Number of Records:     48
              File Size:     92.1  Kbytes
              Percent Inactive:    .0
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1***************************************                         ***************************************
 *                                     *                         *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                         *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998              *                         *   HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                *                         *        609 SECOND STREET            *
 *                                     *                         *     DAVIS, CALIFORNIA 95616         *
 * RUN DATE   21AUG14  TIME  15:10:15  *                         *        (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

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

   1         ID    Cavalliere Flats Rezoning
   2         ID    City of Scottsdale
   3         ID    Prepared by: Kimley-Horn and Associates, Inc.
   4         ID
   5         ID    Proposed Conditions model
   6         ID    10-year, 6-hour Storm event
   7         ID
   8         ID    Based on Troon North Park Model:
   9         ID
  10         ID       PROJECT NAME: TROON NORTH PARK                       JOB#: 236-08
  11         ID       PREPARED FOR: CITY OF SCOTTSDALE
  12         ID       PREPARED BY : ARGUS CONSULTING, P.C.
  13         ID
  14         ID       FILE NAME    : TNP10YR.DAT
  15         ID       STORM EVENT  : 10-YR/6-HR
  16         ID       Unit Hydrograph: Clark
  17         ID       01/24/2011
             *
             *
             *
             *
  18         IT      5 06JUN99    0000    2000
  19         IN     15
  20         IO      5
             *DIAGRAM
             *
             *

  21         KK    001   BASIN
  22         BA  0.112
  23         PB  2.071
  24         PC  0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.075
  25         PC  0.087   0.100   0.119   0.151   0.235   0.415   0.762   0.873   0.915   0.944
  26         PC  0.956   0.967   0.979   0.989   1.000
  27         LG   0.30    0.25    6.00    0.18       3
  28         UC  0.344   0.316
  29         UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  30         UA    100
             *

  31         KK    002   BASIN
  32         BA 0.0167
  33         LG   0.30    0.25    6.00    0.18       7
  34         UC  0.262   0.408
  35         UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  36         UA    100
             *

  37         KK  LP002   ROUTE INFLOW THRU STORAGE AREA
  38         KM          SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  39         KM          LOW FLOW OUTLET = 30" RCP
  40         RS      1    STOR     0.0
  41         SA   .003    .005    .026    .059
  42         SQ      0       5      15      30
  43         SE 2722.0  2723.0  2724.0  2725.0
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1                                            HEC-1 INPUT                                            PAGE  2

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

   44          ST  2725.0      40     2.7     1.5
               *

   45          KK     C001 COMBINE HYDROGRAPHS FROM SUB 001 AND LP002
   46          HC       2
               *

   47          KK  LPC001   ROUTE INFLOW THRU STORAGE AREA
   48          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   49          KM           LOW FLOW OUTLET = OPEN SECTION BETWEEN BERM AND WALL
   50          RS       1    STOR     0.0
   51          SA    .001    .004    .013    .104    .150
   52          SQ       0     6.5      23      50      90
   53          SE  2713.0  2714.0  2715.0  2716.0  2717.0
   54          ST  2717.0      45     2.7     1.5
               *

   55          KK  RLPC01   ROUTE FLOW THRU SUB 007
   56          RS       1    FLOW       0
   57          RC   0.070   0.050   0.070    1736   0.025
   58          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
   59          RY     100    95.5    94.5      90      90    94.5    95.5     100
               *

   60          KK     007   BASIN
   61          BA   0.018
   62          LG    0.27    0.25    6.00    0.20      25
   63          UC   0.241   0.340
   64          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   65          UA     100
               *

   66          KK     C007 COMBINE HYDROGRPAHS FROM SUB 007 AND RLPC01
   67          HC       2
               *

   68          KK  LPC007   ROUTE INFLOW THRU STORAGE AREA
   69          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   70          KM           LOW FLOW OUTLET = 2-36" RCP
   71          RS       1    STOR     0.0
   72          SA    .001    .002    .004    .025    .040    .060    .100
   73          SQ       0      18      35      70     100     125     143
   74          SE    68.0    69.0    70.0    71.0    72.0    73.0    74.0
   75          ST    74.0      45     2.7     1.5
               *

   76          KK     003   BASIN
   77          BA   0.018
   78          LG    0.30    0.25    6.00    0.18       2
   79          UC   0.206   0.235
   80          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   81          UA     100
               *
1                                            HEC-1 INPUT                                            PAGE  3

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

   82          KK    R003   ROUTE FLOW THRU SUB 005
   83          RS       1    FLOW       0
   84          RC   0.070   0.050   0.070     470   0.023
   85          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
   86          RY     100    92.5    91.5      90      90    91.5    92.5     100
               *

   87          KK     005   BASIN
   88          BA   0.007
   89          LG    0.27    0.25    6.00    0.20      23
   90          UC   0.171   0.213
   91          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   92          UA     100
               *

   93          KK     C005 COMBINE HYDROGRPAHS FROM SUB 005 AND R003
   94          HC       2
               *

   95          KK   RC005   ROUTE FLOW THRU SUB 006
   96          RS       1    FLOW       0
   97          RC   0.070   0.050   0.070     450   0.022
   98          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
   99          RY     100    92.5    91.5      90      90    91.5    92.5     100
               *

  100          KK  LPC005    ROUTE INFLOW THRU STORAGE AREA
  101          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  102          KM           LOW FLOW OUTLET = 2-24" RCP
  103          RS       1    STOR       0
  104          SA    .001    .002    .030    .090    .190    .271
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 105          SQ       0      10      26      42      52      62
 106          SE    83.0    84.0    85.0    86.0    87.0    88.0
 107          ST    88.0      45     2.7     1.5
              *

 108          KK     004   BASIN
 109          BA   0.013
 110          LG    0.30    0.25    6.00    0.18       3
 111          UC   0.220   0.270
 112          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 113          UA     100
              *

 114          KK    R004   ROUTE FLOW THRU SUB 006
 115          RS       1    FLOW       0
 116          RC   0.070   0.050   0.070     732   0.024
 117          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
 118          RY     100    92.5    91.5      90      90    91.5    92.5     100
              *
1                                            HEC-1 INPUT                                          PAGE  4

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


 119          KK     006   BASIN
 120          BA   0.015
 121          LG    0.27    0.25    6.00    0.20      22
 122          UC   0.196   0.197
 123          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 124          UA     100
              *

 125          KK    C006 COMBINE HYDROGRAPHS FROM SUB 006 AND R004
 126          HC       2
              *

 127          KK  LPC006   ROUTE INFLOW THRU STORAGE AREA
 128          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 129          KM           LOW FLOW OUTLET = 30" RCP
 130          RS       1    STOR       0
 131          SA    .001    .007    .035    .070    .114    .171    .247
 132          SQ       0       6      18      30      38      45      51
 133          SE    80.0    81.0    82.0    83.0    84.0    85.0    86.0
 134          ST      86      45     2.7     1.5
              *

 135          KK     009   BASIN
 136          BA   0.007
 137          LG    0.27    0.25    6.00    0.20      25
 138          UC   0.174   0.218
 139          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 140          UA     100
              *

 141          KK    C009 COMBINE HYDROGRAPHS FROM SUB 009, LPC05, AND LPC06
 142          HC       3
              *

 143          KK  LPC009   ROUTE INFLOW THRU STORAGE AREA
 144          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 145          KM           LOW FLOW OUTLET = 2-36" RCP
 146          RS       1    STOR       0
 147          SA    .001    .010    .050    .107    .207    .305
 148          SQ       0      18      40      75     105     124
 149          SE    75.0    76.0    77.0    78.0    79.0    80.0
 150          ST    80.0      45     2.7     1.5
              *

 151          KK     012   BASIN
 152          BA   0.004
 153          LG    0.26    0.25    6.00    0.20      27
 154          UC   0.144   0.196
 155          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 156          UA     100
              *
1                                            HEC-1 INPUT                                          PAGE  5

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


 157          KK    C012 COMBINE HYDROGRAPHS SUB 012 AND LPC009
 158          HC       2
              *

 159          KK  LPC012   ROUTE INFLOW THRU STORAGE AREA
 160          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 161          KM           LOW FLOW OUTLET = 2-36" RCP
 162          RS       1    STOR       0
 163          SA    .001    .004    .021    .049    .084    .125    .180
 164          SQ       0      10      30      55      90     110     133
 165          SE    67.5    68.0    69.0    70.0    71.0    72.0    73.0
 166          ST    73.0      45     2.7     1.5
              *
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 167         KK      008   BASIN
 168         BA    0.003
 169         LG     0.27    0.25    6.00    0.20      25
 170         UC    0.181   0.386
 171         UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 172         UA      100
             *

 173         KK      010   BASIN
 174         BA    0.003
 175         LG     0.27    0.25    6.00    0.20      19
 176         UC    0.155   0.219
 177         UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 178         UA      100
             *

 179         KK     C010 COMBINE HYDROGRAPHS FROM SUB 008 AND SUB 010
 180         HC        2
             *

 181         KK    RC010   ROUTE FLOW THRU SUB 011
 182         RS        1    FLOW       0
 183         RC    0.070   0.050   0.070     390   0.020
 184         RX     1000    1001    1039    1045    1055    1061    1099    1100
 185         RY      100      93      92      90      90      92      93     100
             *

 186         KK      011   BASIN
 187         BA    0.005
 188         LG     0.26    0.25    6.00    0.20      25
 189         UC    0.168   0.205
 190         UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 191         UA      100
             *
1                                          HEC-1 INPUT                                               PAGE  6

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

 192         KK     C011 COMBINE HYDROGRAPHS FROM SUB 011 AND RC010
 193         HC        2
             *

 194         KK    C013I COMBINE HYDROGRAPHS C011, LP012 AND LPC007
 195         HC        3
             *

 196         KK   LPC13I   ROUTE INFLOW THRU STORAGE AREA
 197         KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 198         KM            LOW FLOW OUTLET = 10'w x 3'h RCB
 199         RS        1    STOR       0
 200         SA     .001    .005    .029    .082    .216    .432
 201         SQ        0      40      90     150     210     266
 202         SE     61.0    62.0    63.0    64.0    65.0    66.0
 203         ST     66.0      45     2.7     1.5
             *

 204         KK      013   BASIN
 205         BA    0.041
 206         LG     0.26    0.25    6.00    0.20      27
 207         UC    0.255   0.255
 208         UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 209         UA      100
             *

 210         KK     C013 COMBINE HYDROGRAPHS FROM SUB 013 AND LPC13I
 211         HC        2
             *

 212         KK   LPC013   ROUTE INFLOW THRU STORAGE AREA
 213         KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 214         KM            LOW FLOW OUTLET = 10'w x 3'h RCB
 215         RS        1    STOR       0
 216         SA     .001    .003    .005    .024    .100    .355
 217         SQ        0      40     100     160     220     272
 218         SE     55.8    57.0    58.0    59.0    60.0    61.0
 219         ST     61.0      45     2.7     1.5
             *

 220         KK   RLPC13   ROUTE FLOW THRU SUB 018
 221         RS        1    FLOW       0
 222         RC    0.045   0.040   0.045    2178   0.020
 223         RX     1000    1001    1010    1022    1032    1044    1053    1054
 224         RY     95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
             *

 225         KK      014   BASIN
 226         BA    0.018
 227         LG     0.26    0.25    6.00    0.20      25
 228         UC    0.197   0.179
 229         UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 230         UA      100
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                 *
1                                              HEC-1 INPUT                                            PAGE  7

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


      231        KK   LP014   ROUTE INFLOW THRU STORAGE AREA
      232        KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
      233        KM           LOW FLOW OUTLET = 30" RCP
      234        RS      .1    STOR      0
      235        SA    .001    .002    .003    .014    .054    .117
      236        SQ       0      10      22      33      42      48
      237        SE    64.5    66.0      67      68      69    70.0
      238        ST    70.0      45     2.7     1.5
                 *

      239        KK  RLP014   ROUTE FLOW THRU SUB 015
      240        RS       1    FLOW       0
      241        RC   0.070   0.050   0.070    1764   0.021
      242        RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
      243        RY     100    92.5    91.5      90      90    91.5    92.5     100
                 *

      244        KK     016   BASIN
      245        BA   0.031
      246        LG    0.28    0.25    6.00    0.22      19
      247        UC   0.225   0.190
      248        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
      249        UA     100
                 *

      250        KK   LP016   ROUTE INFLOW THRU STORAGE AREA
      251        KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
      252        KM           LOW FLOW OUTLET = NONE
      253        RS       1    STOR      0
      254        SA   .0891    .939   1.154
      255        SQ       0       0     185
      256        SE    42.0    43.0    44.0
                 *

      257        KK  RLP016   ROUTE FLOW THRU SUB 015
      258        RS       1    FLOW       0
      259        RC   0.070   0.050   0.070     730   0.016
      260        RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
      261        RY     100    92.5    91.5      90      90    91.5    92.5     100
                 *

      262        KK     015   BASIN
      263        BA   0.060
      264        LG    0.28    0.25    6.00    0.20      30
      265        UC   0.278   0.251
      266        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
      267        UA     100
                 *
1                                              HEC-1 INPUT                                            PAGE  8

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


      268        KK     017   BASIN
      269        BA   0.017
      270        LG    0.28    0.25    6.00    0.23      28
      271        UC   0.217   0.306
      272        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
      273        UA     100
                 *

      274        KK   DV017    SPLIT HYDROGRAPH SB017. THAT PORTION INTERCEPTED BY DOUBLE CATCH
      275        KM            BASIN AND STORM DRAIN @ INTERSECTION OF 108TH WY AND GRAYTHORN DR
      276        KM            IS DIVERTED FROM PRE-DEVELOPED FLOW PATH TO SB065. FLOW-BY
      277        KM            HYDROGRAPH WILL BE LABELED "DR140" WHICH WILL BE RETRIEVED LATER
      278        KM            AND ROUTED THRU SB145 AS "RR145". DI-DQ RECORD IS FROM GILBERTSON
      279        KM            AND ASSOC PARCEL "J" HEC-1 MODEL 90092100.DAT DATED 01-29-96.
      280        DT   DR017
                 *          KK  DIV1
                 *          KM DIVERT 32 CFS TO CP2I
                 *          DT  DIV1
      281        DI       0      32      45     100
      282        DQ       0      32      32      32
                 *

      283        KK    C017 COMBINE HYDROGRAPHS FROM DV017, SUB 015, RLP016 AND RLP014
      284        HC       4
                 *

      285        KK   RC017    "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL TO REFLECT
      286        KM            ANTICIPATED DEVELOPMENT.
      287        RS       1    FLOW       0
      288        RC   0.070   0.040   0.070     690   0.011
      289        RX    1000    1001  1025.0    1040    1055  1070.0    1099    1100
      290        RY     100    97.0    95.0      90      90    95.0    97.0     100
                 *
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 291          KK     018   BASIN
 292          BA   0.050
 293          LG    0.22    0.21    6.40    0.18      33
 294          UC   0.277   0.277
 295          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 296          UA     100
              *

 297          KK    C018 COMBINE HYDROGRAPHS FROM SUB 018, RC017 AND RLPC13
 298          KM    THIS IS TNP INFLOW FROM ALMA SCHOOL RD. CULVERT
 299          HC       3
              *

 300          KK     019   BASIN
 301          BA   0.050
 302          LG    0.26    0.25    6.00    0.20      57
 303          UC   0.238   0.215
 304          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 305          UA     100
              *
1                                        HEC-1 INPUT                                               PAGE  9

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


 306          KK     020   BASIN
 307          BA   0.016
 308          LG    0.28    0.25    6.00    0.20      18
 309          UC   0.298   0.566
 310          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 311          UA     100
              *

 312          KK    C020 COMBINE HYDROGRAPHS FROM SUB 019 AND SUB 020
 313          HC       2
              *

 314          KK   RC020     NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
 315          KM                TO REFLECT EXISTING DEVELOPMENT.
 316          RS       1    FLOW       0
 317          RC   0.070   0.040   0.070     880   0.018
 318          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
 319          RY     100    95.5    94.5      90      90    94.5    95.5     100
              *

 320          KK     021   BASIN
 321          BA   0.024
 322          LG    0.26    0.25    6.00    0.20      56
 323          UC   0.225   0.250
 324          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 325          UA     100
              *

 326          KK    C021 COMBINE HYDROGRAPHS FROM SUB 021 AND RC020
 327          KM         THIS IS TNP INFLOW FROM C021
 328          HC       2
              *

 329          KK     022   BASIN
 330          BA   0.067
 331          LG    0.29    0.25    6.00    0.19      10
 332          UC   0.318   0.364
 333          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 334          UA     100
              *

 335          KK   LP022    ROUTE INFLOW THRU STORAGE AREA
 336          KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 337          KM            LOW FLOW OUTLET = 4-24" RCP
 338          RS       1    STOR       0
 339          SA    .001    .004    .009    .011    .013    .060    .140
 340          SQ       0      17    48.5    79.5    97.0     113     127
 341          SE    71.0    72.0    73.0    74.0    75.0    76.0    77.0
 342          ST    77.0      45     2.7     1.5
              *
1                                        HEC-1 INPUT                                               PAGE 10

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


 343          KK     023   BASIN
 344          BA   0.065
 345          LG    0.27    0.25    6.00    0.20      22
 346          UC   0.276   0.261
 347          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 348          UA     100
              *

 349          KK   LP023    ROUTE INFLOW THRU STORAGE AREA
 350          KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 351          KM            LOW FLOW OUTLET = 3-30" RCP
 352          RS       1    STOR       0
 353          SA    .001    .052    .288    .518    .751
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 354          SQ       0      15      48      84     113
 355          SE    73.0    74.0    75.0    76.0    77.0
 356          ST    77.0      45     2.7     1.5
              *

 357          KK     C023 COMBINE HYDROGRAPHS FROM LP022 AND LP023
 358          HC       2
              *

 359          KK  RLPC23
 360          RS       2    FLOW       0
 361          RC   0.070   0.050   0.070    1235   0.022
 362          RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
 363          RY     100    95.5    94.5      90      90    94.5    95.5     100
              *

 364          KK     024   BASIN
 365          BA   0.017
 366          LG    0.28    0.25    6.00    0.19      35
 367          UC   0.217   0.243
 368          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 369          UA     100
              *

 370          KK     C024 COMBINE HYDROGRAPHS FROM SUB 024 AND RLPC23
 371          HC       2
              *

 372          KK  LPC024   ROUTE INFLOW THRU STORAGE AREA
 373          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 374          KM           LOW FLOW OUTLET = NONE
 375          RS       1    STOR       0
 376          SA    .108    .346    .566    .815    1.05
 377          SQ       0       0       0      56     230
 378          SE    45.0    46.0    47.0    48.0    49.0
              *
                                          HEC-1 INPUT                                                   PAGE 11

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

 379          KK  RLPC24   NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
 380          KM                   TO REFLECT EXISTING DEVELOPMENT.
 381          RS       3    FLOW       0
 382          RC   0.070   0.040   0.070    1244   0.022
 383          RX    1000    1001  1022.0    1040    1055  1073.0    1099    1100
 384          RY     100    99.0    96.0      90      90    96.0    99.0     100
              *

 385          KK     025   BASIN
 386          BA   0.029
 387          LG    0.26    0.25    6.00    0.20      57
 388          UC   0.227   0.263
 389          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 390          UA     100
              *

 391          KK     C025 COMBINE HYDROGRAPHS FROM SUB 025 AND RR
 392          KM          THIS TNP INFLOW FROM C025
 393          HC       2
              *

 394          KK     026   BASIN
 395          BA   0.039
 396          LG    0.28    0.25    6.00    0.19      11
 397          UC   0.229   0.225
 398          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 399          UA     100
              *

 400          KK   LP026   ROUTE INFLOW THRU STORAGE AREA
 401          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 402          KM           LOW FLOW OUTLET = NONE
 403          RS       1    STOR       0
 404          SA    .142    .186    .210    .238
 405          SQ       0       0       0      78
 406          SE  2700.0  2701.0  2702.0  2703.0
              *

 407          KK  RLP026
 408          RS       4    FLOW       0
 409          RC   0.070   0.050   0.070    2870   0.024
 410          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
 411          RY     100    92.5    91.5      90      90    91.5    92.5     100
              *

 412          KK     028   BASIN
 413          BA   0.004
 414          LG    0.30    0.25    6.00    0.20       9
 415          UC   0.120   0.130
 416          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 417          UA     100
              *
```

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

 418         KK   LP028    ROUTE INFLOW THRU STORAGE AREA
 419         KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 420         KM            LOW FLOW OUTLET = NONE
 421         RS       1     STOR      0
 422         SA    .020    .067    .124    .181    .275
 423         SQ       0       0       0       0       0
 424         SE    28.0    29.0    30.0    31.0    32.0
 425         ST    32.0      41     2.7     1.5
             *

 426         KK     030    BASIN
 427         BA   0.002
 428         LG    0.28    0.25    6.00    0.19      16
 429         UC   0.118   0.174
 430         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 431         UA     100
             *

 432         KK   LP030    ROUTE INFLOW THRU STORAGE AREA
 433         KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 434         KM            LOW FLOW OUTLET = NONE
 435         RS       1     STOR      0
 436         SA    .001    .004    .013    .027    .046    .072
 437         SQ       0       0       0       0       0       0
 438         SE    11.0    12.0    13.0    14.0    15.0    16.0
 439         ST    16.0      45     2.7     1.5
             *

 440         KK     029    BASIN
 441         BA   0.005
 442         LG    0.28    0.25    6.00    0.19      13
 443         UC   0.175   0.291
 444         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 445         UA     100
             *

 446         KK    C029 COMBINE HYDROGRAPHS FROM SUB 029, LP028 AND LP029
 447         HC       3
             *

 448         KK  LPC029    ROUTE INFLOW THRU STORAGE AREA
 449         KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 450         KM            LOW FLOW OUTLET = 24" RCP
 451         RS       1     STOR      0
 452         SA    .001    .002    .010    .039    .067    .100    .148
 453         SQ       0      13      20      26      31      35      38
 454         SE      01      03      04      05      06      07      08
 455         ST      08      40     2.7     1.5
             *
```



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

 456         KK     027    BASIN
 457         BA   0.024
 458         LG    0.30    0.25    6.00    0.18       2
 459         UC   0.223   0.259
 460         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 461         UA     100
             *

 462         KK     031    BASIN
 463         BA   0.010
 464         LG    0.30    0.25    6.00    0.18       2
 465         UC   0.166   0.177
 466         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 467         UA     100
             *

 468         KK    C031 COMBINE HYDROGRAPHS FROM SUB 027, SUB 031 AND LPC029
 469         HC       3
             *

 470         KK   RC031
 471         KM           ROUTE FLOW THRU SUB 032
 472         RS       4    FLOW       0
 473         RC   0.070   0.050   0.070     894   0.019
 474         RX    1000    1001    1039    1045    1055    1061    1099    1100
 475         RY     100      93      92      90      90      92      93     100
             *

 476         KK     032    BASIN
 477         BA   0.014
 478         LG    0.27    0.25    6.00    0.20      21
 479         UC   0.206   0.264
 480         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 481         UA     100
```

```
                  *

 482              KK    C032 COMBINE HYDROGRAPHS FROM SUB 032 AND RC031
 483              HC       2
                  *

 484              KK  LPC032   ROUTE INFLOW THRU STORAGE AREA
 485              KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 486              KM           LOW FLOW OUTLET = 42" RCP
 487              RS       1    STOR       0
 488              SA    .001    .007    .070    .136    .270
 489              SQ       0      11      23      46      63
 490              SE    77.0    78.0    79.0    80.0    81.0
 491              ST    81.0      45     2.7     1.5
                  *
1                                        HEC-1 INPUT                                                    PAGE 14

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


 492              KK  RLPC32
 493              KM          ROUTE FLOW THRU SUB 033
 494              RS       4    FLOW       0
 495              RC   0.070   0.050   0.070    2176   0.021
 496              RX    1000    1001    1039    1045    1055    1061    1099    1100
 497              RY     100      93      92      90      90      92      93     100
                  *

 498              KK     033   BASIN
 499              BA   0.147
 500              LG    0.27    0.25    6.00    0.20      36
 501              UC   0.338   0.277
 502              UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 503              UA     100
                  *

 504              KK    C033 COMBINE HYDROGRAPHS FROM SUB 033, RLPC32 AND RLP026
 505              HC       3
                  *

 506              KK     034   BASIN
 507              BA   0.093
 508              LG    0.30    0.25    6.00    0.18       1
 509              UC   0.272   0.231
 510              UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 511              UA     100
                  *

 512              KK    R034    ROUTE FLOW THRU SUB 035
 513              RS       1    FLOW       0
 514              RC   0.045   0.040   0.045    2178   0.020
 515              RX    1000    1001    1010    1022    1032    1044    1053    1054
 516              RY    95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
                  *

 517              KK     035   BASIN
 518              BA   0.022
 519              LG    0.30    0.23    6.20    0.17       5
 520              UC   0.187   0.194
 521              UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 522              UA     100
                  *

 523              KK     036   BASIN
 524              BA   0.008
 525              LG    0.29    0.23    6.20    0.18      23
 526              UC   0.140   0.165
 527              UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 528              UA     100
                  *
1                                        HEC-1 INPUT                                                    PAGE 15

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


 529              KK    C036 COMBINE HYDROGRAPHS FROM SUB 035, SUB 036, C033 AND R034
 530              KM         THIS IS TNP INFLOW FROM C036
 531              HC       4
                  *

 532              KK     037   BASIN
 533              BA   0.041
 534              LG    0.30    0.23    6.20    0.17       1
 535              UC   0.187   0.146
 536              UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 537              UA     100
                  *

 538              KK    C037 COMBINE ALL HYDROGRAPHS
 539              KM         THIS REPRESENTS TOTAL INFLOW TO BASIN No.1
 540              HC       5
 541              ZW             A=TROON         B=INFLOW         C=FLOW
                  *
```

```
542    KK   DET#1     ROUTE INFLOW THRU DET BASIN #1 (UPPER BASIN)
543    KM             LOW FLOW OUTLET = 4-42" RCP
544    KM             INLET INVERT ELEV - 2598.80
545    KM             OUTLET INVERT ELEV = 2592.0
546    KM             SPILLWAY ELEV = 2610.0
547    KM             WEIR LENGTH = 50'
548    RS        1    STOR      0.0
549    SA    0.023    0.11     0.49     1.23     3.50     4.00     4.24     4.57     4.85     5.33
550    SA     5.95    6.67     7.80     8.95
551    SQ        0      45    103.5      185      264    328.5      382    428.5      470      507
552    SQ      543     575      725      999
553    SE     2599    2600     2601     2602     2603     2604     2605     2606     2607     2608
554    SE     2609    2610     2611     2612
555    ZW              A=TROON          B-DET#1          C=FLOW
       *

556    KK   DET#2     ROUTE INFLOW THRU DET BASIN #2 (LOWER BASIN)
557    KM             LOW FLOW OUTLET = 1-60" RCP
558    KM             INLET INVERT ELEV = 2590.36
559    KM             OUTLET INVERT ELEV = 2589.95
560    KM             SPILLWAY ELEV = 2607.0
561    KM             WEIR LENGTH = 35'
562    RS        1    STOR      0.0
563    SA    0.023   0.048    0.496    0.876    1.119    1.277    1.414    1.558    1.705    1.820
564    SA    1.930   2.042    2.365    2.487    2.615    2.770    2.935    3.258
565    SQ        0    11.5       29       47       78    112.5      148      177      204      226
566    SQ      248     266      283    300.5      315      330      345      378
567    SE   2590.3    2591     2592     2593     2594     2595     2596     2597     2598     2599
568    SE     2600    2601     2602     2603     2604     2605     2606     2607
569    ST     2607      35      3.0      1.5
570    ZW              A=TROON          B=DET#2          C-FLOW
       *
       *   ***********************************************************************
       *   *****************                                      *****************
       *   *****************  START CAVALLIERE FLATS MODEL CHANGES *****************
       *   *****************                                      *****************
       *   ***********************************************************************
       *
1                                    HEC-1 INPUT                                          PAGE 16

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

571    KK  DDET#2
572    KM   Outlet channel capacity is 348 cfs. Divert overtopping flow.
573    DT    OVER
574    DI        0     348    348.1    10000
575    DQ        0       0      0.1     9652
       *
       *   ***********************************************************************
       *   *****************                                      *****************
       *   *****************   END CAVALLIERE FLATS MODEL CHANGES  *****************
       *   *****************                                      *****************
       *   ***********************************************************************
       *

576    KK  RDET#2    ROUTE FLOW THRU SUB 042
577    KM            OUTLET CHANNEL TROON NORTH PARK BASIN
578    RS        1   FLOW        0
579    RC    0.040   0.035    0.040      594    0.010
580    RX      990     992      994     1000     1010     1016     1018     1020
581    RY    -14.0    13.5     13.0     10.0     10.0     13.0     13.5     14.0
       *
       *   ***********************************************************************
       *   ***********************************************************************
       *                      STARTS DOWNSTREAM OFFSITE AREAS MODEL
       *
       *   ***********************************************************************
       *   ***********************************************************************
       *

582    KK      038   BASIN
583    BA    0.047
584    LG     0.28    0.25     6.00     0.21       26
585    UC    0.234   0.266
586    UA        0     5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
587    UA      100
       *

588    KK    LPC38   ROUTE INFLOW THRU STORAGE AREA
589    KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
590    KM            LOW FLOW OUTLET = 3-36" RCP
591    RS        1   STOR        0
592    SA     .001    .007     .047     .086     .160
593    SQ        0      33       82      132      165
594    SE     24.6    26.0     27.0     28.0     29.0
595    ST     29.0      45      2.7      1.5
       *

596    KK      040   BASIN
597    BA    0.018
598    LG     0.26    0.25     6.00     0.20       49
```

```
 599         UC    0.184    0.202
 600         UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
 601         UA      100
             *
1                                            HEC-1 INPUT                                              PAGE 17

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


 602         KK     C040 COMBINE HYDROGRAPHS FROM SUB 040 AND LP038
 603         HC        2
             *

 604         KK    LP040    ROUTE INFLOW THRU STORAGE AREA
 605         KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 606         KM             LOW FLOW OUTLET   3-36" RCP
 607         RS        1     STOR        0
 608         SA     .001     .024     .077     .127
 609         SQ        0       82      132      165
 610         SE     06.6     09.0     10.0     11.0
 611         ST     11.0       45      2.7      1.5
             *

 612         KK   RLP040     ROUTE FLOW THRU SUB 042
 613         RS        1     FLOW        0
 614         RC    0.045    0.040    0.045      927    0.016
 615         RX      990      992      994     1000     1012     1018     1020     1022
 616         RY     13.2     13.1     13.0     10.0     10.0     13.0     13.1     13.2
             *

 617         KK      042    BASIN
 618         BA    0.020
 619         LG     0.27     0.25     6.00     0.20       20
 620         UC    0.289    0.433
 621         UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
 622         UA      100
             *

 623         KK     C042 COMBINE HYDROGRAPHS FROM RDET#2, SUB 042 AND RLP040
 624         HC        3
 625         ZW               A=PVISTA          B=C042          C=FLOW
             *

 626         KK      039    BASIN
 627         BA    0.035
 628         LG     0.26     0.25     6.00     0.20       39
 629         UC    0.225    0.292
 630         UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
 631         UA      100
             *

 632         KK    LP039    ROUTE INFLOW THRU STORAGE AREA
 633         KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 634         KM             LOW FLOW OUTLET = 3-30" RCP
 635         RS        1     STOR        0
 636         SA     .001     .007     .015     .024     .037
 637         SQ        0       49       84      112      135
 638         SE     17.0     19.0     20.0     21.0     22.0
 639         ST     22.0       45      2.7      1.5
             *
1                                            HEC-1 INPUT                                              PAGE 18

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


 640         KK      041    BASIN
 641         BA    0.011
 642         LG     0.28     0.25     6.00     0.19       33
 643         UC    0.231    0.353
 644         UA        0      5.0     16.0     30.0     65.0     77.0     84.0     90.0     94.0     97.0
 645         UA      100
             *

 646         KK     C041 COMBINE HYDROGRAPHS FROM SUB 041 AND LP039
 647         HC        2
             *

 648         KK    LP041    ROUTE INFLOW THRU STORAGE AREA
 649         KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 650         KM             LOW FLOW OUTLET = 3-30" RCP
 651         RS        1     STOR        0
 652         SA     .001     .020     .039     .072     .104
 653         SQ        0       14       49       84      113
 654         SE     07.0     08.0     09.0     10.0     11.0
 655         ST     11.0       45      2.7      1.5
             *

 656         KK   RLP041     ROUTE FLOW THRU SUB 041/042
 657         RS        1     FLOW        0
 658         RC    0.045    0.040    0.045     1314    0.017
 659         RX      990      992      994     1000     1008     1014     1016     1018
 660         RY     13.2     13.1     13.0     10.0     10.0     13.0     13.1     13.2
             *
```

```
 661      KK    043   BASIN
 662      BA  0.008
 663      LG   0.26    0.25    6.00    0.20      29
 664      UC  0.231   0.376
 665      UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 666      UA    100
          *

 667      KK   C043 COMBINE HYDROGRAPHS FROM SUB 043 AND RLP041
 668      HC      2
 669      ZW              A=PVISTA        B=C043          C=FLOW
          *

 670      KK   COMB COMBINE HYDROGRAPHS FROM C042 AND C043
 671      KM           THIS REPRESENTS COMBINED FLOWS AT PINNACLE VISTA ROAD
 672      HC      2
 673      ZW              A=PVISTA        B=COMB          C=FLOW
          *
          *  ***************************************************************************
          *  ******************                                       ******************
          *  ******************  START CAVALLIERE FLATS MODEL CHANGES  ******************
          *  ******************                                       ******************
          *  ***************************************************************************
          *
          *
1                                          HEC-1 INPUT                                           PAGE 19

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

 674      KK   RCF1   ROUTE
 675      RS      1    FLOW
 676      RC  0.035   0.035   0.035     690  0.0200    0.00
 677      RX   0.00   30.00   67.50   72.50   77.50   82.50  120.00  150.00
 678      RY   3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
          *

 679      KK    CF1   BASIN
 680      BA  0.016
 681      LG   0.25    0.25    6.00    0.21      62
 682      UC  0.164   0.162
 683      UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 684      UA    100
          *

 685      KK  CCF1A COMBINE
 686      HC      2
          *

 687      KK  ODET#2
 688      KM  Retrieve flow overtopping Troon North Park Basin outlet channel
 689      DR   OVER
          *

 690      KK  RCF2A   ROUTE
 691      RS      1    FLOW
 692      RC  0.035   0.035   0.035     990  0.0200    0.00
 693      RX   0.00   20.00   40.00   45.00   55.00   60.00   80.00  100.00
 694      RY   2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
          *

 695      KK   CF2A   BASIN
 696      BA  0.012
 697      LG   0.28    0.25    5.85    0.20      35
 698      UC  0.161   0.147
 699      UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 700      UA    100
          *

 701      KK   OFF1   BASIN
 702      BA  0.307
 703      LG   0.32    0.31    6.00    0.17       9
 704      UC  0.462   0.356
 705      UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 706      UA    100
          *

 707      KK  RCF2B   ROUTE
 708      RS      1    FLOW
 709      RC  0.035   0.035   0.035     530  0.0270    0.00
 710      RX   0.00   15.00   30.00   35.00   90.00   95.00  110.00  125.00
 711      RY   2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
          *
1                                          HEC-1 INPUT                                           PAGE 20

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

 712      KK   CF2B   BASIN
 713      BA  0.002
 714      LG   0.10    0.40    6.00    0.15       0
 715      UC  0.136   0.221
```

```
 716        UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 717        UA    100
            *

 718        KK  CCF2B COMBINE
 719        HC      2
            *

 720        KK  CCF2A COMBINE
 721        HC      3
            *

 722        KK  CCF1B COMBINE
 723        HC      2
            *

 724        KK   RCF3   ROUTE
 725        RS      1    FLOW
 726        RC  0.035   0.035   0.035     795  0.0380    0.00
 727        RX   0.00   35.00   80.50  100.00  106.00  125.50  565.00  600.00
 728        RY   5.00    4.00    3.00    0.00    0.00    3.00    4.00    5.00
            *

 729        KK    CF3   BASIN
 730        BA  0.028
 731        LG   0.25    0.25    5.71    0.24      52
 732        UC  0.178   0.125
 733        UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 734        UA    100
            *

 735        KK   CCF3 COMBINE
 736        HC      2
            *

 737        KK   OFF2   BASIN
 738        BA  0.011
 739        LG   0.30    0.25    6.00    0.17       6
 740        UC  0.173   0.213
 741        UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 742        UA    100
            *

 743        KK  RCF4A   ROUTE
 744        RS      1    FLOW
 745        RC  0.035   0.035   0.035    1230  0.0250    0.00
 746        RX   0.00   25.00   50.00   55.00   65.00   70.00   95.00  120.00
 747        RY   3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
            *
1                                     HEC-1 INPUT                                        PAGE 21

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

 748        KK   CF4A   BASIN
 749        BA  0.007
 750        LG   0.13    0.38    6.00    0.15       1
 751        UC  0.152   0.178
 752        UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 753        UA    100
            *

 754        KK   OFF3   BASIN
 755        BA  0.007
 756        LG   0.33    0.34    6.00    0.17       3
 757        UC  0.217   0.330
 758        UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 759        UA    100
            *

 760        KK  COFF3 COMBINE
 761        HC      3
            *

 762        KK   CF4B   BASIN
 763        BA  0.005
 764        LG   0.25    0.25    5.24    0.30      36
 765        UC  0.157   0.179
 766        UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 767        UA    100
            *

 768        KK  CCF4B COMBINE
 769        HC      2
            *

 770        KK   OFF4   BASIN
 771        BA  0.061
 772        LG   0.32    0.32    6.00    0.17      12
 773        UC  0.279   0.266
 774        UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 775        UA    100
            *
```

```
          776            KK    OFF5   BASIN
          777            BA   0.009
          778            LG    0.35    0.35    4.65    0.33       2
          779            UC   0.292   0.470
          780            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          781            UA     100
                         *

          782            KK   COFF4 COMBINE
          783            HC       2
                         *
1                                              HEC-1 INPUT                                            PAGE 22

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


          784            KK    RCF6   ROUTE
          785            RS       1    FLOW
          786            RC   0.035   0.035   0.035     270  0.0300    0.00
          787            RX    0.00   50.00  100.00  105.00  115.00  120.00  170.00  220.00
          788            RY    1.00    0.75    0.50    0.00    0.00    0.50    0.75    1.00
                         *

          789            KK     CF6   BASIN
          790            BA   0.004
          791            LG    0.25    0.25    5.05    0.33      36
          792            UC   0.208   0.258
          793            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          794            UA     100
                         *

          795            KK    CCF6 COMBINE
          796            HC       2
                         *
          797            ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE       (V) ROUTING             (--->) DIVERSION OR PUMP FLOW

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

   21          001
                .
                .
   31           .          002
                .           V
                .           V
   37           .        LP002
                .           .
                .           .
   45         C001...........
                V
                V
   47        LPC001
                V
                V
   55        RLPC01
                .
                .
   60           .          007
                .           .
                .           .
   66         C007...........
                V
                V
   68        LPC007
                .
                .
   76           .          003
                .           V
                .           V
   82           .         R003
                .           .
                .           .
   87           .           .          005
                .           .           .
                .           .           .
   93           .         C005...........
                .           V
                .           V
   95           .        RC005
                .           V
                .           V
  100           .       LPC005
                .           .
                .           .
  108           .           .          004
                .           .           V
                .           .           V
  114           .           .         R004
                .           .           .
```

```
119          .           .           .         006
             .           .           .           .
125          .           .        C006............
             .           .           V
             .           .           V
127          .           .      LPC006
             .           .           .
135          .           .           .         009
             .           .           .           .
141          .        C009........................
             .           V
             .           V
143          .      LPC009
             .           .
151          .           .         012
             .           .           .
157          .        C012............
             .           V
             .           V
159          .      LPC012
             .           .
167          .           .         008
             .           .           .
173          .           .           .         010
             .           .           .           .
179          .           .        C010............
             .           .           V
             .           .           V
181          .           .       RC010
             .           .           .
186          .           .           .         011
             .           .           .           .
192          .           .        C011............
             .           .           .
194       C013T........................
             V
             V
196     LPC13T
             .
204          .         013
             .           .
210       C013............
             V
             V
212     LPC013
             V
             V
220     RLPC13
             .
225          .         014
             .           V
             .           V
231          .       LP014
             .           V
             .           V
239          .      RLP014
             .           .
244          .           .         016
             .           .           V
             .           .           V
250          .           .       LP016
             .           .           V
             .           .           V
257          .           .      RLP016
             .           .           .
262          .           .           .         015
             .           .           .           .
268          .           .           .           .         017
             .           .           .           .           .
280          .           .           .           .           .------->    DR017
274          .           .           .           .       DV017
             .           .           .           .           .
283          .        C017....................................
```

```
                           V
               .           V
285            .       RC017
               .           .
               .           .
291            .           .         018
               .           .           .
               .           .           .
297         C018........................
               .
               .
300            .         019
               .           .
               .           .
306            .           .         020
               .           .           .
               .           .           .
312            .        C020............
               .           V
               .           V
314            .       RC020
               .           .
               .           .
320            .           .         021
               .           .           .
               .           .           .
326            .        C021............
               .           .
               .           .
329            .           .         022
               .           .           V
               .           .           V
335            .           .       LP022
               .           .           .
               .           .           .
343            .           .           .         023
               .           .           .           V
               .           .           .           V
349            .           .           .       LP023
               .           .           .           .
               .           .           .           .
357            .           .        C023............
               .           .           V
               .           .           V
359            .           .      RLPC23
               .           .           .
               .           .           .
364            .           .           .         024
               .           .           .           .
               .           .           .           .
370            .           .        C024............
               .           .           V
               .           .           V
372            .           .      LPC024
               .           .           V
               .           .           V
379            .           .      RLPC24
               .           .           .
               .           .           .
385            .           .           .         025
               .           .           .           .
               .           .           .           .
391            .           .        C025............
               .           .           .
               .           .           .
394            .           .           .         026
               .           .           .           V
               .           .           .           V
400            .           .           .       LP026
               .           .           .           V
               .           .           .           V
407            .           .           .      RLP026
               .           .           .           .
               .           .           .           .
412            .           .           .           .         028
               .           .           .           .           V
               .           .           .           .           V
418            .           .           .           .       LP028
               .           .           .           .           .
               .           .           .           .           .
426            .           .           .           .           .         030
               .           .           .           .           .           V
               .           .           .           .           .           V
432            .           .           .           .           .       LP030
               .           .           .           .           .           .
               .           .           .           .           .           .
440            .           .           .           .           .           .         029
               .           .           .           .           .           .           .
               .           .           .           .           .           .           .
446            .           .           .           .        C029........................
               .           .           .           .           V
               .           .           .           .           V
448            .           .           .           .      LPC029
```

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               .           .           .           .           .
456            .           .           .           .           .         027
               .           .           .           .           .           .
462            .           .           .           .           .           .         031
               .           .           .           .           .           .           .
468            .           .           .           .        C031........................
               .           .           .           .           V
               .           .           .           .           V
470            .           .           .           .       RC031
               .           .           .           .           .
476            .           .           .           .           .         032
               .           .           .           .           .           .
482            .           .           .           .        C032............
               .           .           .           .           V
               .           .           .           .           V
484            .           .           .           .      LPC032
               .           .           .           .           V
               .           .           .           .           V
492            .           .           .           .      RLPC32
               .           .           .           .           .
498            .           .           .           .           .         033
               .           .           .           .           .           .
504            .           .           .        C033........................
               .           .           .           .
506            .           .           .           .         034
               .           .           .           .           V
               .           .           .           .           V
512            .           .           .           .        R034
               .           .           .           .           .
517            .           .           .           .           .         035
               .           .           .           .           .           .
523            .           .           .           .           .           .         036
               .           .           .           .           .           .           .
529            .           .           .        C036....................................
               .           .           .           .
532            .           .           .           .         037
               .           .           .           .           .
538         C037................................................
               V
               V
542         DET#1
               V
               V
556         DET#2
               .
573            .------->    OVER
571         DDET#2
               V
               V
576         RDET#2
               .
582            .         038
               .           V
               .           V
588            .       LP038
               .           .
596            .           .         040
               .           .           .
602            .        C040............
               .           V
               .           V
604            .       LP040
               .           V
               .           V
612            .      RLP040
               .           .
617            .           .         042
               .           .           .
623         C042........................
               .
626            .         039
               .           V
               .           V
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 632           .        LP039
               .            .
               .            .
 640           .            .            041
               .            .              .
               .            .              .
 646           .         C041............
               .            V
               .            V
 648           .        LP041
               .            V
               .            V
 656           .       RLP041
               .            .
               .            .
 661           .            .            043
               .            .              .
               .            .              .
 667           .         C043............
               .            .
               .            .
 670        COMB............
               V
               V
 674        RCF1
               .
               .
 679           .          CF1
               .            .
               .            .
 685       CCF1A............
               .
               .
 689           .            .<-------    OVER
 687           .       ODET#2
               .            V
               .            V
 690           .        RCF2A
               .            .
               .            .
 695           .            .           CF2A
               .            .              .
               .            .              .
 701           .            .              .         OFF1
               .            .              .            V
               .            .              .            V
 707           .            .              .        RCF2B
               .            .              .            .
               .            .              .            .
 712           .            .              .            .          CF2B
               .            .              .            .             .
               .            .              .            .             .
 718           .            .              .        CCF2B............
               .            .              .            .
               .            .              .            .
 720           .        CCF2A.........................
               .            .
               .            .
 722       CCF1B............
               V
               V
 724        RCF3
               .
               .
 729           .          CF3
               .            .
               .            .
 735        CCF3............
               .
               .
 737           .         OFF2
               .            V
               .            V
 743           .        RCF4A
               .            .
               .            .
 748           .            .           CF4A
               .            .              .
               .            .              .
 754           .            .              .         OFF3
               .            .              .            .
               .            .              .            .
 760           .        COFF3.........................
               .            .
               .            .
 762           .            .           CF4B
               .            .              .
               .            .              .
 768           .        CCF4B............
               .            .
               .            .
 770           .            .           OFF4
               .            .              .
```

```
                .            .            .
  776           .            .            .          OFF5
                .            .            .             .
                .            .            .             .
  782           .            .         COFF4............
                .            .            V
                .            .            V
  784           .            .          RCF6
                .            .            .
                .            .            .
  789           .            .            .           CF6
                .            .            .             .
                .            .            .             .
  795           .            .          CCF6............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                                         *****************************************
 *                                       *                                                         *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                         *   U.S. ARMY CORPS OF ENGINEERS        *
 *             JUN  1998                 *                                                         *   HYDROLOGIC ENGINEERING CENTER       *
 *           VERSION 4.1                 *                                                         *        609 SECOND STREET              *
 *                                       *                                                         *     DAVIS, CALIFORNIA 95616           *
 *  RUN DATE   21AUG14  TIME  15:10:15   *                                                         *         (916) 756-1104                *
 *                                       *                                                         *                                       *
*****************************************                                                          *****************************************



                              Cavalliere Flats Rezoning
                              City of Scottsdale
                              Prepared by: Kimley-Horn and Associates, Inc.

                              Proposed Conditions model
                              10-year, 6-hour Storm event

                              Based on Troon North Park Model:

                                  PROJECT NAME: TROON NORTH PARK                                JOB#: 236-08
                                  PREPARED FOR: CITY OF SCOTTSDALE
                                  PREPARED BY : ARGUS CONSULTING, P.C.

                                  FILE NAME   : TNP10YR.DAT
                                  STORM EVENT : 10-YR/6-HR
                                  Unit Hydrograph: Clark
                                  01/24/2011

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

      IT         HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     6JUN99  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE    12JUN99  ENDING DATE
                      NDTIME       2235  ENDING TIME
                       ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE  166.58 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
  -----DSS---ZOPEN:  Existing File Opened,  File: 01-10.DSS
                     Unit:  71;  DSS Version: 6-JG
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/05JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/06JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/07JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/08JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/09JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/10JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/11JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/12JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/05JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/06JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/07JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/08JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/09JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/10JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/11JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/12JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/05JUN1999/5MIN//
 -----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/06JUN1999/5MIN//
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-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/12JUN1999/5MIN//
1
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	001	83.	4.17	9.	2.	1.	.11		
HYDROGRAPH AT	002	11.	4.17	1.	0.	0.	.02		
ROUTED TO	LP002	11.	4.17	2.	0.	0.	.02	2723.63	4.17
2 COMBINED AT	C001	94.	4.17	11.	3.	1.	.13		
ROUTED TO	LPC001	92.	4.17	11.	3.	1.	.13	2717.03	4.17
ROUTED TO	RLPC01	88.	4.25	11.	3.	1.	.13	91.70	4.25
HYDROGRAPH AT	007	15.	4.08	2.	1.	0.	.02		
2 COMBINED AT	C007	100.	4.25	13.	3.	1.	.15		
ROUTED TO	LPC007	100.	4.25	13.	3.	1.	.15	72.00	4.25
HYDROGRAPH AT	003	16.	4.08	1.	0.	0.	.02		
ROUTED TO	R003	16.	4.08	1.	0.	0.	.02	90.69	4.08
HYDROGRAPH AT	005	7.	4.08	1.	0.	0.	.01		
2 COMBINED AT	C005	23.	4.08	2.	1.	0.	.02		
ROUTED TO	RC005	22.	4.08	2.	1.	0.	.02	90.85	4.08
ROUTED TO	LPC005	22.	4.17	2.	1.	0.	.02	84.76	4.17
HYDROGRAPH AT	004	11.	4.08	1.	0.	0.	.01		

ROUTED TO	R004	10.	4.17	1.	0.	0.	.01	90.56	4.17
HYDROGRAPH AT	006	16.	4.08	2.	0.	0.	.01		
2 COMBINED AT	C006	25.	4.08	3.	1.	0.	.03		
ROUTED TO	LPC006	24.	4.17	3.	1.	0.	.03	82.49	4.17
HYDROGRAPH AT	009	7.	4.08	1.	0.	0.	.01		
3 COMBINED AT	C009	52.	4.17	6.	1.	0.	.06		
ROUTED TO	LPC009	52.	4.17	6.	1.	0.	.06	77.35	4.17
HYDROGRAPH AT	012	4.	4.00	0.	0.	0.	.00		
2 COMBINED AT	C012	56.	4.17	6.	2.	1.	.06		
ROUTED TO	LPC012	56.	4.17	6.	2.	1.	.06	70.03	4.17
HYDROGRAPH AT	008	2.	4.08	0.	0.	0.	.00		
HYDROGRAPH AT	010	3.	4.08	0.	0.	0.	.00		
2 COMBINED AT	C010	5.	4.08	1.	0.	0.	.01		
ROUTED TO	RC010	5.	4.08	1.	0.	0.	.01	90.18	4.08
HYDROGRAPH AT	011	5.	4.08	1.	0.	0.	.00		
2 COMBINED AT	C011	10.	4.08	1.	0.	0.	.01		
3 COMBINED AT	C013I	160.	4.25	21.	5.	2.	.22		
ROUTED TO	LPC13I	159.	4.25	21.	5.	2.	.22	64.15	4.25
HYDROGRAPH AT	013	39.	4.08	5.	1.	0.	.04		
2 COMBINED AT	C013	190.	4.25	25.	6.	2.	.26		
ROUTED TO	LPC013	191.	4.25	25.	6.	2.	.26	59.51	4.25
ROUTED TO	RLPC13	185.	4.33	25.	6.	2.	.26	91.85	4.33
HYDROGRAPH AT	014	19.	4.08	2.	1.	0.	.02		
ROUTED TO	LP014	20.	4.08	2.	1.	0.	.02	66.81	4.08
ROUTED TO	RLP014	17.	4.17	2.	1.	0.	.02	90.73	4.17
HYDROGRAPH AT	016	31.	4.08	3.	1.	0.	.03		
ROUTED TO	LP016	28.	4.17	2.	1.	0.	.03	43.15	4.17

	ROUTED TO									
+		RLP016	26.	4.25	2.	1.	0.	.03		
+									91.04	4.25
	HYDROGRAPH AT									
+		015	58.	4.08	7.	2.	1.	.06		
	HYDROGRAPH AT									
+		017	15.	4.08	2.	0.	0.	.02		
	DIVERSION TO									
+		DR017	15.	.00	2.	0.	0.	.02		
	HYDROGRAPH AT									
+		DV017	0.	.00	0.	0.	0.	.02		
	4 COMBINED AT									
+		C017	97.	4.17	11.	3.	1.	.13		
	ROUTED TO									
+		RC017	94.	4.17	11.	3.	1.	.13		
+									91.24	4.17
	HYDROGRAPH AT									
+		018	49.	4.08	7.	2.	1.	.05		
	3 COMBINED AT									
+		C018	317.	4.25	43.	11.	4.	.44		
	HYDROGRAPH AT									
+		019	59.	4.08	8.	2.	1.	.05		
	HYDROGRAPH AT									
+		020	9.	4.17	2.	0.	0.	.02		
	2 COMBINED AT									
+		C020	68.	4.08	10.	2.	1.	.07		
	ROUTED TO									
+		RC020	65.	4.17	10.	2.	1.	.07		
+									91.42	4.17
	HYDROGRAPH AT									
+		021	27.	4.08	4.	1.	0.	.02		
	2 COMBINED AT									
+		C021	92.	4.08	13.	3.	1.	.09		
	HYDROGRAPH AT									
+		022	48.	4.17	6.	2.	1.	.07		
	ROUTED TO									
+		LP022	48.	4.17	6.	2.	1.	.07		
+									73.00	4.17
	HYDROGRAPH AT									
+		023	59.	4.08	7.	2.	1.	.06		
	ROUTED TO									
+		LP023	54.	4.17	7.	2.	1.	.06		
+									75.17	4.17
	2 COMBINED AT									
+		C023	102.	4.17	13.	3.	1.	.13		
	ROUTED TO									
+		RLPC23	101.	4.25	13.	3.	1.	.13		
+									91.87	4.25
	HYDROGRAPH AT									
+		C24	17.	4.08	2.	1.	0.	.02		
	2 COMBINED AT									
+		C024	114.	4.25	15.	4.	1.	.15		
	ROUTED TO									
+		LPC024	110.	4.25	14.	4.	1.	.15		
+									48.31	4.25
	ROUTED TO									
+		RLPC24	113.	4.33	14.	4.	1.	.15		
+									91.13	4.33
	HYDROGRAPH AT									
+		025	32.	4.08	5.	1.	0.	.03		
	2 COMBINED AT									
+		C025	133.	4.33	19.	5.	2.	.18		
	HYDROGRAPH AT									
+		026	37.	4.08	4.	1.	0.	.04		
	ROUTED TO									

	LP026	36.	4.08	3.	1.	0.	.04	2702.46	4.08
ROUTED TO	RLP026	32.	4.33	3.	1.	0.	.04	91.04	4.33
HYDROGRAPH AT	028	5.	4.00	0.	0.	0.	.00		
ROUTED TO	LP028	0.	.00	0.	0.	0.	.00	30.19	6.75
HYDROGRAPH AT	030	2.	4.00	0.	0.	0.	.00		
ROUTED TO	LP030	0.	.00	0.	0.	0.	.00	15.54	7.00
HYDROGRAPH AT	029	4.	4.08	0.	0.	0.	.00		
3 COMBINED AT	C029	4.	4.08	0.	0.	0.	.01		
ROUTED TO	LPC029	4.	4.08	0.	0.	0.	.01	1.66	4.08
HYDROGRAPH AT	027	20.	4.08	2.	0.	0.	.02		
HYDROGRAPH AT	031	10.	4.00	1.	0.	0.	.01		
3 COMBINED AT	C031	35.	4.08	3.	1.	0.	.05		
ROUTED TO	RC031	34.	4.08	3.	1.	0.	.05	90.81	4.08
HYDROGRAPH AT	032	13.	4.08	2.	0.	0.	.01		
2 COMBINED AT	C032	47.	4.08	5.	1.	0.	.06		
ROUTED TO	LPC032	45.	4.17	5.	1.	0.	.06	79.94	4.17
ROUTED TO	RLPC32	43.	4.33	5.	1.	0.	.06	90.91	4.33
HYDROGRAPH AT	033	137.	4.17	19.	5.	2.	.15		
3 COMBINED AT	C033	191.	4.25	27.	7.	2.	.25		
HYDROGRAPH AT	034	82.	4.08	8.	2.	1.	.09		
ROUTED TO	R034	72.	4.17	8.	2.	1.	.09	91.11	4.17
HYDROGRAPH AT	035	22.	4.08	2.	0.	0.	.02		
HYDROGRAPH AT	036	9.	4.00	1.	0.	0.	.01		
4 COMBINED AT	C036	281.	4.25	37.	9.	3.	.37		
HYDROGRAPH AT	037	45.	4.00	4.	1.	0.	.04		
5 COMBINED AT	C037	824.	4.25	116.	29.	10.	1.12		
ROUTED TO	DET#1	446.	4.58	116.	29.	10.	1.12	2606.42	4.58
ROUTED TO	DET#2	303.	5.33	115.	29.	10.	1.12	2603.18	5.33

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC007
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	68.00	74.00	74.00
STORAGE	0.	0.	0.
OUTFLOW	0.	143.	143.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	72.00	.00	0.	100.	.00	4.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC005
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	83.00	88.00	88.00
STORAGE	0.	0.	0.
OUTFLOW	0.	62.	62.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	84.76	.00	0.	22.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC006
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	80.00	86.00	86.00
STORAGE	0.	1.	1.
OUTFLOW	0.	51.	51.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	82.49	.00	0.	24.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC009
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	75.00	80.00	80.00
STORAGE	0.	1.	1.
OUTFLOW	0.	124.	124.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	77.35	.00	0.	52.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC012
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	67.50	73.00	73.00
STORAGE	0.	0.	0.
OUTFLOW	0.	133.	133.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	70.03	.00	0.	56.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC131
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	61.00	66.00	66.00
STORAGE	0.	1.	1.
OUTFLOW	0.	266.	266.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	64.15	.00	0.	159.	.00	4.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC013
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	55.80	61.00	61.00
STORAGE	0.	0.	0.
OUTFLOW	0.	272.	272.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	59.51	.00	0.	191.	.00	4.25	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP014
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	64.50	70.00	70.00
STORAGE	0.	0.	0.
OUTFLOW	0.	48.	48.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	66.81	.00	0.	20.	.00	4.08	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP022
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	71.00	77.00	77.00
STORAGE	0.	0.	0.
OUTFLOW	0.	127.	127.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	73.00	.00	0.	48.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP023
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	73.00	77.00	77.00
STORAGE	0.	1.	1.
OUTFLOW	0.	113.	113.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	75.17	.00	0.	54.	.00	4.17	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP028
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	28.00	32.00	32.00
STORAGE	0.	1.	1.
OUTFLOW	0.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	30.19	.00	0.	0.	.00	.00	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP030
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	11.00	16.00	16.00
STORAGE	0.	0.	0.
OUTFLOW	0.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	15.54	.00	0.	0.	.00	.00	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP0029
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1.00	8.00	8.00

```
                        STORAGE            0.             0.            0.
                        OUTFLOW            0.            38.           38.

                 RATIO   MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
                  OF    RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
                  PMF    W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS      HOURS

                 1.00      1.66        .00        0.        4.       .00       4.08        .00
1                        SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC032
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                        ELEVATION          77.00            81.00            81.00
                        STORAGE             0.               0.               0.
                        OUTFLOW             0.              63.              63.

                 RATIO   MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
                  OF    RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
                  PMF    W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS      HOURS

                 1.00     79.94        .00        0.       45.       .00       4.17        .00
1                        SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    DET#2
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                        ELEVATION         2590.30          2607.00          2607.00
                        STORAGE             0.              29.              29.
                        OUTFLOW             0.             378.             378.

                 RATIO   MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
                  OF    RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
                  PMF    W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS      HOURS

                 1.00   2603.18        .00       18.      303.       .00       5.33        .00
1                        SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP038
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                        ELEVATION          24.60            29.00            29.00
                        STORAGE             0.               0.               0.
                        OUTFLOW             0.             165.             165.

                 RATIO   MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
                  OF    RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
                  PMF    W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS      HOURS

                 1.00     26.21        .00        0.       43.       .00       4.08        .00
1                        SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP040
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                        ELEVATION           6.60            11.00            11.00
                        STORAGE             0.               0.               0.
                        OUTFLOW             0.             165.             165.

                 RATIO   MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
                  OF    RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
                  PMF    W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS      HOURS

                 1.00      8.48        .00        0.       64.       .00       4.08        .00
1                        SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP039
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                        ELEVATION          17.00            22.00            22.00
                        STORAGE             0.               0.               0.
                        OUTFLOW             0.             135.             135.

                 RATIO   MAXIMUM     MAXIMUM   MAXIMUM   MAXIMUM   DURATION    TIME OF    TIME OF
                  OF    RESERVOIR     DEPTH    STORAGE   OUTFLOW   OVER TOP  MAX OUTFLOW  FAILURE
                  PMF    W.S.ELEV   OVER DAM    AC-FT      CFS      HOURS      HOURS      HOURS

                 1.00     18.38        .00        0.       34.       .00       4.08        .00
1                        SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP041
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


    PLAN  1 ...............              INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                        ELEVATION           7.00            11.00            11.00
                        STORAGE             0.               0.               0.
                        OUTFLOW             0.             113.             113.
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RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	8.82	.00	0.	43.	.00	4.08	.00

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

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-----DSS---ZCLOSE Unit:  71,   File: 01-10.DSS
          Pointer Utilization:    .27
          Number of Records:     48
          File Size:     92.1  Kbytes
          Percent Inactive:     .0
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1***************************************                                        ***************************************
 *                                     *                                        *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                                        *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998              *                                        *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1               *                                        *        609 SECOND STREET            *
 *                                     *                                        *     DAVIS, CALIFORNIA 95616         *
 *  RUN DATE   21AUG14  TIME  15:10:36 *                                        *        (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

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

          1        ID   Cavalliere Flats Rezoning
          2        ID   City of Scottsdale
          3        ID   Prepared by: Kimley-Horn and Associates, Inc.
          4        ID
          5        ID   Proposed Conditions model
          6        ID   100-year, 6-hour Storm event
          7        ID
          8        ID   Based on Troon North Park Model:
          9        ID
         10        ID       PROJECT NAME: TROON NORTH PARK                    JOB#: 236-08
         11        ID       PREPARED FOR: CITY OF SCOTTSDALE
         12        ID       PREPARED BY : ARGUS CONSULTING, P.C.
         13        ID
         14        ID       FILE NAME   : INP100YR.DAT
         15        ID       STORM EVENT : 100-YR/6-HR
         16        ID       Unit Hydrograph: Clark
         17        ID       01/24/2011
                   *
                   *
                   *
                   *
         18        IT       5 06JUN99     0000     2000
         19        IN      15
         20        IO       5
                   *DIAGRAM
                   *
                   *

         21        KK     001   BASIN
         22        BA   0.112
         23        PB   3.136
         24        PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.075
         25        PC   0.087   0.100   0.119   0.151   0.235   0.415   0.762   0.873   0.915   0.944
         26        PC   0.956   0.967   0.979   0.989   1.000
         27        LG    0.30    0.25    6.00    0.18       3
         28        UC   0.261   0.233
         29        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         30        UA     100
                   *

         31        KK     002   BASIN
         32        BA  0.0167
         33        LG    0.30    0.25    6.00    0.18       7
         34        UC   0.201   0.303
         35        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         36        UA     100
                   *

         37        KK   LP002   ROUTE INFLOW THRU STORAGE AREA
         38        KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
         39        KM           LOW FLOW OUTLET = 30" RCP
         40        RS       1    STOR     0.0
         41        SA    .003    .005    .026    .059
         42        SQ       0       5      15      30
         43        SE  2722.0  2723.0  2724.0  2725.0
```

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1                                    HEC-1 INPUT                                              PAGE  2

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

   44      ST  2725.0      40     2.7     1.5
           *

   45      KK     C001 COMBINE HYDROGRAPHS FROM SUB 001 AND LP002
   46      HC       2
           *

   47      KK  LPC001   ROUTE INFLOW THRU STORAGE AREA
   48      KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   49      KM           LOW FLOW OUTLET = OPEN SECTION BETWEEN BERM AND WALL
   50      RS       1    STOR     0.0
   51      SA    .001    .004    .013    .104    .150
   52      SQ       0     6.5      23      50      90
   53      SE  2713.0  2714.0  2715.0  2716.0  2717.0
   54      ST  2717.0      45     2.7     1.5
           *

   55      KK  RLPC01   ROUTE FLOW THRU SUB 007
   56      RS       1    FLOW       0
   57      RC   0.070   0.050   0.070    1736   0.025
   58      RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
   59      RY     100    95.5    94.5      90      90    94.5    95.5     100
           *

   60      KK     007   BASIN
   61      BA   0.018
   62      LG    0.27    0.25    6.00    0.20      25
   63      UC   0.137   0.167
   64      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   65      UA     100
           *

   66      KK     C007 COMBINE HYDROGRPAHS FROM SUB 007 AND RLPC01
   67      HC       2
           *

   68      KK  LPC007   ROUTE INFLOW THRU STORAGE AREA
   69      KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
   70      KM           LOW FLOW OUTLET = 2-36" RCP
   71      RS       1    STOR     0.0
   72      SA    .001    .002    .004    .025    .040    .060    .100
   73      SQ       0      18      35      70     100     125     143
   74      SE    68.0    69.0    70.0    71.0    72.0    73.0    74.0
   75      ST    74.0      45     2.7     1.5
           *

   76      KK     003   BASIN
   77      BA   0.018
   78      LG    0.30    0.25    6.00    0.18       2
   79      UC   0.156   0.173
   80      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   81      UA     100
           *
1                                    HEC-1 INPUT                                              PAGE  3

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

   82      KK    R003   ROUTE FLOW THRU SUB 005
   83      RS       1    FLOW       0
   84      RC   0.070   0.050   0.070     470   0.023
   85      RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
   86      RY     100    92.5    91.5      90      90    91.5    92.5     100
           *

   87      KK     005   BASIN
   88      BA   0.007
   89      LG    0.27    0.25    6.00    0.20      23
   90      UC   0.134   0.162
   91      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   92      UA     100
           *

   93      KK     C005 COMBINE HYDROGRPAHS FROM SUB 005 AND R003
   94      HC       2
           *

   95      KK   RC005   ROUTE FLOW THRU SUB 006
   96      RS       1    FLOW       0
   97      RC   0.070   0.050   0.070     450   0.022
   98      RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
   99      RY     100    92.5    91.5      90      90    91.5    92.5     100
           *

  100      KK  LPC005   ROUTE INFLOW THRU STORAGE AREA
  101      KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  102      KM           LOW FLOW OUTLET = 2-24" RCP
  103      RS       1    STOR       0
  104      SA    .001    .002    .030    .090    .190    .271
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 105          SQ       0      10      26      42      52      62
 106          SE    83.0    84.0    85.0    86.0    87.0    88.0
 107          ST    88.0      45     2.7     1.5
              *

 108          KK     004   BASIN
 109          BA   0.013
 110          LG    0.30    0.25    6.00    0.18       3
 111          UC   0.167   0.199
 112          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 113          UA     100
              *

 114          KK    R004   ROUTE FLOW THRU SUB 006
 115          RS       1    FLOW       0
 116          RC   0.070   0.050   0.070     732   0.024
 117          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
 118          RY     100    92.5    91.5      90      90    91.5    92.5     100
              *
                                             HEC-1 INPUT                                               PAGE  4

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

 119          KK     006   BASIN
 120          BA   0.015
 121          LG    0.27    0.25    6.00    0.20      22
 122          UC   0.153   0.150
 123          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 124          UA     100
              *

 125          KK    C006 COMBINE HYDROGRAPHS FROM SUB 006 AND R004
 126          HC       2
              *

 127          KK  LPC006   ROUTE INFLOW THRU STORAGE AREA
 128          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 129          KM           LOW FLOW OUTLET - 30" RCP
 130          RS       1    STOR       0
 131          SA    .001    .007    .035    .070    .114    .171    .247
 132          SQ       0       6      18      30      38      45      51
 133          SE    80.0    81.0    82.0    83.0    84.0    85.0    86.0
 134          ST      86      45     2.7     1.5
              *

 135          KK     009   BASIN
 136          BA   0.007
 137          LG    0.27    0.25    6.00    0.20      25
 138          UC   0.137   0.167
 139          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 140          UA     100
              *

 141          KK    C009 COMBINE HYDROGRAPHS FROM SUB 009, LPC05, AND LPC06
 142          HC       3
              *

 143          KK  LPC009   ROUTE INFLOW THRU STORAGE AREA
 144          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 145          KM           LOW FLOW OUTLET = 2-36" RCP
 146          RS       1    STOR       0
 147          SA    .001    .010    .050    .107    .207    .305
 148          SQ       0      18      40      75     105     124
 149          SE    75.0    76.0    77.0    78.0    79.0    80.0
 150          ST    80.0      45     2.7     1.5
              *

 151          KK     012   BASIN
 152          BA   0.004
 153          LG    0.26    0.25    6.00    0.20      27
 154          UC   0.114   0.150
 155          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 156          UA     100
              *
1                                            HEC-1 INPUT                                               PAGE  5

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

 157          KK    C012 COMBINE HYDROGRAPHS SUB 012 AND LPC009
 158          HC       2
              *

 159          KK  LPC012   ROUTE INFLOW THRU STORAGE AREA
 160          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 161          KM           LOW FLOW OUTLET = 2-36" RCP
 162          RS       1    STOR       0
 163          SA    .001    .004    .021    .049    .084    .125    .180
 164          SQ       0      10      30      55      90     110     133
 165          SE    67.5    68.0    69.0    70.0    71.0    72.0    73.0
 166          ST    73.0      45     2.7     1.5
              *
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 167          KK     008   BASIN
 168          BA   0.003
 169          LG    0.27    0.25    6.00    0.20      25
 170          UC   0.142   0.295
 171          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 172          UA     100
              *

 173          KK     010   BASIN
 174          BA   0.003
 175          LG    0.27    0.25    6.00    0.20      19
 176          UC   0.121   0.166
 177          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 178          UA     100
              *

 179          KK    C010 COMBINE HYDROGRAPHS FROM SUB 008 AND SUB 010
 180          HC       2
              *

 181          KK   RC010   ROUTE FLOW THRU SUB 011
 182          RS       1    FLOW       0
 183          RC   0.070   0.050   0.070     390   0.020
 184          RX    1000    1001    1039    1045    1055    1061    1099    1100
 185          RY     100      93      92      90      90      92      93     100
              *

 186          KK     011   BASIN
 187          BA   0.005
 188          LG    0.26    0.25    6.00    0.20      25
 189          UC   0.132   0.157
 190          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 191          UA     100
              *
1                                             HEC-1 INPUT                                       PAGE  6

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

 192          KK    C011 COMBINE HYDROGRAPHS FROM SUB 011 AND RC010
 193          HC       2
              *

 194          KK   C013I COMBINE HYDROGRAPHS C011, LP012 AND LPC007
 195          HC       3
              *

 196          KK  LPC13I   ROUTE INFLOW THRU STORAGE AREA
 197          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 198          KM           LOW FLOW OUTLET = 10'w x 3'h RCB
 199          RS       1    STOR       0
 200          SA    .001    .005    .029    .082    .216    .432
 201          SQ       0      40      90     150     210     266
 202          SE    61.0    62.0    63.0    64.0    65.0    66.0
 203          ST    66.0      45     2.7     1.5
              *

 204          KK     013   BASIN
 205          BA   0.041
 206          LG    0.26    0.25    6.00    0.20      27
 207          UC   0.201   0.196
 208          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 209          UA     100
              *

 210          KK    C013 COMBINE HYDROGRAPHS FROM SUB 013 AND LPC13I
 211          HC       2
              *

 212          KK  LPC013   ROUTE INFLOW THRU STORAGE AREA
 213          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 214          KM           LOW FLOW OUTLET = 10'w x 3'h RCB
 215          RS       1    STOR       0
 216          SA    .001    .003    .005    .024    .100    .355
 217          SQ       0      40     100     160     220     272
 218          SE    55.8    57.0    58.0    59.0    60.0    61.0
 219          ST    61.0      45     2.7     1.5
              *

 220          KK  RLPC13   ROUTE FLOW THRU SUB 018
 221          RS       1    FLOW       0
 222          RC   0.045   0.040   0.045    2178   0.020
 223          RX    1000    1001    1010    1022    1032    1044    1053    1054
 224          RY    95.5    95.0    94.0    90.0    90.0    94.0    95.0    95.5
              *

 225          KK     014   BASIN
 226          BA   0.018
 227          LG    0.26    0.25    6.00    0.20      25
 228          UC   0.155   0.137
 229          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 230          UA     100
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LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          KK   LP014   ROUTE INFLOW THRU STORAGE AREA
          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
          KM           LOW FLOW OUTLET = 30" RCP
          RS       1    STOR       0
          SA    .001    .002    .003    .014    .054    .117
          SQ       0      10      22      33      42      48
          SE    64.5    66.0      67      68      69    70.0
          ST    70.0      45     2.7     1.5
          *

          KK   RLP014  ROUTE FLOW THRU SUB 015
          RS       1    FLOW       0
          RC   0.070   0.050   0.070    1764   0.021
          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
          RY     100    92.5    91.5      90      90    91.5    92.5     100
          *

          KK     016   BASIN
          BA   0.031
          LG    0.28    0.25    6.00    0.22      19
          UC   0.174   0.143
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   LP016   ROUTE INFLOW THRU STORAGE AREA
          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
          KM           LOW FLOW OUTLET = NONE
          RS       1    STOR       0
          SA   .0891    .939   1.154
          SQ       0       0     185
          SE    42.0    43.0    44.0
          *

          KK   RLP016  ROUTE FLOW THRU SUB 015
          RS       1    FLOW       0
          RC   0.070   0.050   0.070     730   0.016
          RX    1000    1001  1045.5    1050    1055  1059.5    1099    1100
          RY     100    92.5    91.5      90      90    91.5    92.5     100
          *

          KK     015   BASIN
          BA   0.060
          LG    0.28    0.25    6.00    0.20      30
          UC   0.220   0.194
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *
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LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          KK     017   BASIN
          BA   0.017
          LG    0.28    0.25    6.00    0.23      28
          UC   0.170   0.233
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   DV017    SPLIT HYDROGRAPH SB017. THAT PORTION INTERCEPTED BY DOUBLE CATCH
          KM            BASIN AND STORM DRAIN @ INTERSECTION OF 108TH WY AND GRAYTHORN DR
          KM            IS DIVERTED FROM PRE-DEVELOPED FLOW PATH TO SB065. FLOW-BY
          KM            HYDROGRAPH WILL BE LABELED "DR140" WHICH WILL BE RETRIEVED LATER
          KM            AND ROUTED THRU SB145 AS "RR145". DI-DQ RECORD IS FROM GILBERTSON
          KM            AND ASSOC PARCEL "J" HEC-1 MODEL 90092100.DAT DATED 01-29-96.
          DT   DR017
          *           KK  DIV1
          *           KM DIVERT 32 CFS TO CP2I
          *           DT  DIV1
          DI       0      32      45     100
          DQ       0      32      32      32
          *

          KK    C017 COMBINE HYDROGRAPHS FROM DV017, SUB 015, RLP016 AND RLP014
          HC       4
          *

          KK   RC017    "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL TO REFLECT
          KM            ANTICIPATED DEVELOPMENT.
          RS       1    FLOW       0
          RC   0.070   0.040   0.070     690   0.011
          RX    1000    1001  1025.0    1040    1055  1070.0    1099    1100
          RY     100    97.0    95.0      90      90    95.0    97.0     100
          *
```

```
 291             KK     018   BASIN
 292             BA   0.050
 293             LG    0.22    0.21    6.40    0.18      33
 294             UC   0.223   0.219
 295             UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 296             UA     100
                  *

 297             KK    C018 COMBINE HYDROGRAPHS FROM SUB 018, RC017 AND RLPC13
 298             KM    THIS IS TNP INFLOW FROM ALMA SCHOOL RD. CULVERT
 299             HC       3
                  *

 300             KK     019   BASIN
 301             BA   0.050
 302             LG    0.26    0.25    6.00    0.20      57
 303             UC   0.195   0.172
 304             UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 305             UA     100
                  *
1                                              HEC-1 INPUT                                              PAGE  9

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


 306             KK     020   BASIN
 307             BA   0.016
 308             LG    0.28    0.25    6.00    0.20      18
 309             UC   0.231   0.427
 310             UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 311             UA     100
                  *

 312             KK    C020 COMBINE HYDROGRAPHS FROM SUB 019 AND SUB 020
 313             HC       2
                  *

 314             KK   RC020    NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
 315             KM                  TO REFLECT EXISTING DEVELOPMENT.
 316             RS       1    FLOW       0
 317             RC   0.070   0.040   0.070     880   0.018
 318             RX    1000    1001    1034  1047.5  1052.5    1066    1099    1100
 319             RY     100    95.5    94.5      90      90    94.5    95.5     100
                  *

 320             KK     021   BASIN
 321             BA   0.024
 322             LG    0.26    0.25    6.00    0.20      56
 323             UC   0.184   0.200
 324             UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 325             UA     100
                  *

 326             KK    C021 COMBINE HYDROGRAPHS FROM SUB 021 AND RC020
 327             KM          THIS IS TNP INFLOW FROM C021
 328             HC       2
                  *

 329             KK     022   BASIN
 330             BA   0.067
 331             LG    0.29    0.25    6.00    0.19      10
 332             UC   0.244   0.272
 333             UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 334             UA     100
                  *

 335             KK   LP022   ROUTE INFLOW THRU STORAGE AREA
 336             KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 337             KM           LOW FLOW OUTLET = 4-24" RCP
 338             RS       1    STOR       0
 339             SA    .001    .004    .009    .011    .013    .060    .140
 340             SQ       0      17    48.5    79.5    97.0     113     127
 341             SE    71.0    72.0    73.0    74.0    75.0    76.0    77.0
 342             ST    77.0      45     2.7     1.5
                  *
1                                              HEC-1 INPUT                                              PAGE 10

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


 343             KK     023   BASIN
 344             BA   0.065
 345             LG    0.27    0.25    6.00    0.20      22
 346             UC   0.216   0.198
 347             UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 348             UA     100
                  *

 349             KK   LP023   ROUTE INFLOW THRU STORAGE AREA
 350             KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 351             KM           LOW FLOW OUTLET = 3-30" RCP
 352             RS       1    STOR       0
 353             SA    .001    .052    .288    .518    .751
```

```
354           SQ      0      15      48      84     113
355           SE   73.0    74.0    75.0    76.0    77.0
356           ST   77.0      45     2.7     1.5
              *

357           KK     C023 COMBINE HYDROGRAPHS FROM LP022 AND LP023
358           HC      2
              *

359           KK  RLPC23
360           RS      2    FLOW       0
361           RC  0.070   0.050   0.070    1235   0.022
362           RX   1000    1001    1034  1047.5  1052.5    1066    1099    1100
363           RY    100    95.5    94.5      90      90    94.5    95.5     100
              *

364           KK    024    BASIN
365           BA  0.017
366           LG   0.28    0.25    6.00    0.19      35
367           UC  0.173   0.189
368           UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
369           UA    100
              *

370           KK    C024 COMBINE HYDROGRAPHS FROM SUB 024 AND RLPC23
371           HC      2
              *

372           KK  LPC024    ROUTE INFLOW THRU STORAGE AREA
373           KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
374           KM            LOW FLOW OUTLET = NONE
375           RS      1    STOR       0
376           SA   .108    .346    .566    .815    1.05
377           SQ      0       0       0      56     230
378           SE   45.0    46.0    47.0    48.0    49.0
              *
1                                         HEC-1 INPUT                                                   PAGE 11

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

379           KK  RLPC24     NOTE: "n" VALUE AND GEOMETRY MODIFIED FROM PRE-DEVELOPED MODEL
380           KM                    TO REFLECT EXISTING DEVELOPMENT.
381           RS      3    FLOW       0
382           RC  0.070   0.040   0.070    1244   0.022
383           RX   1000    1001  1022.0    1040    1055  1073.0    1099    1100
384           RY    100    99.0    96.0      90      90    96.0    99.0     100
              *

385           KK    025    BASIN
386           BA  0.029
387           LG   0.26    0.25    6.00    0.20      57
388           UC  0.186   0.211
389           UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
390           UA    100
              *

391           KK    C025 COMBINE HYDROGRAPHS FROM SUB 025 AND RR
392           KM           THIS INP INFLOW FROM C025
393           HC      2
              *

394           KK    026    BASIN
395           BA  0.039
396           LG   0.28    0.25    6.00    0.19      11
397           UC  0.177   0.169
398           UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
399           UA    100
              *

400           KK  LP026     ROUTE INFLOW THRU STORAGE AREA
401           KM            SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
402           KM            LOW FLOW OUTLET = NONE
403           RS      1    STOR       0
404           SA   .142    .186    .210    .238
405           SQ      0       0       0      78
406           SE 2700.0  2701.0  2702.0  2703.0
              *

407           KK  RLP026
408           RS      4    FLOW       0
409           RC  0.070   0.050   0.070    2870   0.024
410           RX   1000    1001  1045.5    1050    1055  1059.5    1099    1100
411           RY    100    92.5    91.5      90      90    91.5    92.5     100
              *

412           KK    028    BASIN
413           BA  0.004
414           LG   0.30    0.25    6.00    0.20       9
415           UC  0.092   0.096
416           UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
417           UA    100
              *
```

```
1                                              HEC-1 INPUT                                              PAGE 12

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

          418          KK   LP028   ROUTE INFLOW THRU STORAGE AREA
          419          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
          420          KM           LOW FLOW OUTLET = NONE
          421          RS       1    STOR       0
          422          SA    .020    .067    .124    .181    .275
          423          SQ       0       0       0       0       0
          424          SE    28.0    29.0    30.0    31.0    32.0
          425          ST    32.0      41     2.7     1.5
                       *

          426          KK     030   BASIN
          427          BA   0.002
          428          LG    0.28    0.25    6.00    0.19      16
          429          UC   0.092   0.132
          430          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          431          UA     100
                       *

          432          KK   LP030   ROUTE INFLOW THRU STORAGE AREA
          433          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
          434          KM           LOW FLOW OUTLET = NONE
          435          RS       1    STOR       0
          436          SA    .001    .004    .013    .027    .046    .072
          437          SQ       0       0       0       0       0       0
          438          SE    11.0    12.0    13.0    14.0    15.0    16.0
          439          ST    16.0      45     2.7     1.5
                       *

          440          KK     029   BASIN
          441          BA   0.005
          442          LG    0.28    0.25    6.00    0.19      13
          443          UC   0.135   0.218
          444          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          445          UA     100
                       *

          446          KK    C029 COMBINE HYDROGRAPHS FROM SUB 029, LP028 AND LP029
          447          HC       3
                       *

          448          KK  LPC029   ROUTE INFLOW THRU STORAGE AREA
          449          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
          450          KM           LOW FLOW OUTLET = 24" RCP
          451          RS       1    STOR       0
          452          SA    .001    .002    .010    .039    .067    .100    .148
          453          SQ       0      13      20      26      31      35      38
          454          SE      01      03      04      05      06      07      08
          455          ST      08      40     2.7     1.5
                       *
1                                              HEC-1 INPUT                                              PAGE 13

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

          456          KK     027   BASIN
          457          BA   0.024
          458          LG    0.30    0.25    6.00    0.18       2
          459          UC   0.169   0.191
          460          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          461          UA     100
                       *

          462          KK     031   BASIN
          463          BA   0.010
          464          LG    0.30    0.25    6.00    0.18       2
          465          UC   0.126   0.130
          466          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          467          UA     100
                       *

          468          KK    C031 COMBINE HYDROGRAPHS FROM SUB 027, SUB 031 AND LPC029
          469          HC       3
                       *

          470          KK   RC031
          471          KM          ROUTE FLOW THRU SUB 032
          472          RS       4    FLOW       0
          473          RC   0.070   0.050   0.070     894   0.019
          474          RX    1000    1001    1039    1045    1055    1061    1099    1100
          475          RY     100      93      92      90      90      92      93     100
                       *

          476          KK     032   BASIN
          477          BA   0.014
          478          LG    0.27    0.25    6.00    0.20      21
          479          UC   0.161   0.201
          480          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          481          UA     100
```

```
                     *

  482                KK     C032 COMBINE HYDROGRAPHS FROM SUB 032 AND RC031
  483                HC        2
                     *

  484                KK  LPC032     ROUTE INFLOW THRU STORAGE AREA
  485                KM             SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
  486                KM             LOW FLOW OUTLET = 42" RCP
  487                RS       1     STOR       0
  488                SA    .001     .007    .070    .136    .270
  489                SQ       0       11      23      46      63
  490                SE    77.0     78.0    79.0    80.0    81.0
  491                ST    81.0       45     2.7     1.5
                     *
1                                               HEC-1 INPUT                                                         PAGE 14

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


  492                KK  RLPC32
  493                KM            ROUTE FLOW THRU SUB 033
  494                RS       4     FLOW       0
  495                RC   0.070    0.050   0.070    2176   0.021
  496                RX    1000     1001    1039    1045    1055    1061    1099    1100
  497                RY     100       93      92      90      90      92      93     100
                     *

  498                KK     033     BASIN
  499                BA   0.147
  500                LG    0.27     0.25    6.00    0.20      36
  501                UC   0.270    0.216
  502                UA       0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  503                UA     100
                     *

  504                KK     C033 COMBINE HYDROGRAPHS FROM SUB 033, RLPC32 AND RLP026
  505                HC       3
                     *

  506                KK     034     BASIN
  507                BA   0.093
  508                LG    0.30     0.25    6.00    0.18       1
  509                UC   0.206    0.169
  510                UA       0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  511                UA     100
                     *

  512                KK    R034     ROUTE FLOW THRU SUB 035
  513                RS       1     FLOW       0
  514                RC   0.045    0.040   0.045    2178   0.020
  515                RX    1000     1001    1010    1022    1032    1044    1053    1054
  516                RY    95.5     95.0    94.0    90.0    90.0    94.0    95.0    95.5
                     *

  517                KK     035     BASIN
  518                BA   0.022
  519                LG    0.30     0.23    6.20    0.17       5
  520                UC   0.144    0.145
  521                UA       0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  522                UA     100
                     *

  523                KK     036     BASIN
  524                BA   0.008
  525                LG    0.29     0.23    6.20    0.18      23
  526                UC   0.110    0.127
  527                UA       0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  528                UA     100
                     *
1                                               HEC-1 INPUT                                                         PAGE 15

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


  529                KK     C036 COMBINE HYDROGRAPHS FROM SUB 035, SUB 036, C033 AND R034
  530                KM          THIS IS TNP INFLOW FROM C036
  531                HC       4
                     *

  532                KK     037     BASIN
  533                BA   0.041
  534                LG    0.30     0.23    6.20    0.17       1
  535                UC   0.143    0.108
  536                UA       0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  537                UA     100
                     *

  538                KK     C037 COMBINE ALL HYDROGRAPHS
  539                KM          THIS REPRESENTS TOTAL INFLOW TO BASIN No.1
  540                HC       5
  541                ZW       A=TROON         B=INFLOW        C=FLOW
                     *
```

```
 542        KK  DET#1    ROUTE INFLOW THRU DET BASIN #1 (UPPER BASIN)
 543        KM           LOW FLOW OUTLET = 4-42" RCP
 544        KM           INLET INVERT ELEV = 2598.80
 545        KM           OUTLET INVERT ELEV = 2592.0
 546        KM           SPILLWAY ELEV = 2610.0
 547        KM           WEIR LENGTH = 50'
 548        RS       1   STOR     0.0
 549        SA   0.023   0.11    0.49    1.23    3.50    4.00    4.24    4.57    4.85    5.33
 550        SA    5.95   6.67    7.80    8.95
 551        SQ       0     45   103.5     185     264   328.5     382   428.5     470     507
 552        SQ     543    575     725     999
 553        SE    2599   2600    2601    2602    2603    2604    2605    2606    2607    2608
 554        SE    2609   2610    2611    2612
 555        ZW       A=TROON        B=DET#1        C=FLOW
            *

 556        KK  DET#2    ROUTE INFLOW THRU DET BASIN #2 (LOWER BASIN)
 557        KM           LOW FLOW OUTLET = 1-60" RCP
 558        KM           INLET INVERT ELEV = 2590.36
 559        KM           OUTLET INVERT ELEV = 2589.95
 560        KM           SPILLWAY ELEV = 2607.0
 561        KM           WEIR LENGTH = 35'
 562        RS       1   STOR     0.0
 563        SA   0.023  0.048   0.496   0.876    1.12    1.28    1.41    1.56    1.70    1.82
 564        SA    1.93   2.04    2.36    2.49    2.61    2.77    2.93    3.26
 565        SQ       0   11.5      29      47      78   112.5     148     177     204     226
 566        SQ     248    266     283   300.5     315     330     345     378
 567        SE  2590.3   2591    2592    2593    2594    2595    2596    2597    2598    2599
 568        SE    2600   2601    2602    2603    2604    2605    2606    2607
 569        ST    2607     35     3.0     1.5
 570        ZW       A=TROON        B=DET#2        C=FLOW
            *
            *  ************************************************************************************
            *  *****************                                              *****************
            *  *****************  START CAVALLIERE FLATS MODEL CHANGES        *****************
            *  *****************                                              *****************
            *  ************************************************************************************
            *
1                                       HEC-1 INPUT                                                PAGE 16

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

 571        KK  DDET#2
 572        KM  Outlet channel capacity is 348 cfs. Divert overtopping flow.
 573        DT    OVER
 574        DI       0    348  348.1   10000
 575        DQ       0      0    0.1    9652
            *
            *  ************************************************************************************
            *  *****************                                              *****************
            *  *****************   END CAVALLIERE FLATS MODEL CHANGES         *****************
            *  *****************                                              *****************
            *  ************************************************************************************
            *

 576        KK  RDET#2   ROUTE FLOW THRU SUB 042
 577        KM           OUTLET CHANNEL TROON NORTH PARK BASIN
 578        RS       1   FLOW       0
 579        RC   0.040  0.035   0.040     594   0.010
 580        RX     990    992     994    1000    1010    1016    1018    1020
 581        RY    14.0   13.5    13.0    10.0    10.0    13.0    13.5    14.0
            *
            *  ************************************************************************************
            *  ************************************************************************************
            *                   STARTS DOWNSTREAM OFFSITE AREAS MODEL
            *
            *  ************************************************************************************
            *  ************************************************************************************
            *

 582        KK     038   BASIN
 583        BA   0.047
 584        LG    0.28   0.25    6.00    0.21      26
 585        UC   0.234  0.266
 586        UA       0    5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 587        UA     100
            *

 588        KK   LP038   ROUTE INFLOW THRU STORAGE AREA
 589        KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 590        KM           LOW FLOW OUTLET = 3-36" RCP
 591        RS       1   STOR       0
 592        SA    .001   .007    .047    .086    .160
 593        SQ       0     33      82     132     165
 594        SE    24.6   26.0    27.0    28.0    29.0
 595        ST    29.0     45     2.7     1.5
            *

 596        KK     040   BASIN
 597        BA   0.018
 598        LG    0.26   0.25    6.00    0.20      49
```

```
 599          UC   0.184   0.202
 600          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 601          UA     100
              *
1                                      HEC-1 INPUT                                              PAGE 17

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


 602          KK    C040 COMBINE HYDROGRAPHS FROM SUB 040 AND LP038
 603          HC       2
              *

 604          KK   LP040   ROUTE INFLOW THRU STORAGE AREA
 605          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 606          KM           LOW FLOW OUTLET = 3-36" RCP
 607          RS       1    STOR       0
 608          SA    .001    .024    .077    .127
 609          SQ       0      82     132     165
 610          SE    06.6    09.0    10.0    11.0
 611          ST    11.0      45     2.7     1.5
              *

 612          KK  RLP040    ROUTE FLOW THRU SUB 042
 613          RS       1    FLOW       0
 614          RC   0.045   0.040   0.045     927   0.016
 615          RX     990     992     994    1000    1012    1018    1020    1022
 616          RY    13.2    13.1    13.0    10.0    10.0    13.0    13.1    13.2
              *

 617          KK     042   BASIN
 618          BA   0.020
 619          LG    0.27    0.25    6.00    0.20      20
 620          UC   0.289   0.433
 621          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 622          UA     100
              *

 623          KK    C042 COMBINE HYDROGRAPHS FROM RDET#2, SUB 042 AND RLP040
 624          HC       3
 625          ZW      A=PVISTA        B=C042          C=FLOW
              *

 626          KK     039   BASIN
 627          BA   0.035
 628          LG    0.26    0.25    6.00    0.20      39
 629          UC   0.225   0.292
 630          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 631          UA     100
              *

 632          KK   LP039   ROUTE INFLOW THRU STORAGE AREA
 633          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 634          KM           LOW FLOW OUTLET = 3-30" RCP
 635          RS       1    STOR       0
 636          SA    .001    .007    .015    .024    .037
 637          SQ       0      49      84     112     135
 638          SE    17.0    19.0    20.0    21.0    22.0
 639          ST    22.0      45     2.7     1.5
              *
1                                      HEC-1 INPUT                                              PAGE 18

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


 640          KK     041   BASIN
 641          BA   0.011
 642          LG    0.28    0.25    6.00    0.19      33
 643          UC   0.231   0.353
 644          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 645          UA     100
              *

 646          KK    C041 COMBINE HYDROGRAPHS FROM SUB 041 AND LP039
 647          HC       2
              *

 648          KK   LP041   ROUTE INFLOW THRU STORAGE AREA
 649          KM           SURFACE AREA-ELEVATION RELATIONSHIPS FROM COS GIS MAPS
 650          KM           LOW FLOW OUTLET = 3-30" RCP
 651          RS       1    STOR       0
 652          SA    .001    .020    .039    .072    .104
 653          SQ       0      14      49      84     113
 654          SE    07.0    08.0    09.0    10.0    11.0
 655          ST    11.0      45     2.7     1.5
              *

 656          KK  RLP041    ROUTE FLOW THRU SUB 041/042
 657          RS       1    FLOW       0
 658          RC   0.045   0.040   0.045    1314   0.017
 659          RX     990     992     994    1000    1008    1014    1016    1018
 660          RY    13.2    13.1    13.0    10.0    10.0    13.0    13.1    13.2
              *
```

```
 661           KK     043   BASIN
 662           BA   0.008
 663           LG    0.26    0.25    6.00    0.20      29
 664           UC   0.183   0.290
 665           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 666           UA     100
               *

 667           KK    C043 COMBINE HYDROGRAPHS FROM SUB 043 AND RLP041
 668           HC       2
 669           ZW       A=PVISTA       B C043         C=FLOW
               *

 670           KK    COMB COMBINE HYDROGRAPHS FROM C042 AND C043
 671           KM          THIS REPRESENTS COMBINED FLOWS AT PINNACLE VISTA ROAD
 672           HC       2
 673           ZW       A=PVISTA       B=COMB         C=FLOW
               *
               *  ****************************************************************************
               *  ******************                                      ******************
               *  ******************   START CAVALLIERE FLATS MODEL CHANGES   ******************
               *  ******************                                      ******************
               *  ****************************************************************************
               *
               *
1                                            HEC-1 INPUT                                          PAGE 19

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


 674           KK    RCF1   ROUTE
 675           RS       1    FLOW
 676           RC   0.035   0.035   0.035     690  0.0200    0.00
 677           RX    0.00   30.00   67.50   72.50   77.50   82.50  120.00  150.00
 678           RY    3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
               *

 679           KK     CF1   BASIN
 680           BA   0.016
 681           LG    0.25    0.25    6.00    0.21      62
 682           UC   0.136   0.132
 683           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 684           UA     100
               *

 685           KK   CCF1A COMBINE
 686           HC       2
               *

 687           KK  ODET#2
 688           KM  Retrieve flow overtopping Troon North Park Basin outlet channel
 689           DR    OVER
               *

 690           KK   RCF2A   ROUTE
 691           RS       1    FLOW
 692           RC   0.035   0.035   0.035     990  0.0200    0.00
 693           RX    0.00   20.00   40.00   45.00   55.00   60.00   80.00  100.00
 694           RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
               *

 695           KK    CF2A   BASIN
 696           BA   0.012
 697           LG    0.28    0.25    5.85    0.20      35
 698           UC   0.130   0.116
 699           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 700           UA     100
               *

 701           KK    OFF1   BASIN
 702           BA   0.307
 703           LG    0.32    0.31    6.00    0.17       9
 704           UC   0.356   0.267
 705           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 706           UA     100
               *

 707           KK   RCF2B   ROUTE
 708           RS       1    FLOW
 709           RC   0.035   0.035   0.035     530  0.0270    0.00
 710           RX    0.00   15.00   30.00   35.00   90.00   95.00  110.00  125.00
 711           RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
               *
1                                            HEC-1 INPUT                                          PAGE 20

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


 712           KK    CF2B   BASIN
 713           BA   0.002
 714           LG    0.10    0.40    6.00    0.15       0
 715           UC   0.105   0.167
```

```
 716      UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 717      UA    100
          *

 718      KK  CCF2B COMBINE
 719      HC      2
          *

 720      KK  CCF2A COMBINE
 721      HC      3
          *

 722      KK  CCF1B COMBINE
 723      HC      2
          *

 724      KK   RCF3   ROUTE
 725      RS      1    FLOW
 726      RC  0.035   0.035   0.035     795  0.0380    0.00
 727      RX   0.00   35.00   80.50  100.00  106.00  125.50  565.00  600.00
 728      RY   5.00    4.00    3.00    0.00    0.00    3.00    4.00    5.00
          *

 729      KK    CF3   BASIN
 730      BA  0.028
 731      LG   0.25    0.25    5.71    0.24      52
 732      UC  0.146   0.100
 733      UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 734      UA    100
          *

 735      KK   CCF3 COMBINE
 736      HC      2
          *

 737      KK   OFF2   BASIN
 738      BA  0.011
 739      LG   0.30    0.25    6.00    0.17       6
 740      UC  0.135   0.161
 741      UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 742      UA    100
          *

 743      KK  RCF4A   ROUTE
 744      RS      1    FLOW
 745      RC  0.035   0.035   0.035    1230  0.0250    0.00
 746      RX   0.00   25.00   50.00   55.00   65.00   70.00   95.00  120.00
 747      RY   3.00    2.50    2.00    0.00    0.00    2.00    2.50    3.00
          *
1                                    HEC-1 INPUT                                         PAGE 21

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


 748      KK   CF4A   BASIN
 749      BA  0.007
 750      LG   0.13    0.38    6.00    0.15       1
 751      UC  0.118   0.135
 752      UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 753      UA    100
          *

 754      KK   OFF3   BASIN
 755      BA  0.007
 756      LG   0.33    0.34    6.00    0.17       3
 757      UC  0.165   0.243
 758      UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 759      UA    100
          *

 760      KK  COFF3 COMBINE
 761      HC      3
          *

 762      KK   CF4B   BASIN
 763      BA  0.005
 764      LG   0.25    0.25    5.24    0.30      36
 765      UC  0.126   0.140
 766      UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 767      UA    100
          *

 768      KK  CCF4B COMBINE
 769      HC      2
          *

 770      KK   OFF4   BASIN
 771      BA  0.061
 772      LG   0.32    0.32    6.00    0.17      12
 773      UC  0.216   0.200
 774      UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 775      UA    100
          *
```

```
          776           KK    OFF5   BASIN
          777           BA   0.009
          778           LG    0.35    0.35    4.65    0.33       2
          779           UC   0.219   0.342
          780           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          781           UA     100
                        *

          782           KK   COFF4 COMBINE
          783           HC       2
                        *
1                                                    HEC-1 INPUT                                                    PAGE 22

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

          784           KK    RCF6   ROUTE
          785           RS       1    FLOW
          786           RC   0.035   0.035   0.035     270  0.0300    0.00
          787           RX    0.00   50.00  100.00  105.00  115.00  120.00  170.00  220.00
          788           RY    1.00    0.75    0.50    0.00    0.00    0.50    0.75    1.00
                        *

          789           KK     CF6   BASIN
          790           BA   0.004
          791           LG    0.25    0.25    5.05    0.33      36
          792           UC   0.167   0.202
          793           UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          794           UA     100
                        *

          795           KK    CCF6 COMBINE
          796           HC       2
                        *
          797           ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING            (--->) DIVERSION OR PUMP FLOW

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

   21          001
                .
                .
   31           .         002
                .           V
                .           V
   37           .       LP002
                .           .
                .           .
   45         C001............
                V
                V
   47       LPC001
                V
                V
   55       RLPC01
                .
                .
   60           .         007
                .           .
                .           .
   66         C007............
                V
                V
   68       LPC007
                .
                .
   76           .         003
                .           V
                .           V
   82           .        R003
                .           .
                .           .
   87           .           .         005
                .           .           .
                .           .           .
   93           .        C005............
                .           V
                .           V
   95           .       RC005
                .           V
                .           V
  100           .      LPC005
                .           .
                .           .
  108           .           .         004
                .           .           V
                .           .           V
  114           .           .        R004
                .           .           .
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 119            .             .             .            006
                .             .             .             .
                .             .             .             .
 125            .             .           C006............
                .             .             V
                .             .             V
 127            .             .          LPC006
                .             .             .
                .             .             .
 135            .             .             .            009
                .             .             .             .
                .             .             .             .
 141            .           C009.......................
                .             V
                .             V
 143            .          LPC009
                .             .
                .             .
 151            .             .            012
                .             .             .
                .             .             .
 157            .           C012............
                .             V
                .             V
 159            .          LPC012
                .             .
                .             .
 167            .             .            008
                .             .             .
                .             .             .
 173            .             .             .            010
                .             .             .             .
                .             .             .             .
 179            .             .           C010............
                .             .             V
                .             .             V
 181            .             .           RC010
                .             .             .
                .             .             .
 186            .             .             .            011
                .             .             .             .
                .             .             .             .
 192            .             .           C011............
                .             .             .
                .             .             .
 194         C0131.......................
                V
                V
 196         LPC131
                .
                .
 204            .            013
                .             .
                .             .
 210          C013............
                V
                V
 212         LPC013
                V
                V
 220         RLPC13
                .
                .
 225            .            014
                .             V
                .             V
 231            .           LP014
                .             V
                .             V
 239            .          RLP014
                .             .
                .             .
 244            .             .            016
                .             .             V
                .             .             V
 250            .             .           LP016
                .             .             V
                .             .             V
 257            .             .          RLP016
                .             .             .
                .             .             .
 262            .             .             .            015
                .             .             .             .
                .             .             .             .
 268            .             .             .             .            017
                .             .             .             .             .
                .             .             .             .             .
 280            .             .             .             .             .-------->     DR017
 274            .             .             .             .           DV017
                .             .             .             .             .
                .             .             .             .             .
 283            .           C017...................................
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               .           V
               .           V
285            .       RC017
               .           .
               .           .
291            .           .         018
               .           .           .
               .           .           .
297         C018........................

               .
               .
300            .         019
               .           .
               .           .
306            .           .         020
               .           .           .
               .           .           .
312            .        C020............
               .           V
               .           V
314            .       RC020
               .           .
               .           .
320            .           .         021
               .           .           .
               .           .           .
326            .        C021............
               .           .
               .           .
329            .           .         022
               .           .           V
               .           .           V
335            .           .       LP022
               .           .           .
               .           .           .
343            .           .           .         023
               .           .           .           V
               .           .           .           V
349            .           .           .       LP023
               .           .           .           .
               .           .           .           .
357            .           .        C023............
               .           .           V
               .           .           V
359            .           .      RLPC23
               .           .           .
               .           .           .
364            .           .           .         024
               .           .           .           .
               .           .           .           .
370            .           .        C024............
               .           .           V
               .           .           V
372            .           .      LPC024
               .           .           V
               .           .           V
379            .           .      RLPC24
               .           .           .
               .           .           .
385            .           .           .         025
               .           .           .           .
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391            .           .        C025............
               .           .           .
               .           .           .
394            .           .           .         026
               .           .           .           V
               .           .           .           V
400            .           .           .       LP026
               .           .           .           V
               .           .           .           V
407            .           .           .      RLP026
               .           .           .           .
               .           .           .           .
412            .           .           .           .         028
               .           .           .           .           V
               .           .           .           .           V
418            .           .           .           .       LP028
               .           .           .           .           .
               .           .           .           .           .
426            .           .           .           .           .         030
               .           .           .           .           .           V
               .           .           .           .           .           V
432            .           .           .           .           .       LP030
               .           .           .           .           .           .
               .           .           .           .           .           .
440            .           .           .           .           .           .         029
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               .           .           .           .           .           .           .
446            .           .           .           .        C029........................
               .           .           .           .           V
               .           .           .           .           V
448            .           .           .           .      LPC029
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            .         .         .         .         .
456         .         .         .         .         .       027
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462         .         .         .         .         .         .       031
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            .         .         .         .         .         .         .
468         .         .         .         .      C031........................
            .         .         .         .         V
            .         .         .         .         V
470         .         .         .         .     RC031
            .         .         .         .         .
            .         .         .         .         .
476         .         .         .         .         .       032
            .         .         .         .         .         .
            .         .         .         .         .         .
482         .         .         .         .      C032..........
            .         .         .         .         V
            .         .         .         .         V
484         .         .         .         .    LPC032
            .         .         .         .         V
            .         .         .         .         V
492         .         .         .         .    RLPC32
            .         .         .         .         .
            .         .         .         .         .
498         .         .         .         .         .       033
            .         .         .         .         .         .
            .         .         .         .         .         .
504         .         .         .      C033....................
            .         .         .         .
            .         .         .         .
506         .         .         .         .       034
            .         .         .         .         V
            .         .         .         .         V
512         .         .         .         .      R034
            .         .         .         .         .
            .         .         .         .         .
517         .         .         .         .         .       035
            .         .         .         .         .         .
            .         .         .         .         .         .
523         .         .         .         .         .         .       036
            .         .         .         .         .         .         .
            .         .         .         .         .         .         .
529         .         .         .      C036..............................
            .         .         .         .
            .         .         .         .
532         .         .         .         .       037
            .         .         .         .         .
            .         .         .         .         .
538      C037........................................
            V
            V
542     DET#1
            V
            V
556     DET#2
            .
            .
573         .------->    OVER
571    DDET#2
            V
            V
576    RDET#2
            .
            .
582         .       038
            .         V
            .         V
588         .     LP038
            .         .
            .         .
596         .         .       040
            .         .         .
            .         .         .
602         .      C040..........
            .         V
            .         V
604         .     LP040
            .         V
            .         V
612         .    RLPC40
            .         .
            .         .
617         .         .       042
            .         .         .
            .         .         .
623      C042....................
            .
            .
626         .       039
            .         V
            .         V
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     632           .       LP039
                   .           .
                   .           .
     640           .           .         041
                   .           .           .
                   .           .           .
     646           .        C041............
                   .           V
                   .           V
     648           .       LP041
                   .           V
                   .           V
     656           .      RLP041
                   .           .
                   .           .
     661           .           .         043
                   .           .           .
                   .           .           .
     667           .        C043............
                   .           .
                   .           .
     670        COMB............
                   V
                   V
     674        RCF1
                   .
                   .
     679           .         CF1
                   .           .
                   .           .
     685       CCF1A............
                   .
                   .
     689           .           .<-------    OVER
     687           .      ODET#2
                   .           V
                   .           V
     690           .       RCF2A
                   .           .
                   .           .
     695           .           .        CF2A
                   .           .           .
                   .           .           .
     701           .           .           .        OFF1
                   .           .           .           V
                   .           .           .           V
     707           .           .           .       RCF2B
                   .           .           .           .
                   .           .           .           .
     712           .           .           .           .        CF2B
                   .           .           .           .           .
                   .           .           .           .           .
     718           .           .           .       CCF2B............
                   .           .           .           .
                   .           .           .           .
     720           .       CCF2A........................
                   .           .
                   .           .
     722       CCF1B............
                   V
                   V
     724        RCF3
                   .
                   .
     729           .         CF3
                   .           .
                   .           .
     735        CCF3............
                   .
                   .
     737           .        OFF2
                   .           V
                   .           V
     743           .       RCF4A
                   .           .
                   .           .
     748           .           .        CF4A
                   .           .           .
                   .           .           .
     754           .           .           .        OFF3
                   .           .           .           .
                   .           .           .           .
     760           .       COFF3........................
                   .           .
                   .           .
     762           .           .        CF4B
                   .           .           .
                   .           .           .
     768           .       CCF4B............
                   .           .
                   .           .
     770           .           .        OFF4
                   .           .           .
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 776          .              .              .          OFF5
              .              .              .              .
              .              .              .              .
 782          .              .           COFF4............
              .              .              V
              .              .              V
 784          .              .           RCF6
              .              .              .
              .              .              .
 789          .              .              .           CF6
              .              .              .              .
              .              .              .              .
 795          .              .           CCF6............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                    ******************************************
*                                        *                    *                                        *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                    *  U.S. ARMY CORPS OF ENGINEERS          *
*          JUN   1998                    *                    *  HYDROLOGIC ENGINEERING CENTER         *
*       VERSION 4.1                      *                    *  609 SECOND STREET                     *
*                                        *                    *  DAVIS, CALIFORNIA 95616               *
* RUN DATE   21AUG14  TIME  15:10:36     *                    *  (916) 756-1104                        *
*                                        *                    *                                        *
******************************************                    ******************************************

                        Cavalliere Flats Rezoning
                        City of Scottsdale
                        Prepared by: Kimley-Horn and Associates, Inc.

                        Proposed Conditions model
                        100-year, 6-hour Storm event

                        Based on Troon North Park Model:

                           PROJECT NAME: TROON NORTH PARK                      JOB#: 236-08
                           PREPARED FOR: CITY OF SCOTTSDALE
                           PREPARED BY : ARGUS CONSULTING, P.C.

                           FILE NAME   : TNP100YR.DAT
                           STORM EVENT : 100-YR/6-HR
                           Unit Hydrograph: Clark
                           01/24/2011

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

   IT         HYDROGRAPH TIME DATA
                   NMIN             5  MINUTES IN COMPUTATION INTERVAL
                   IDATE       6JUN99  STARTING DATE
                   ITIME         0000  STARTING TIME
                   NQ            2000  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     12JUN99  ENDING DATE
                   NDTIME        2235  ENDING TIME
                   ICENT           19  CENTURY MARK

              COMPUTATION INTERVAL      .08 HOURS
                   TOTAL TIME BASE   166.58 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
 -----DSS---ZOPEN:  Existing File Opened,  File: 01-100.DSS
                    Unit:  71;  DSS Version: 6-JG
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/INFLOW/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#1/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/06JUN1999/5MIN//
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-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.   14:  /TROON/DET#2/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C042/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/C043/FLOW/12JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/05JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/06JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/07JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/08JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/09JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/10JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/11JUN1999/5MIN//
-----DSS---ZWRITE Unit  71; Vers.    6:  /PVISTA/COMB/FLOW/12JUN1999/5MIN//
1
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	001	185.	4.08	20.	5.	2.	.11		
HYDROGRAPH AT	002	25.	4.08	3.	1.	0.	.02		
ROUTED TO	LP002	24.	4.08	3.	1.	0.	.02	2724.63	4.08
2 COMBINED AT	C001	209.	4.08	23.	6.	2.	.13		
ROUTED TO	LPC001	206.	4.08	23.	6.	2.	.13	2717.79	4.08
ROUTED TO	RLPC01	200.	4.17	23.	6.	2.	.13	92.53	4.17
HYDROGRAPH AT	007	36.	4.00	4.	1.	0.	.02		
2 COMBINED AT	C007	226.	4.17	26.	7.	2.	.15		
ROUTED TO	LPC007	222.	4.08	26.	7.	2.	.15	74.67	4.08
HYDROGRAPH AT	003	34.	4.00	3.	1.	0.	.02		
ROUTED TO	R003	34.	4.08	3.	1.	0.	.02	91.08	4.08
HYDROGRAPH AT	005	14.	4.00	1.	0.	0.	.01		
2 COMBINED AT	C005	47.	4.08	5.	1.	0.	.02		
ROUTED TO	RC005	47.	4.08	5.	1.	0.	.02	91.27	4.08
ROUTED TO	LPC005	44.	4.17	5.	1.	0.	.02	86.16	4.17
HYDROGRAPH AT	004	23.	4.00	2.	1.	0.	.01		

ROUTED TO	R004	23.	4.08	2.	1.	0.	.01	90.84	4.08
HYDROGRAPH AT	006	31.	4.00	3.	1.	0.	.01		
2 COMBINED AT	C006	52.	4.08	5.	1.	0.	.03		
ROUTED TO	LPC006	43.	4.17	5.	1.	0.	.03	84.78	4.17
HYDROGRAPH AT	009	14.	4.00	1.	0.	0.	.01		
3 COMBINED AT	C009	99.	4.08	11.	3.	1.	.06		
ROUTED TO	LPC009	96.	4.17	11.	3.	1.	.06	78.71	4.17
HYDROGRAPH AT	012	8.	4.00	1.	0.	0.	.00		
2 COMBINED AT	C012	102.	4.17	12.	3.	1.	.06		
ROUTED TO	LPC012	100.	4.25	12.	3.	1.	.06	71.49	4.25
HYDROGRAPH AT	008	5.	4.08	1.	0.	0.	.00		
HYDROGRAPH AT	010	6.	4.00	1.	0.	0.	.00		
2 COMBINED AT	C010	11.	4.00	1.	0.	0.	.01		
ROUTED TO	RC010	10.	4.08	1.	0.	0.	.01	90.36	4.08
HYDROGRAPH AT	011	10.	4.00	1.	0.	0.	.00		
2 COMBINED AT	C011	20.	4.08	2.	1.	0.	.01		
3 COMBINED AT	C013I	338.	4.17	41.	10.	3.	.22		
ROUTED TO	LPC13I	338.	4.17	41.	10.	3.	.22	66.51	4.17
HYDROGRAPH AT	013	76.	4.08	9.	2.	1.	.04		
2 COMBINED AT	C013	402.	4.17	49.	12.	4.	.26		
ROUTED TO	LPC013	392.	4.25	50.	12.	4.	.26	61.76	4.25
ROUTED TO	RLPC13	378.	4.25	50.	12.	4.	.26	92.68	4.25
HYDROGRAPH AT	014	38.	4.00	4.	1.	0.	.02		
ROUTED TO	LP014	37.	4.08	4.	1.	0.	.02	68.40	4.08
ROUTED TO	RLP014	33.	4.08	4.	1.	0.	.02	91.08	4.08
HYDROGRAPH AT	016	62.	4.00	6.	1.	0.	.03		
ROUTED TO	LP016	59.	4.08	5.	1.	0.	.03	43.32	4.08

+	ROUTED TO	RLP016	56.	4.17	5.	1.	0.	.03	91.51	4.17
+	HYDROGRAPH AT	015	112.	4.08	13.	3.	1.	.06		
+	HYDROGRAPH AT	017	29.	4.08	4.	1.	0.	.02		
+	DIVERSION TO	DR017	29.	.00	4.	1.	0.	.02		
+	HYDROGRAPH AT	DV017	0.	.00	0.	0.	0.	.02		
+	4 COMBINED AT	C017	199.	4.08	22.	5.	2.	.13		
+	ROUTED TO	RC017	195.	4.08	22.	5.	2.	.13	91.87	4.08
+	HYDROGRAPH AT	018	92.	4.08	11.	3.	1.	.05		
+	3 COMBINED AT	C018	610.	4.17	83.	21.	7.	.44		
+	HYDROGRAPH AT	019	102.	4.00	13.	3.	1.	.05		
+	HYDROGRAPH AT	020	20.	4.08	3.	1.	0.	.02		
+	2 COMBINED AT	C020	122.	4.08	16.	4.	1.	.07		
+	ROUTED TO	RC020	122.	4.08	16.	4.	1.	.07	91.94	4.08
+	HYDROGRAPH AT	021	47.	4.08	6.	2.	1.	.02		
+	2 COMBINED AT	C021	169.	4.08	22.	6.	2.	.09		
+	HYDROGRAPH AT	022	105.	4.08	12.	3.	1.	.07		
+	ROUTED TO	LP022	104.	4.08	12.	3.	1.	.07	75.45	4.08
+	HYDROGRAPH AT	023	118.	4.08	13.	3.	1.	.06		
+	ROUTED TO	LP023	97.	4.17	13.	3.	1.	.06	76.45	4.17
+	2 COMBINED AT	C023	199.	4.17	25.	6.	2.	.13		
+	ROUTED TO	RLPC23	198.	4.17	25.	6.	2.	.13	92.60	4.17
+	HYDROGRAPH AT	024	33.	4.00	4.	1.	0.	.02		
+	2 COMBINED AT	C024	225.	4.17	29.	7.	2.	.15		
+	ROUTED TO	LPC024	218.	4.25	28.	7.	2.	.15	48.93	4.25
+	ROUTED TO	RLPC24	219.	4.25	28.	7.	2.	.15	91.65	4.25
+	HYDROGRAPH AT	025	56.	4.08	8.	2.	1.	.03		
+	2 COMBINED AT	C025	258.	4.25	36.	9.	3.	.18		
+	HYDROGRAPH AT	026	74.	4.00	7.	2.	1.	.04		
	ROUTED TO									

	LP026	74.	4.08	7.	2.	1.	.04	2702.94	4.08
ROUTED TO	RLP026	68.	4.17	7.	2.	1.	.04	91.50	4.17
HYDROGRAPH AT	028	9.	4.00	1.	0.	0.	.00		
ROUTED TO	LP028	0.	.00	0.	0.	0.	.00	31.25	6.58
HYDROGRAPH AT	030	4.	4.00	0.	0.	0.	.00		
ROUTED TO	LP030	3.	4.17	0.	0.	0.	.00	16.08	4.17
HYDROGRAPH AT	029	9.	4.00	1.	0.	0.	.00		
3 COMBINED AT	C029	10.	4.17	1.	0.	0.	.01		
ROUTED TO	LPC029	10.	4.17	1.	0.	0.	.01	2.50	4.17
HYDROGRAPH AT	027	43.	4.00	4.	1.	0.	.02		
HYDROGRAPH AT	031	21.	4.00	2.	0.	0.	.01		
3 COMBINED AT	C031	73.	4.00	7.	2.	1.	.05		
ROUTED TO	RC031	73.	4.08	7.	2.	1.	.05	91.27	4.08
HYDROGRAPH AT	032	26.	4.00	3.	1.	0.	.01		
2 COMBINED AT	C032	99.	4.08	10.	2.	1.	.06		
ROUTED TO	LPC032	95.	4.08	10.	2.	1.	.06	81.36	4.08
ROUTED TO	RLPC32	91.	4.25	10.	2.	1.	.06	91.40	4.25
HYDROGRAPH AT	033	267.	4.08	33.	8.	3.	.15		
3 COMBINED AT	C033	400.	4.17	50.	12.	4.	.25		
HYDROGRAPH AT	034	170.	4.08	16.	4.	1.	.09		
ROUTED TO	R034	160.	4.08	16.	4.	1.	.09	91.72	4.08
HYDROGRAPH AT	035	45.	4.00	4.	1.	0.	.02		
HYDROGRAPH AT	036	18.	4.00	2.	0.	0.	.01		
4 COMBINED AT	C036	602.	4.08	71.	18.	6.	.37		
HYDROGRAPH AT	037	90.	4.00	7.	2.	1.	.04		
5 COMBINED AT	C037	1658.	4.17	219.	55.	18.	1.12		
ROUTED TO	DET#1	810.	4.50	219.	55.	18.	1.12	2611.31	4.50
ROUTED TO	DET#2	538.	5.17	216.	55.	18.	1.12	2608.11	5.17

+ DIVERSION TO	OVER	190.	4.67	28.	7.	2.	1.12		
+ HYDROGRAPH AT	DDET#2	348.	4.67	187.	48.	16.	1.12		
+ ROUTED TO	RDET#2	349.	4.75	187.	48.	16.	1.12	13.07	4.75
+ HYDROGRAPH AT	038	77.	4.08	10.	2.	1.	.05		
+ ROUTED TO	LP038	76.	4.08	10.	2.	1.	.05	26.89	4.08
+ HYDROGRAPH AT	040	35.	4.08	4.	1.	0.	.02		
+ 2 COMBINED AT	C040	111.	4.08	14.	4.	1.	.06		
+ ROUTED TO	LP040	110.	4.08	14.	4.	1.	.06	9.56	4.08
+ ROUTED TO	RLP040	107.	4.17	14.	4.	1.	.06	11.41	4.17
+ HYDROGRAPH AT	042	25.	4.17	4.	1.	0.	.02		
+ 3 COMBINED AT	C042	386.	4.67	205.	52.	17.	1.20		
+ HYDROGRAPH AT	039	58.	4.08	8.	2.	1.	.04		
+ ROUTED TO	LP039	58.	4.08	8.	2.	1.	.04	19.26	4.08
+ HYDROGRAPH AT	041	16.	4.08	2.	1.	0.	.01		
+ 2 COMBINED AT	C041	74.	4.08	11.	3.	1.	.05		
+ ROUTED TO	LP041	73.	4.08	11.	3.	1.	.05	9.68	4.08
+ ROUTED TO	RLP041	71.	4.17	11.	3.	1.	.05	11.35	4.17
+ HYDROGRAPH AT	043	13.	4.08	2.	0.	0.	.01		
+ 2 COMBINED AT	C043	83.	4.17	12.	3.	1.	.05		
+ 2 COMBINED AT	COMB	443.	4.25	217.	55.	18.	1.25		
+ ROUTED TO	RCF1	443.	4.25	217.	55.	18.	1.25	2.76	4.25
+ HYDROGRAPH AT	CF1	37.	4.00	4.	1.	0.	.02		
+ 2 COMBINED AT	CCF1A	461.	4.25	221.	57.	19.	1.27		
+ HYDROGRAPH AT	ODET#2	190.	5.17	28.	7.	2.	.00		
+ ROUTED TO	RCF2A	188.	5.17	28.	7.	2.	.00	1.47	5.17
+ HYDROGRAPH AT	CF2A	27.	4.00	3.	1.	0.	.01		
+ HYDROGRAPH AT	OFF1	466.	4.25	55.	14.	5.	.31		
+ ROUTED TO	RCF2B	470.	4.25	55.	14.	5.	.31		

								1.10	4.25
HYDROGRAPH AT	CF2B	4.	4.00	0.	0.	0.	.00		
2 COMBINED AT	CCF2B	472.	4.25	55.	14.	5.	.31		
3 COMBINED AT	CCF2A	484.	4.25	86.	22.	7.	.32		
2 COMBINED AT	CCF1B	945.	4.25	307.	78.	26.	1.59		
ROUTED TO	RCF3	946.	4.25	307.	78.	26.	1.59	3.04	4.25
HYDROGRAPH AT	CF3	67.	4.00	7.	2.	1.	.03		
2 COMBINED AT	CCF3	973.	4.25	314.	80.	27.	1.62		
HYDROGRAPH AT	OFF2	21.	4.08	2.	1.	0.	.01		
ROUTED TO	RCF4A	20.	4.08	2.	1.	0.	.01	.47	4.08
HYDROGRAPH AT	CF4A	14.	4.00	1.	0.	0.	.01		
HYDROGRAPH AT	OFF3	11.	4.08	1.	0.	0.	.01		
3 COMBINED AT	COFF3	45.	4.08	4.	1.	0.	.03		
HYDROGRAPH AT	CF4B	11.	4.00	1.	0.	0.	.00		
2 COMBINED AT	CCF4B	54.	4.08	5.	1.	0.	.03		
HYDROGRAPH AT	OFF4	109.	4.08	11.	3.	1.	.06		
HYDROGRAPH AT	OFF5	11.	4.17	1.	0.	0.	.01		
2 COMBINED AT	COFF4	119.	4.08	12.	3.	1.	.07		
ROUTED TO	RCF6	117.	4.17	12.	3.	1.	.07	.81	4.17
HYDROGRAPH AT	CF6	7.	4.00	1.	0.	0.	.00		
2 COMBINED AT	CCF6	123.	4.17	13.	3.	1.	.07		

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LP002
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2722.00	2725.00	2725.00
STORAGE	0.	0.	0.
OUTFLOW	0.	30.	30.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2724.63	.00	0.	24.	.00	4.08	.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LPC001
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2713.00	2717.00	2717.00
STORAGE	0.	0.	0.
OUTFLOW	0.	90.	90.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS

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                1.00     2717.79       .79        0.       206.       .58        4.08        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC007
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST    TOP OF DAM
                              ELEVATION           68.00             74.00           74.00
                              STORAGE                0.                0.              0.
                              OUTFLOW                0.              143.            143.

               RATIO     MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF      RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                PMF      W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS       HOURS        HOURS

                1.00       74.67       .67        0.       222.       .50        4.08        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC005
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST    TOP OF DAM
                              ELEVATION           83.00             88.00           88.00
                              STORAGE                0.                0.              0.
                              OUTFLOW                0.               62.             62.

               RATIO     MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF      RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                PMF      W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS       HOURS        HOURS

                1.00       86.16       .00        0.        44.       .00        4.17        .00
                               SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC006
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST    TOP OF DAM
                              ELEVATION           80.00             86.00           86.00
                              STORAGE                0.                1.              1.
                              OUTFLOW                0.               51.             51.

               RATIO     MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF      RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                PMF      W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS       HOURS        HOURS

                1.00       84.78       .00        0.        43.       .00        4.17        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC009
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST    TOP OF DAM
                              ELEVATION           75.00             80.00           80.00
                              STORAGE                0.                1.              1.
                              OUTFLOW                0.              124.            124.

               RATIO     MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF      RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                PMF      W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS       HOURS        HOURS

                1.00       78.71       .00        0.        96.       .00        4.17        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC012
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST    TOP OF DAM
                              ELEVATION           67.50             73.00           73.00
                              STORAGE                0.                0.              0.
                              OUTFLOW                0.              133.            133.

               RATIO     MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF      RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                PMF      W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS       HOURS        HOURS

                1.00       71.49       .00        0.       100.       .00        4.25        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC13I
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)


     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST    TOP OF DAM
                              ELEVATION           61.00             66.00           66.00
                              STORAGE                0.                1.              1.
                              OUTFLOW                0.              266.            266.

               RATIO     MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF      TIME OF
                OF      RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                PMF      W.S.ELEV   OVER DAM     AC-FT       CFS        HOURS       HOURS        HOURS

                1.00       66.51       .51        1.       338.       .33        4.17        .00
1                              SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC013
                        (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)
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      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION         55.80              61.00             61.00
                                 STORAGE              0.                 0.                0.
                                 OUTFLOW              0.               272.              272.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                     OF      RESERVOIR     DEPTH      STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                    PMF      W.S.ELEV     OVER DAM     AC-FT       CFS       HOURS       HOURS       HOURS

                    1.00       61.76         .76         1.       392.        .42        4.25         .00
1                                 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP014
                              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION         64.50              70.00             70.00
                                 STORAGE              0.                 0.                0.
                                 OUTFLOW              0.                48.               48.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                     OF      RESERVOIR     DEPTH      STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                    PMF      W.S.ELEV     OVER DAM     AC-FT       CFS       HOURS       HOURS       HOURS

                    1.00       68.40         .00         0.        37.        .00        4.08         .00
1                                 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP022
                              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION         71.00              77.00             77.00
                                 STORAGE              0.                 0.                0.
                                 OUTFLOW              0.               127.              127.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                     OF      RESERVOIR     DEPTH      STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                    PMF      W.S.ELEV     OVER DAM     AC-FT       CFS       HOURS       HOURS       HOURS

                    1.00       75.45         .00         0.       104.        .00        4.08         .00
1                                 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP023
                              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION         73.00              77.00             77.00
                                 STORAGE              0.                 1.                1.
                                 OUTFLOW              0.               113.              113.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                     OF      RESERVOIR     DEPTH      STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                    PMF      W.S.ELEV     OVER DAM     AC-FT       CFS       HOURS       HOURS       HOURS

                    1.00       76.45         .00         1.        97.        .00        4.17         .00
1                                 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP028
                              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION         28.00              32.00             32.00
                                 STORAGE              0.                 1.                1.
                                 OUTFLOW              0.                 0.                0.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                     OF      RESERVOIR     DEPTH      STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                    PMF      W.S.ELEV     OVER DAM     AC-FT       CFS       HOURS       HOURS       HOURS

                    1.00       31.25         .00         0.         0.        .00         .00         .00
1                                 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LP030
                              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION         11.00              16.00             16.00
                                 STORAGE              0.                 0.                0.
                                 OUTFLOW              0.                 0.                0.

                    RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                     OF      RESERVOIR     DEPTH      STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                    PMF      W.S.ELEV     OVER DAM     AC-FT       CFS       HOURS       HOURS       HOURS

                    1.00       16.08         .08         0.         3.     162.50        4.17         .00
1                                 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION     LPC029
                              (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

      PLAN  1 ...............                 INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
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                  ELEVATION         1.00            8.00            8.00
                  STORAGE             0.              0.              0.
                  OUTFLOW             0.             38.             38.

        RATIO    MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
         OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
         PMF     W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

        1.00       2.50        .00          0.        10.        .00         4.17         .00
1                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LPC032
                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............            INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                  ELEVATION        77.00            81.00           81.00
                  STORAGE             0.              0.              0.
                  OUTFLOW             0.             63.             63.

        RATIO    MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
         OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
         PMF     W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

        1.00      81.36        .36          0.        95.        .25         4.08         .00
1                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    DET#2
                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............            INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                  ELEVATION      2590.30          2607.00         2607.00
                  STORAGE             0.             29.             29.
                  OUTFLOW             0.            378.            378.

        RATIO    MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
         OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
         PMF     W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

        1.00    2608.11       1.11         33.       538.       1.33         5.17         .00
1                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP038
                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............            INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                  ELEVATION        24.60            29.00           29.00
                  STORAGE             0.              0.              0.
                  OUTFLOW             0.            165.            165.

        RATIO    MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
         OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
         PMF     W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

        1.00      26.89        .00          0.        76.        .00         4.08         .00
1                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP040
                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............            INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                  ELEVATION         6.60            11.00           11.00
                  STORAGE             0.              0.              0.
                  OUTFLOW             0.            165.            165.

        RATIO    MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
         OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
         PMF     W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

        1.00       9.56        .00          0.       110.        .00         4.08         .00
1                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP039
                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............            INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                  ELEVATION        17.00            22.00           22.00
                  STORAGE             0.              0.              0.
                  OUTFLOW             0.            135.            135.

        RATIO    MAXIMUM     MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
         OF     RESERVOIR     DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
         PMF     W.S.ELEV   OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

        1.00      19.26        .00          0.        58.        .00         4.08         .00
1                  SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    LP041
                (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

PLAN  1 ..............            INITIAL VALUE    SPILLWAY CREST    TOP OF DAM
                  ELEVATION         7.00            11.00           11.00
                  STORAGE             0.              0.              0.
                  OUTFLOW             0.            113.            113.
```

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	9.68	.00	0.	73.	.00	4.08	.00

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


   -----DSS---ZCLOSE Unit:  71,    File: 01-100.DSS
              Pointer Utilization:    .27
              Number of Records:      48
              File Size:      92.1  Kbytes
              Percent Inactive:     .0
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Appendix D–HYDRUALICS

Existing Conditions

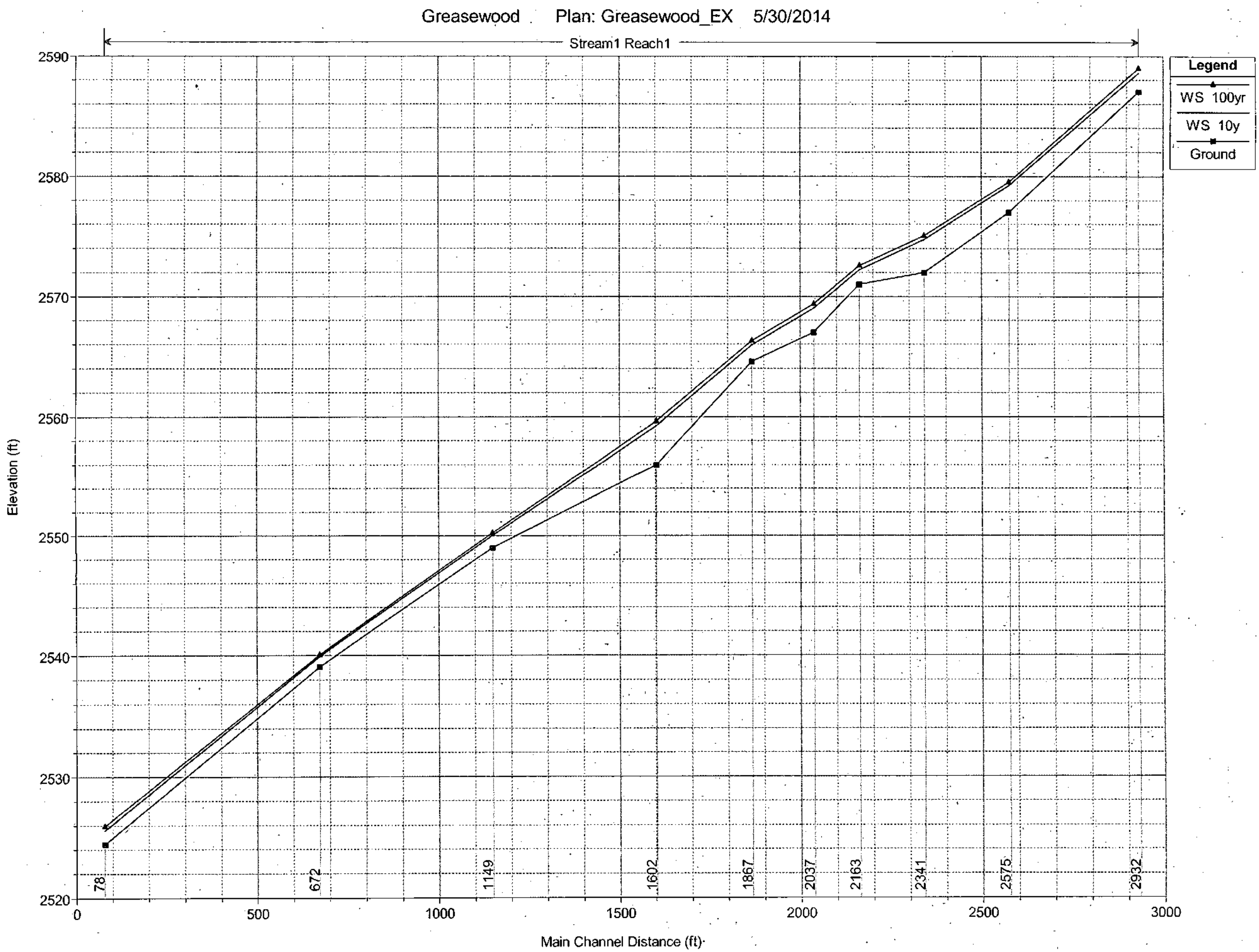
Proposed Conditions

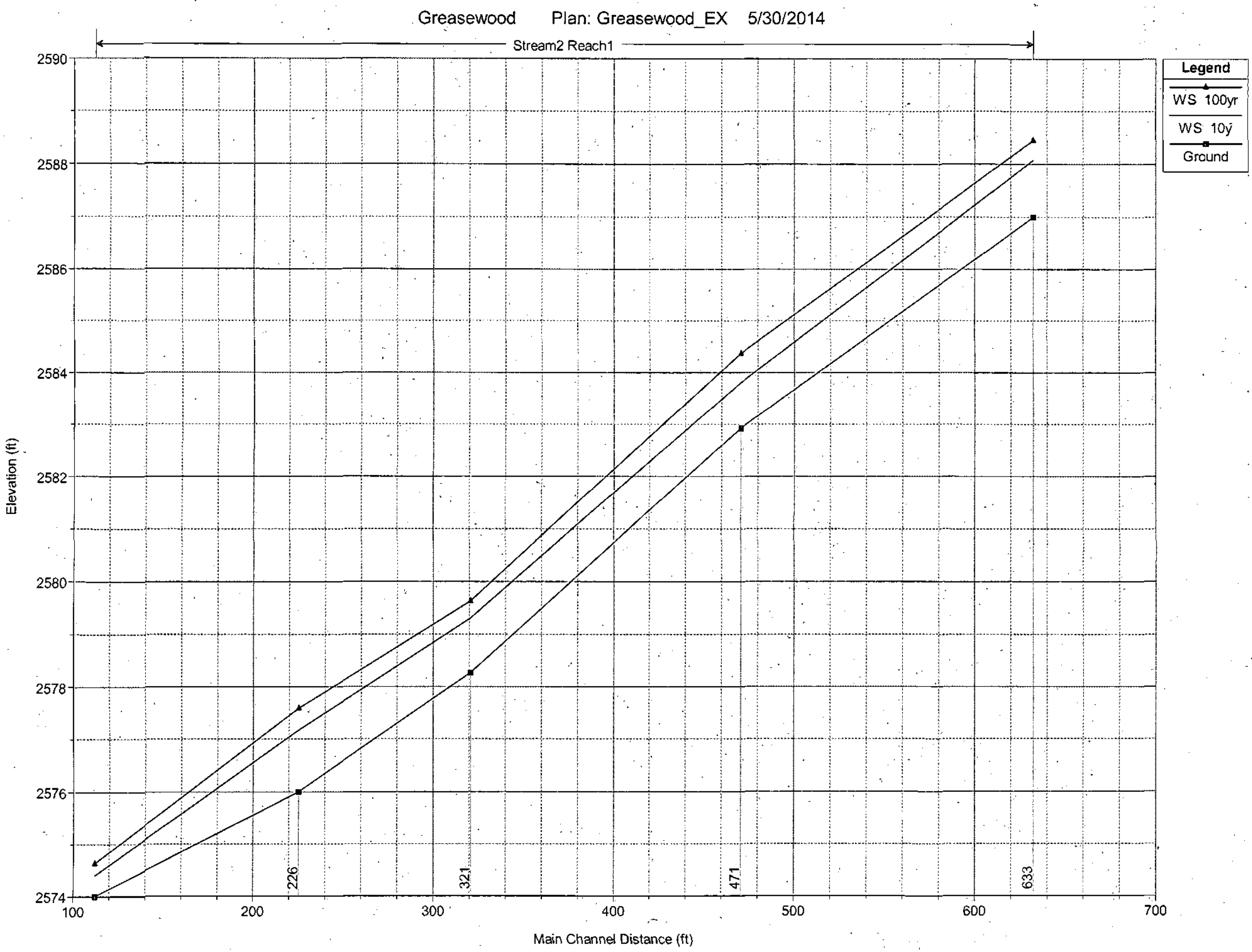
HY-8 Output

Erosion Setback Analysis

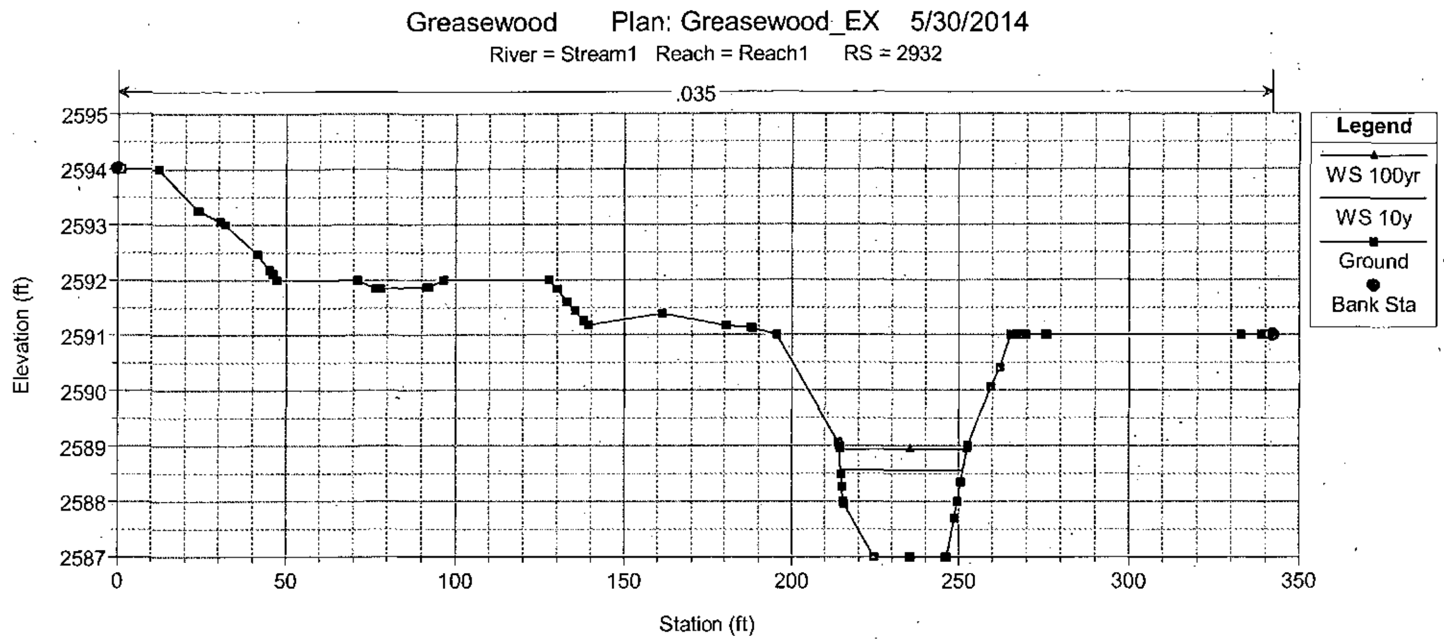
HEC-RAS Plan: GW_EX

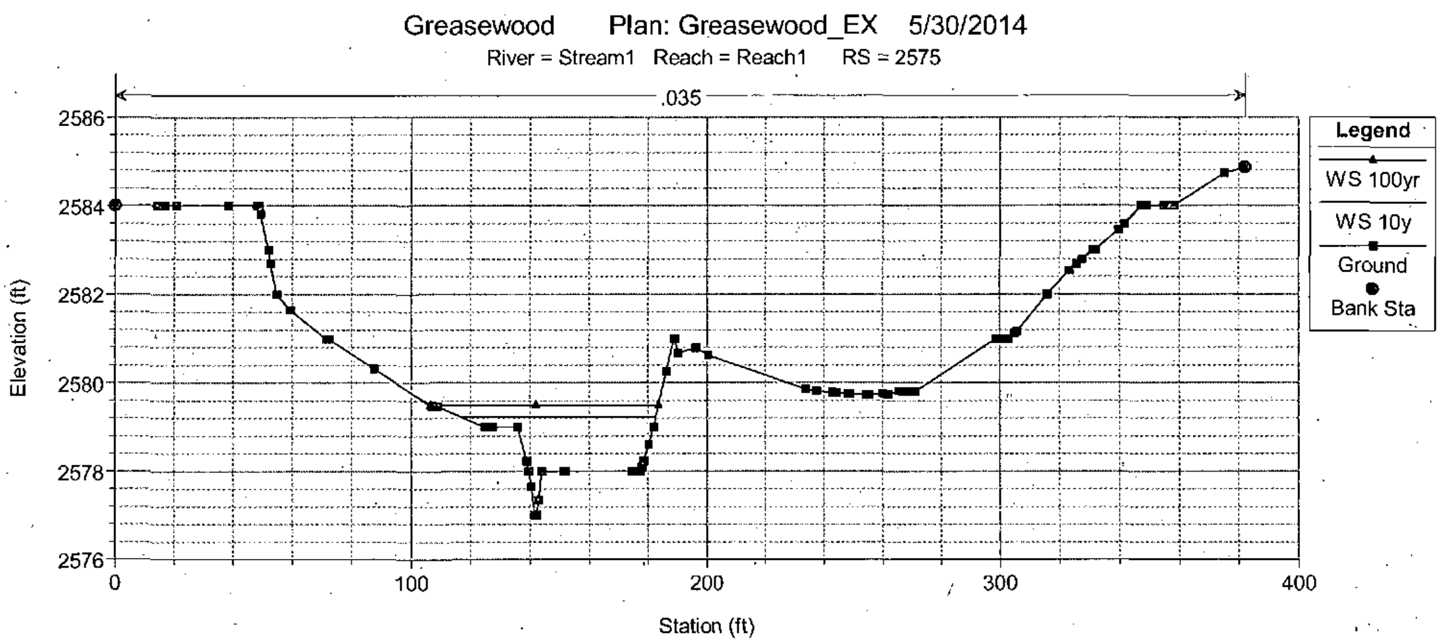
River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream2	Reach1	633	10y	217.00	2587.00	2588.08	2588.08	2588.34	0.023202	4.16	52.15	100.64	1.02
Stream2	Reach1	633	100yr	484.00	2587.00	2588.45	2588.45	2588.89	0.019264	5.32	91.05	105.75	1.01
Stream2	Reach1	471	10y	217.00	2582.93	2583.81	2583.81	2584.18	0.020306	4.87	44.53	61.37	1.01
Stream2	Reach1	471	100yr	484.00	2582.93	2584.37	2584.37	2584.79	0.019404	5.18	93.35	113.41	1.01
Stream2	Reach1	321	10y	217.00	2578.27	2579.31	2579.31	2579.53	0.022280	3.82	56.74	120.97	0.98
Stream2	Reach1	321	100yr	484.00	2578.27	2579.63	2579.63	2580.01	0.020433	4.93	98.14	133.86	1.02
Stream2	Reach1	226	10y	217.00	2576.00	2577.17	2577.17	2577.43	0.021548	4.07	53.26	183.63	0.99
Stream2	Reach1	226	100yr	484.00	2576.00	2577.59	2577.59	2577.88	0.021377	4.34	111.54	307.26	1.00
Stream2	Reach1	112	10y	217.00	2574.00	2574.41	2574.37	2574.55	0.020022	3.08	70.44	191.66	0.90
Stream2	Reach1	112	100yr	484.00	2574.00	2574.64	2574.62	2574.91	0.020018	4.18	115.71	198.73	0.97
Stream1	Reach1	2932	10y	314.00	2587.00	2588.56	2588.56	2589.23	0.016859	6.54	48.00	36.60	1.01
Stream1	Reach1	2932	100yr	453.00	2587.00	2588.93	2588.93	2589.77	0.016064	7.34	61.75	38.01	1.01
Stream1	Reach1	2575	10y	314.00	2577.00	2579.24	2579.24	2579.68	0.018891	5.35	58.67	66.02	1.00
Stream1	Reach1	2575	100yr	453.00	2577.00	2579.50	2579.50	2580.03	0.019183	5.85	77.38	77.08	1.03
Stream1	Reach1	2341	10y	314.00	2572.00	2574.76		2574.94	0.007334	3.36	93.42	104.17	0.63
Stream1	Reach1	2341	100yr	453.00	2572.00	2575.06	2574.69	2575.26	0.006463	3.58	126.65	117.09	0.61
Stream1	Reach1	2163	10y	531.00	2571.00	2572.22	2572.22	2572.58	0.020492	4.86	109.20	152.48	1.01
Stream1	Reach1	2163	100yr	937.00	2571.00	2572.56	2572.56	2573.07	0.018050	5.75	162.95	160.85	1.01
Stream1	Reach1	2037	10y	531.00	2567.00	2569.02	2568.92	2569.38	0.015676	4.78	111.13	130.12	0.91
Stream1	Reach1	2037	100yr	937.00	2567.00	2569.37	2569.36	2569.90	0.017601	5.86	159.82	150.23	1.00
Stream1	Reach1	1867	10y	531.00	2564.58	2565.93	2565.93	2566.30	0.021062	4.86	109.15	155.54	1.02
Stream1	Reach1	1867	100yr	937.00	2564.58	2566.28	2566.28	2566.74	0.019337	5.44	172.40	195.11	1.02
Stream1	Reach1	1602	10y	531.00	2556.00	2559.26	2559.26	2559.65	0.021043	5.01	105.99	143.44	1.03
Stream1	Reach1	1602	100yr	937.00	2556.00	2559.63	2559.63	2560.14	0.018470	5.71	164.14	165.77	1.01
Stream1	Reach1	1149	10y	531.00	2549.00	2550.02	2549.97	2550.27	0.017690	4.03	131.89	218.97	0.91
Stream1	Reach1	1149	100yr	937.00	2549.00	2550.24	2550.24	2550.65	0.019805	5.14	182.45	228.86	1.01
Stream1	Reach1	672	10y	531.00	2539.07	2539.89	2539.89	2540.07	0.026181	3.41	155.67	444.85	1.02
Stream1	Reach1	672	100yr	937.00	2539.07	2540.05	2540.05	2540.31	0.023619	4.10	228.79	460.06	1.02
Stream1	Reach1	78	10y	531.00	2524.44	2525.56	2525.56	2525.95	0.019800	5.00	106.18	138.56	1.01
Stream1	Reach1	78	100yr	937.00	2524.44	2525.93	2525.93	2526.47	0.017859	5.89	159.06	150.25	1.01

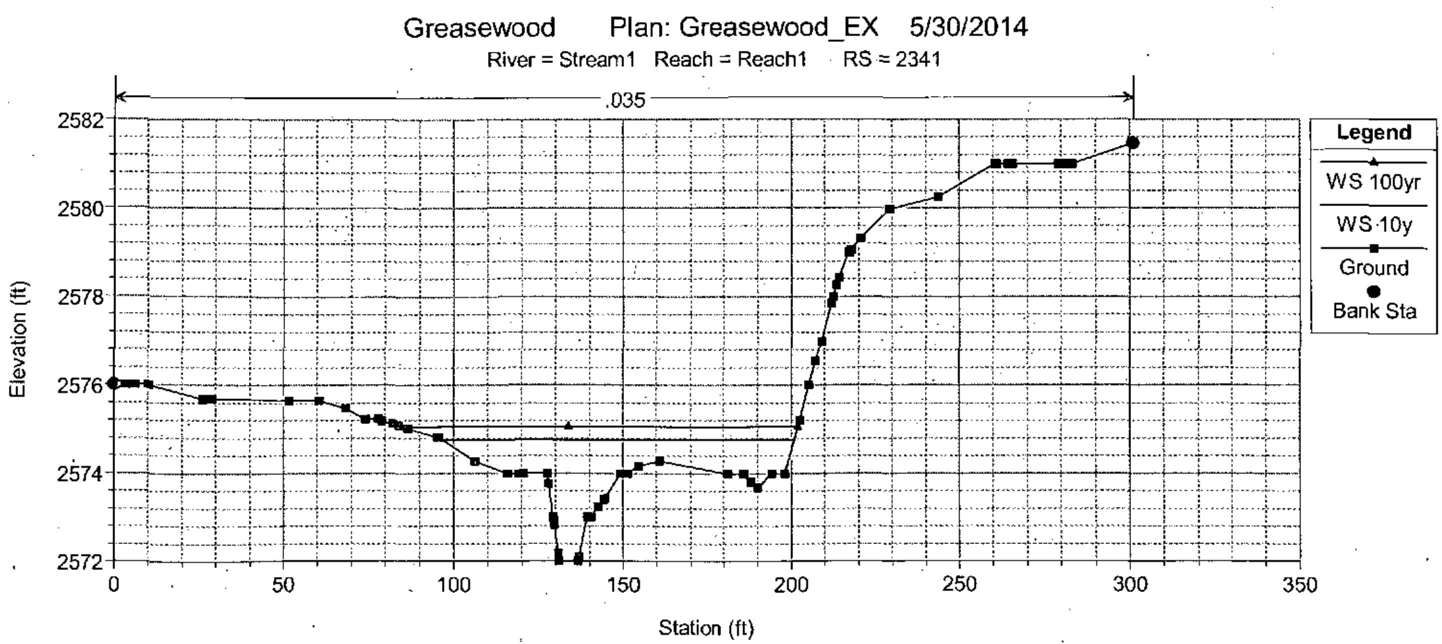

Greasewood Plan: Greasewood_EX 5/30/2014
Stream1 Reach1
Legend
WS 100yr
WS 10y
Ground
Elevation (ft)
Main Channel Distance (ft)
2520
2530
2540
2550
2560
2570
2580
2590
0
500
1000
1500
2000
2500
3000
78
672
1149
1602
1867
2037
2163
2341
2575
2932



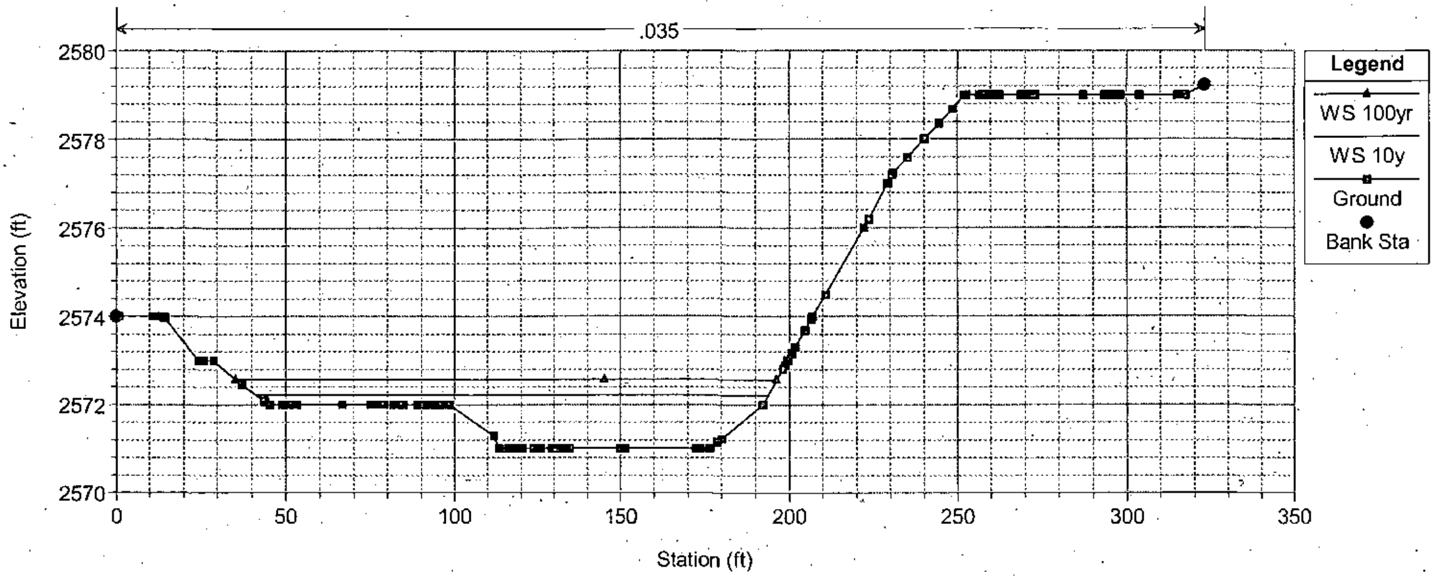
Greasewood Plan: Greasewood_EX 5/30/2014
Stream2 Reach1
Legend
WS 100yr
WS 10yr
Ground
Elevation (ft)
Main Channel Distance (ft)
2590
2588
2586
2584
2582
2580
2578
2576
2574
100
200
300
400
500
600
700
226
321
471
633


Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 2932
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

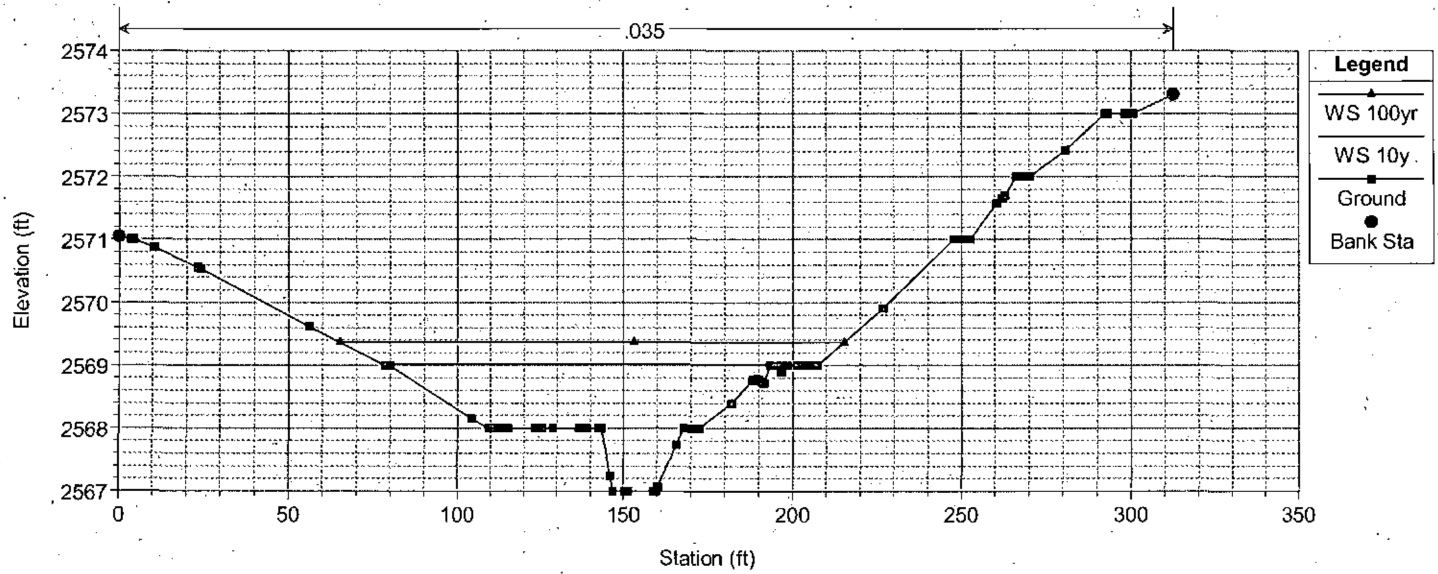

Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 2575
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta


Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 2341
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

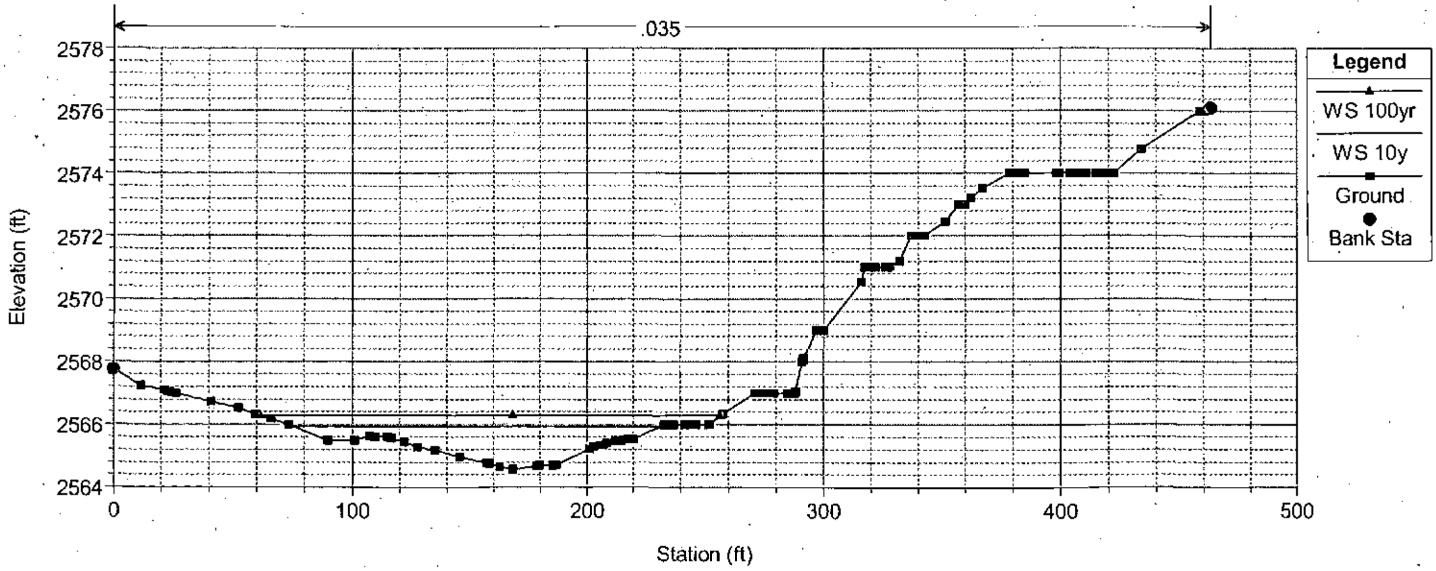
Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 2163

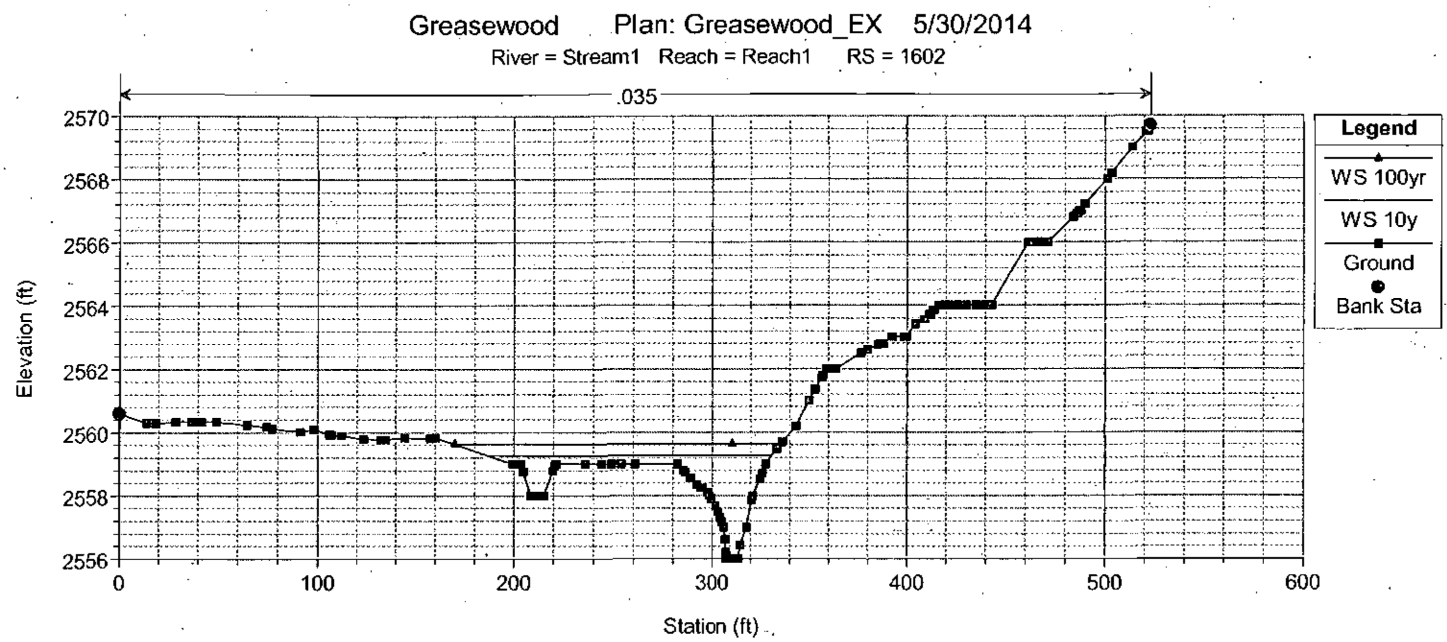


Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 2037

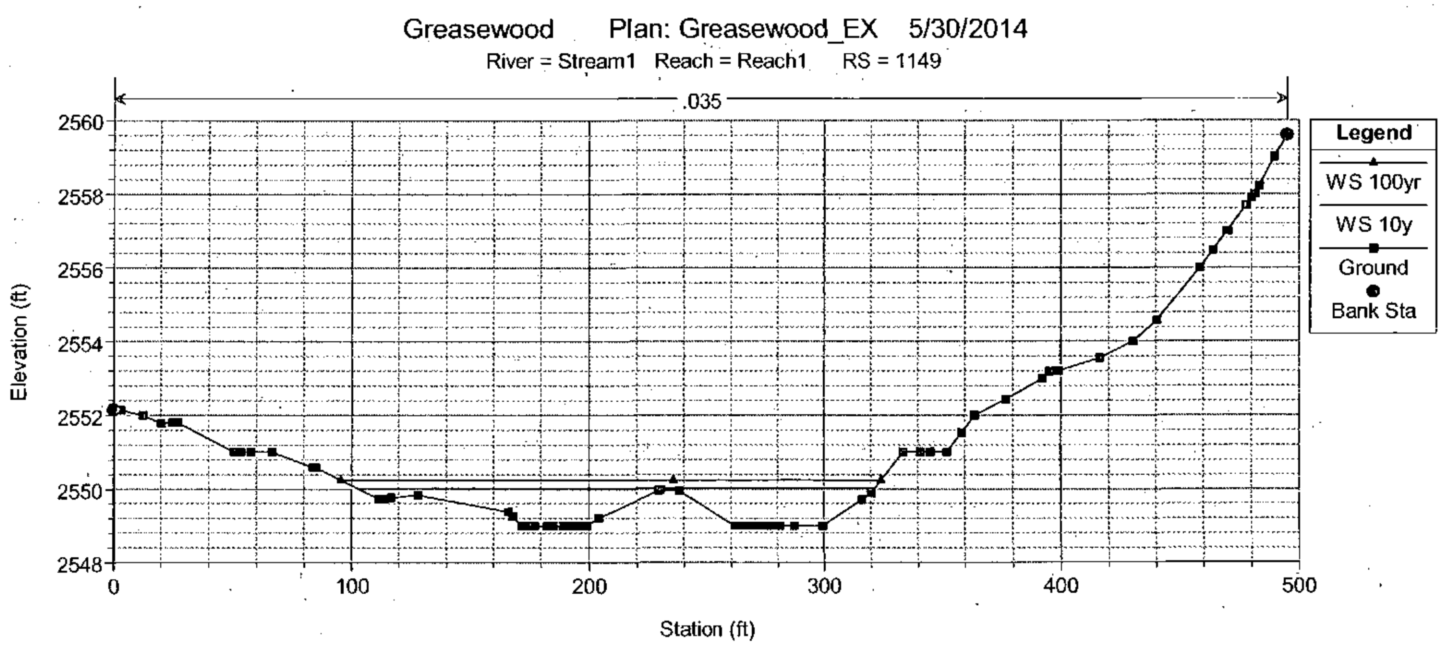


Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 1867

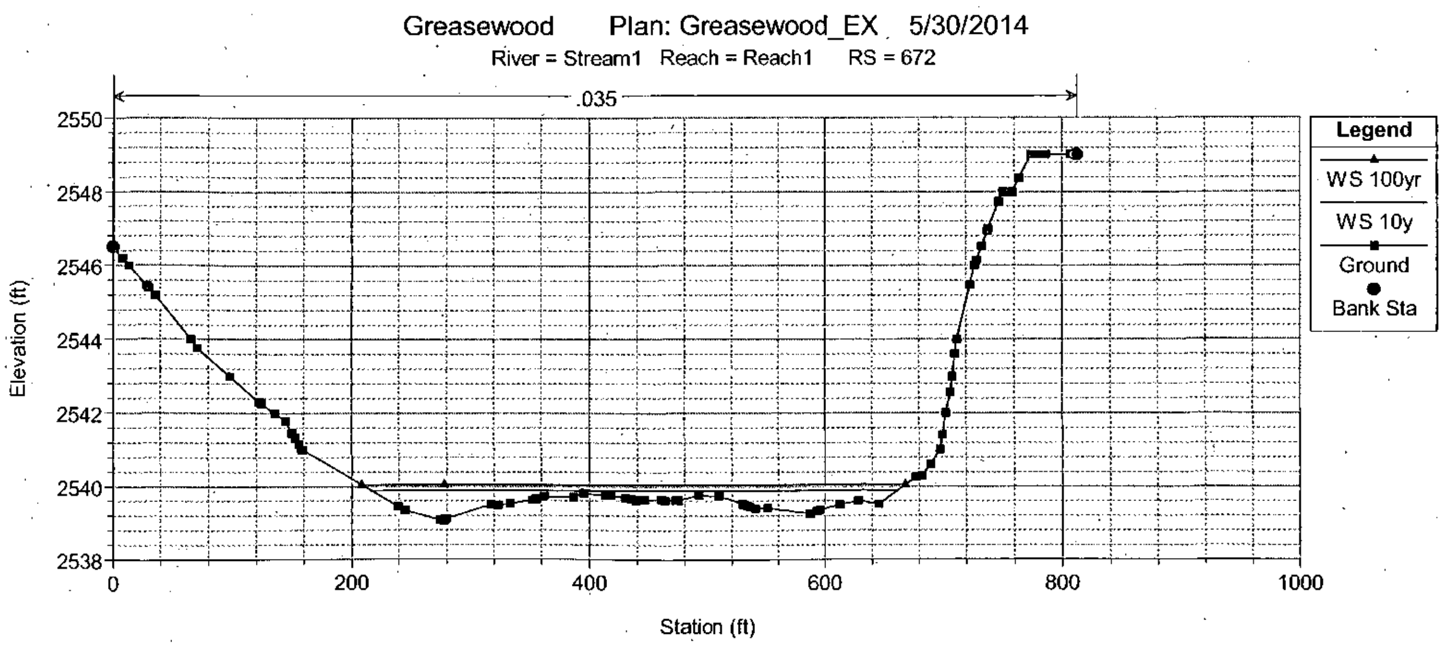




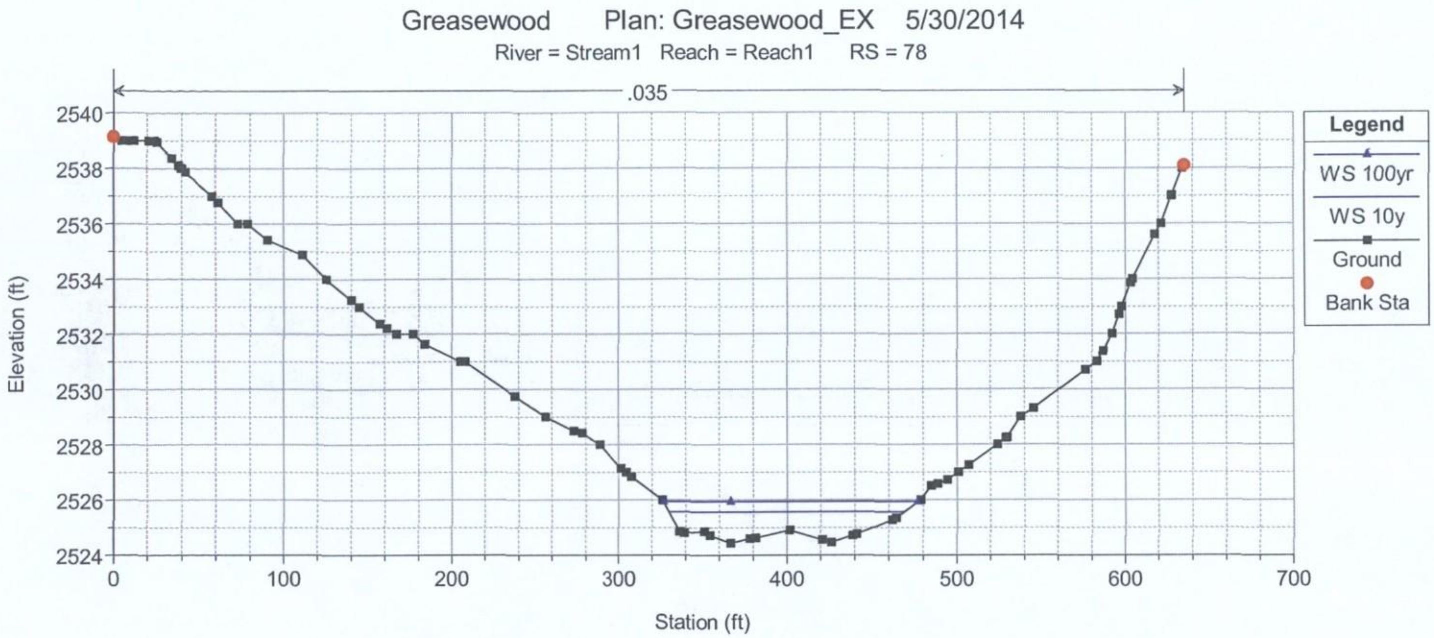
Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 1602
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

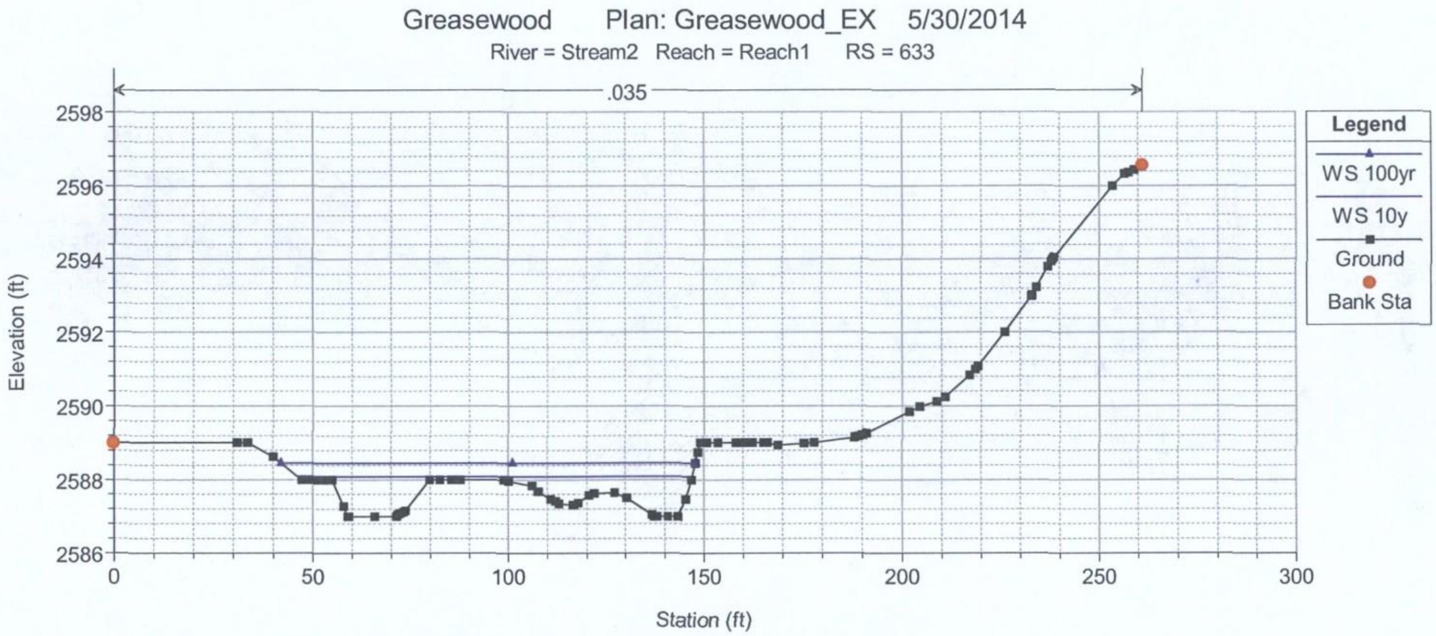


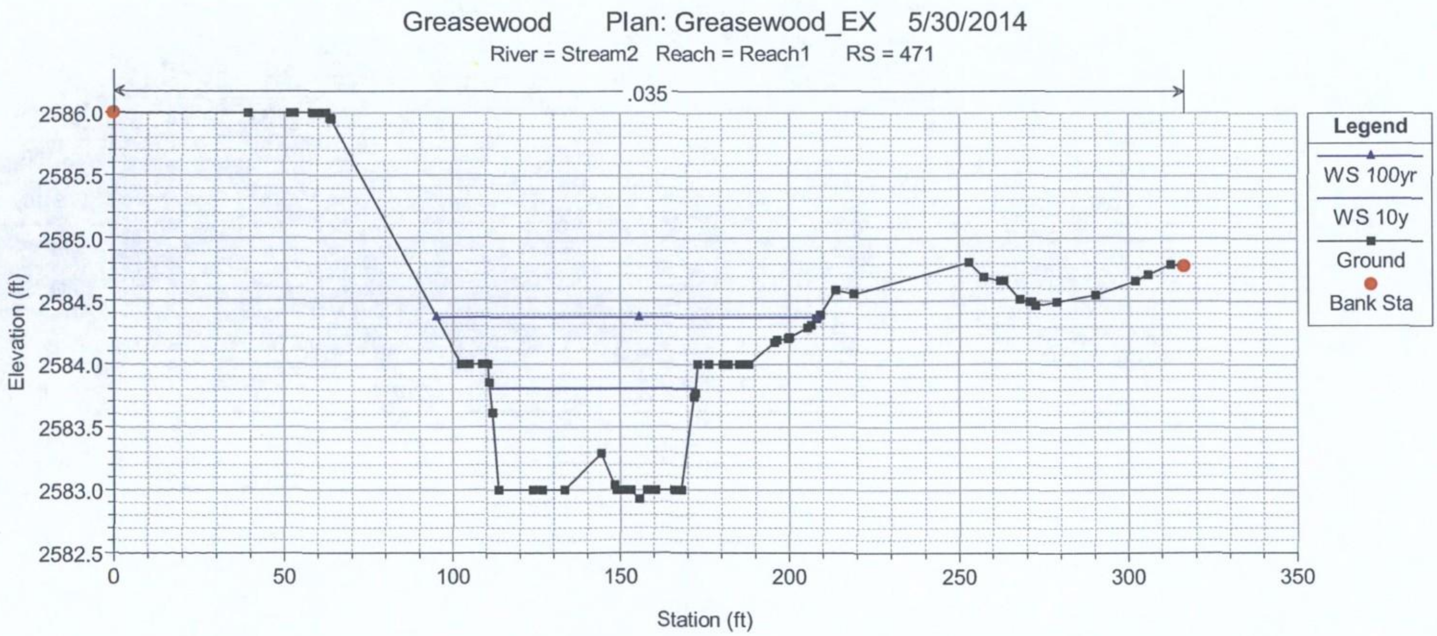
Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 1149
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

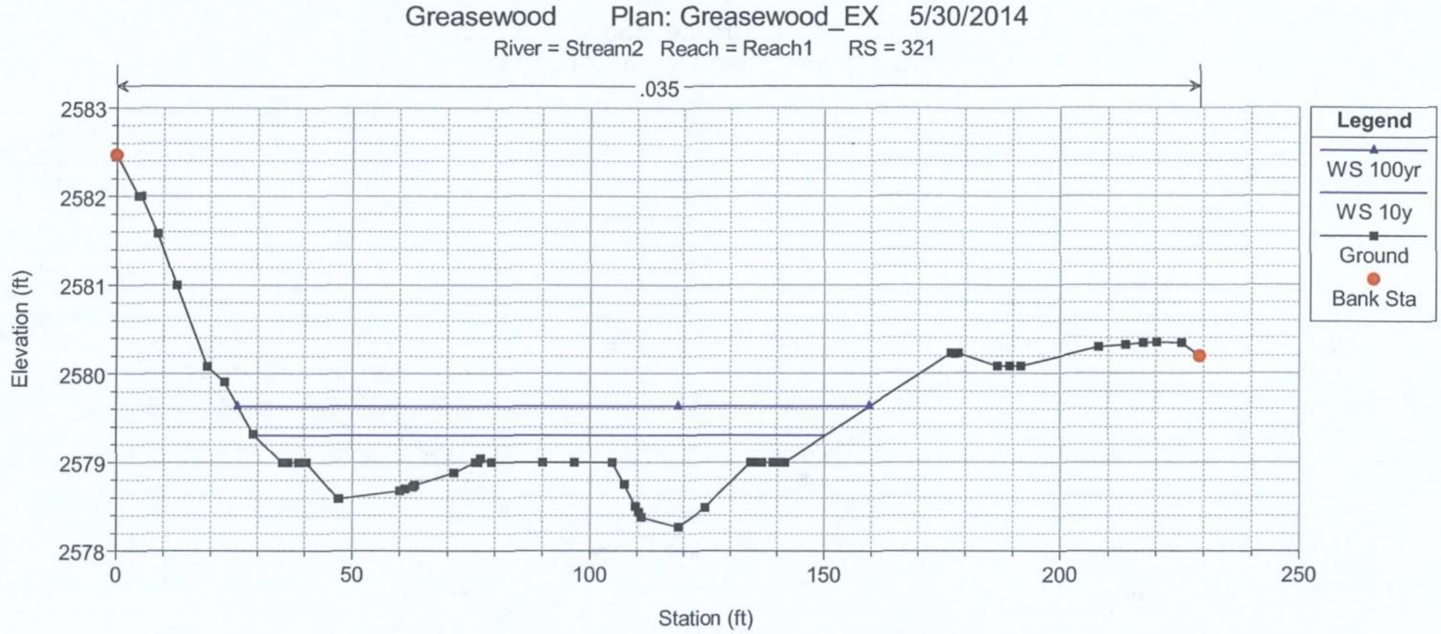


Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 672
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

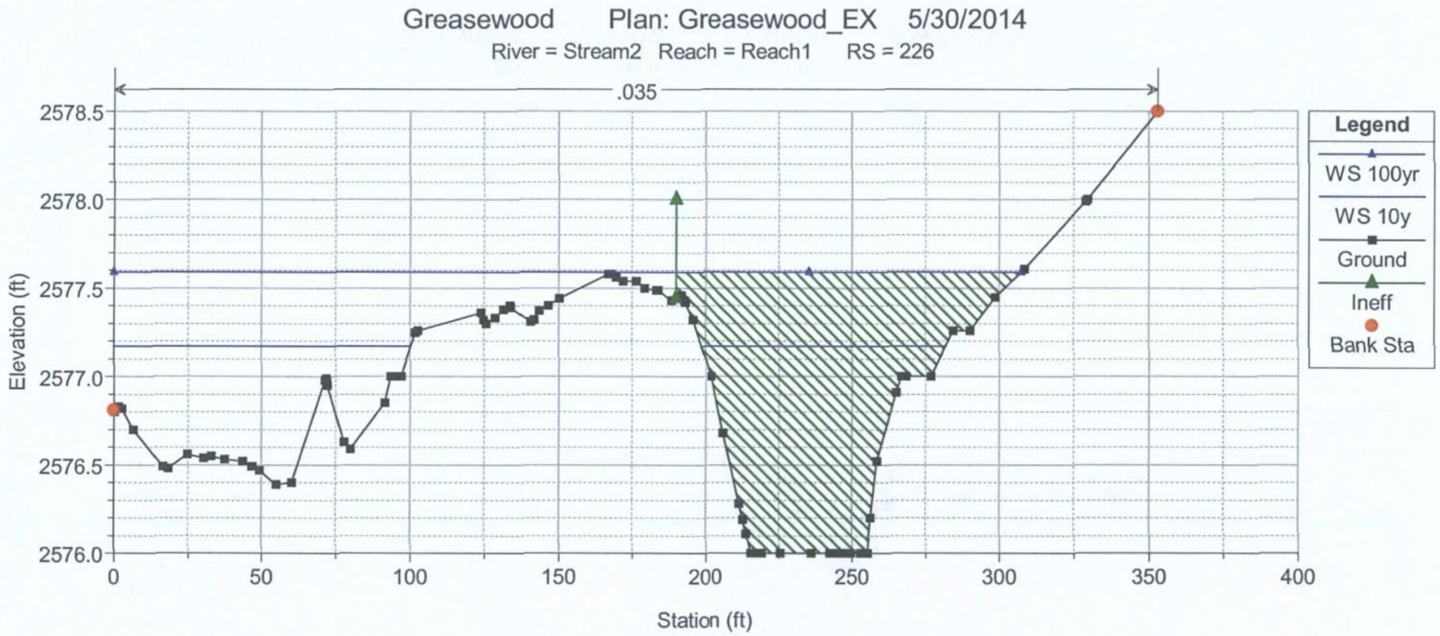

Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream1 Reach = Reach1 RS = 78
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta


Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream2 Reach = Reach1 RS = 633
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

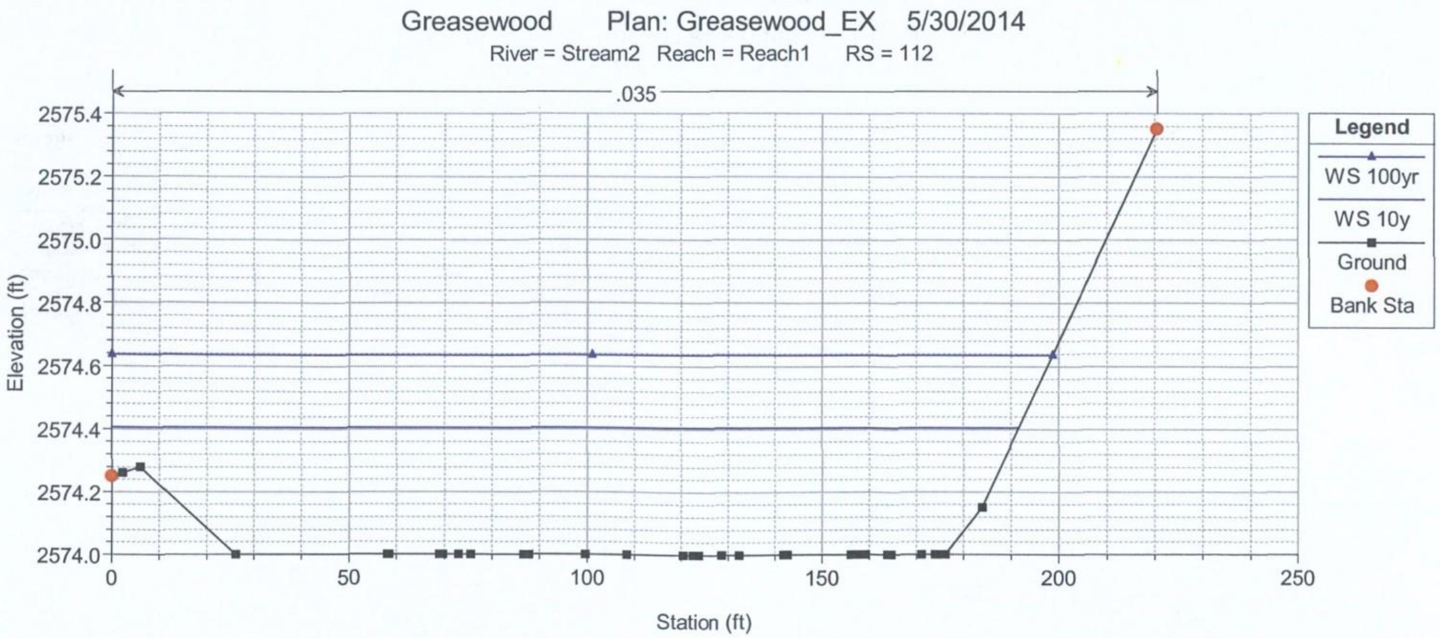

Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream2 Reach = Reach1 RS = 471
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta



Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream2 Reach = Reach1 RS = 321
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta



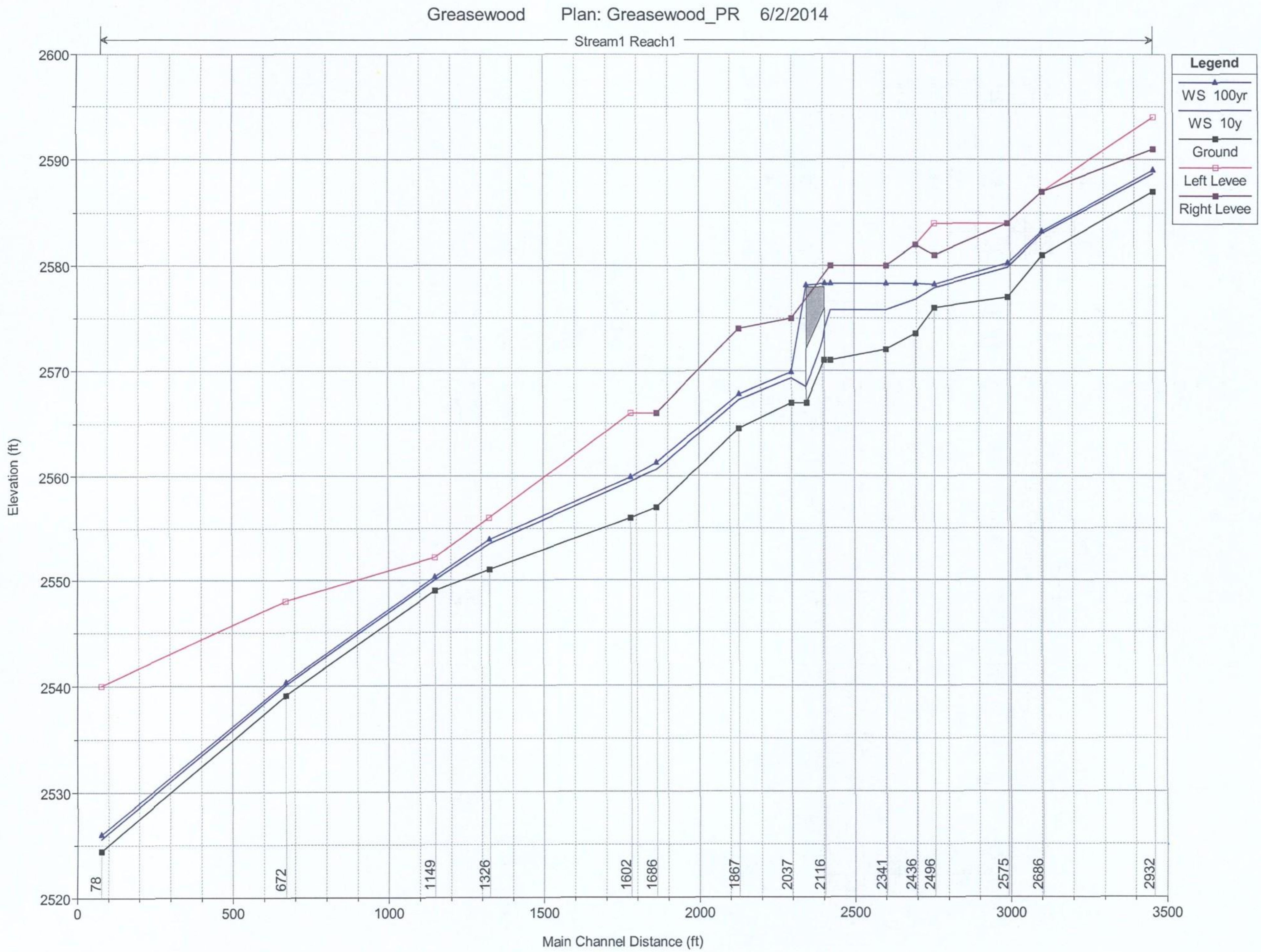
Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream2 Reach = Reach1 RS = 226
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Ineff
Bank Sta



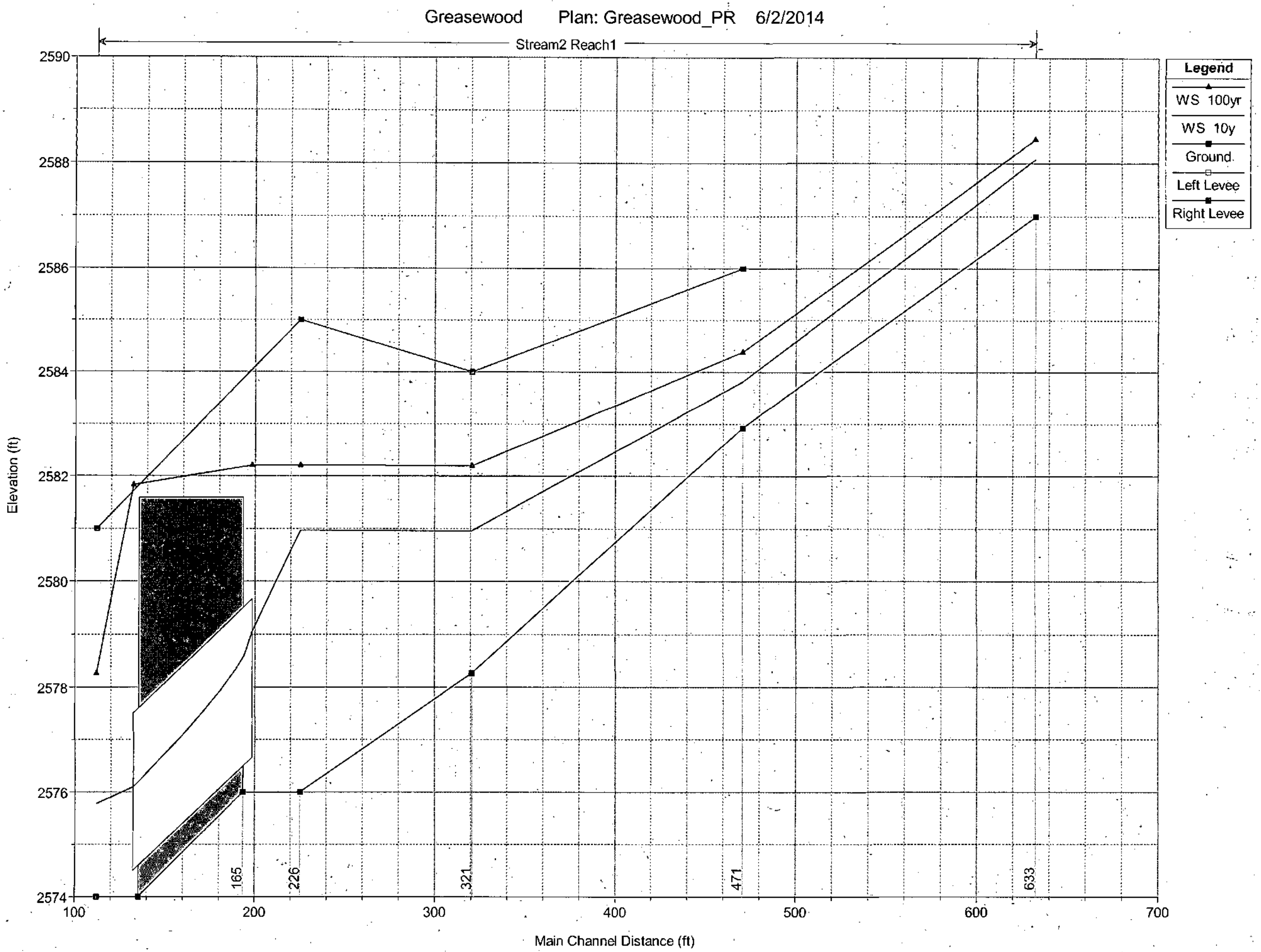
Greasewood Plan: Greasewood_EX 5/30/2014
River = Stream2 Reach = Reach1 RS = 112
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

HEC-RAS Plan: GW_PR River: Stream1 Reach: Reach1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach1	2932	10y	314.00	2587.00	2588.68	2588.57	2589.24	0.012810	5.99	52.43	37.06	0.89
Reach1	2932	100yr	461.00	2587.00	2588.99	2588.99	2589.80	0.015067	7.23	63.76	38.21	0.99
Reach1	2686	10y	314.00	2581.00	2583.05	2583.05	2583.36	0.021427	4.47	70.23	113.84	1.00
Reach1	2686	100yr	461.00	2581.00	2583.24	2583.24	2583.63	0.019195	5.01	91.94	115.37	0.99
Reach1	2575	10y	314.00	2577.00	2579.85	2579.24	2579.99	0.003756	2.96	105.93	86.24	0.47
Reach1	2575	100yr	461.00	2577.00	2580.25	2579.54	2580.41	0.003760	3.24	142.50	101.80	0.48
Reach1	2496	10y	314.00	2576.00	2577.90	2577.87	2578.33	0.017004	5.21	60.29	64.69	0.95
Reach1	2496	100yr	461.00	2576.00	2578.22	2578.22	2578.69	0.018665	5.53	83.40	88.15	1.00
Reach1	2436	10y	314.00	2573.56	2576.81	2576.81	2577.22	0.019784	5.10	61.55	76.14	1.00
Reach1	2436	100yr	461.00	2573.56	2578.31	2577.12	2578.35	0.001098	1.71	269.25	197.00	0.26
Reach1	2341	10y	314.00	2572.00	2575.79	2574.50	2575.82	0.000665	1.40	224.07	153.45	0.20
Reach1	2341	100yr	461.00	2572.00	2578.32	2574.71	2578.33	0.000052	0.75	616.04	155.00	0.07
Reach1	2163	10y	533.00	2571.00	2575.79	2572.23	2575.79	0.000049	0.73	731.53	188.59	0.07
Reach1	2163	100yr	973.00	2571.00	2578.31	2572.60	2578.32	0.000034	0.79	1233.02	210.00	0.06
Reach1	2116		Culvert									
Reach1	2037	10y	533.00	2567.00	2569.34	2568.92	2569.52	0.006198	3.44	155.05	148.38	0.59
Reach1	2037	100yr	973.00	2567.00	2569.89	2569.40	2570.14	0.005396	4.03	241.36	163.46	0.58
Reach1	1867	10y	533.00	2564.58	2567.28	2567.28	2567.82	0.017551	5.85	91.12	83.88	0.99
Reach1	1867	100yr	973.00	2564.58	2567.81	2567.81	2568.61	0.016052	7.17	135.64	85.42	1.00
Reach1	1686	10y	533.00	2557.00	2560.68	2560.68	2561.25	0.017178	6.05	88.08	76.16	0.99
Reach1	1686	100yr	973.00	2557.00	2561.33	2561.33	2561.87	0.017119	5.90	164.88	148.90	0.99
Reach1	1602	10y	533.00	2556.00	2559.48	2559.26	2559.72	0.008786	3.93	135.52	136.49	0.70
Reach1	1602	100yr	973.00	2556.00	2559.88	2559.67	2560.28	0.009887	5.10	190.81	141.86	0.77
Reach1	1326	10y	533.00	2551.00	2553.50	2553.50	2553.89	0.020546	5.01	106.38	141.43	1.02
Reach1	1326	100yr	973.00	2551.00	2553.89	2553.89	2554.44	0.017372	5.97	162.96	146.48	1.00
Reach1	1149	10y	533.00	2549.00	2550.01	2549.98	2550.27	0.018747	4.11	129.80	218.55	0.94
Reach1	1149	100yr	973.00	2549.00	2550.28	2550.28	2550.68	0.018653	5.11	190.53	230.40	0.99
Reach1	672	10y	533.00	2539.07	2540.06	2540.06	2540.28	0.023448	3.81	140.02	312.12	1.00
Reach1	672	100yr	973.00	2539.07	2540.29	2540.29	2540.61	0.019662	4.51	215.60	325.99	0.98
Reach1	78	10y	533.00	2524.44	2525.57	2525.57	2525.95	0.019201	4.96	107.50	138.86	0.99
Reach1	78	100yr	973.00	2524.44	2525.97	2525.97	2526.51	0.016947	5.86	165.92	151.70	0.99

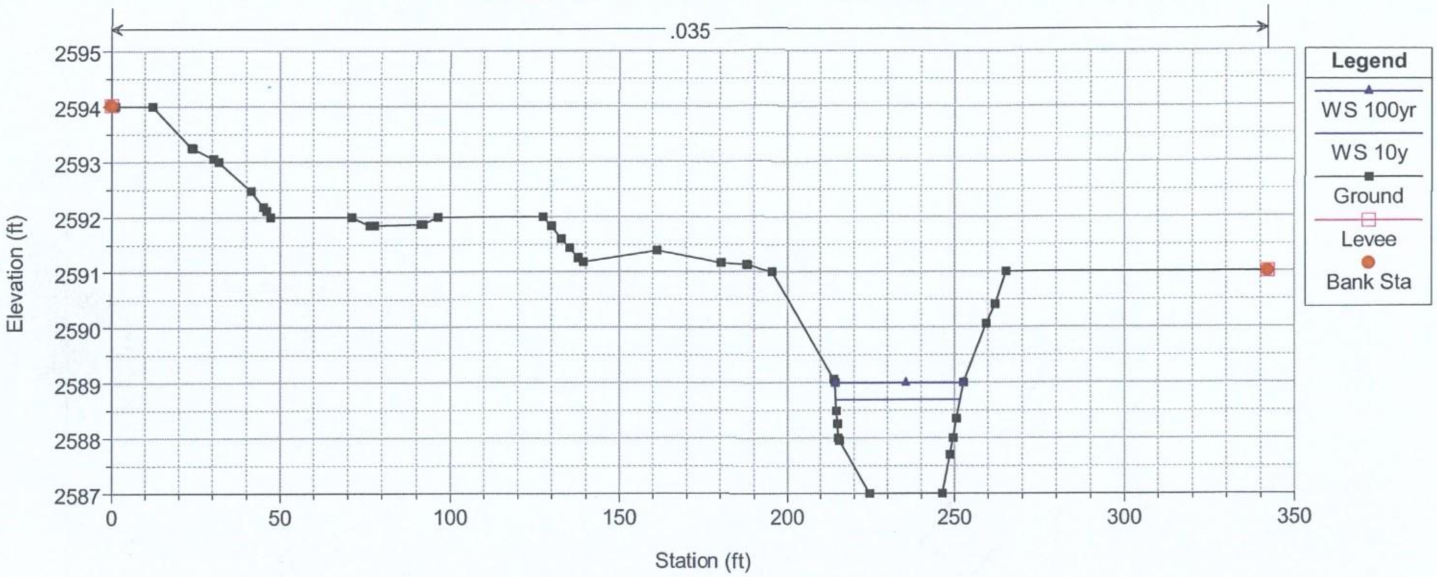


Greasewood Plan: Greasewood_PR 6/2/2014
Stream1 Reach1
Legend
WS 100yr
WS 10y
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
2600
2590
2580
2570
2560
2550
2540
2530
2520
0
500
1000
1500
2000
2500
3000
3500
78
672
1149
1326
1602
1686
1867
2037
2116
2341
2436
2496
2575
2686
2932

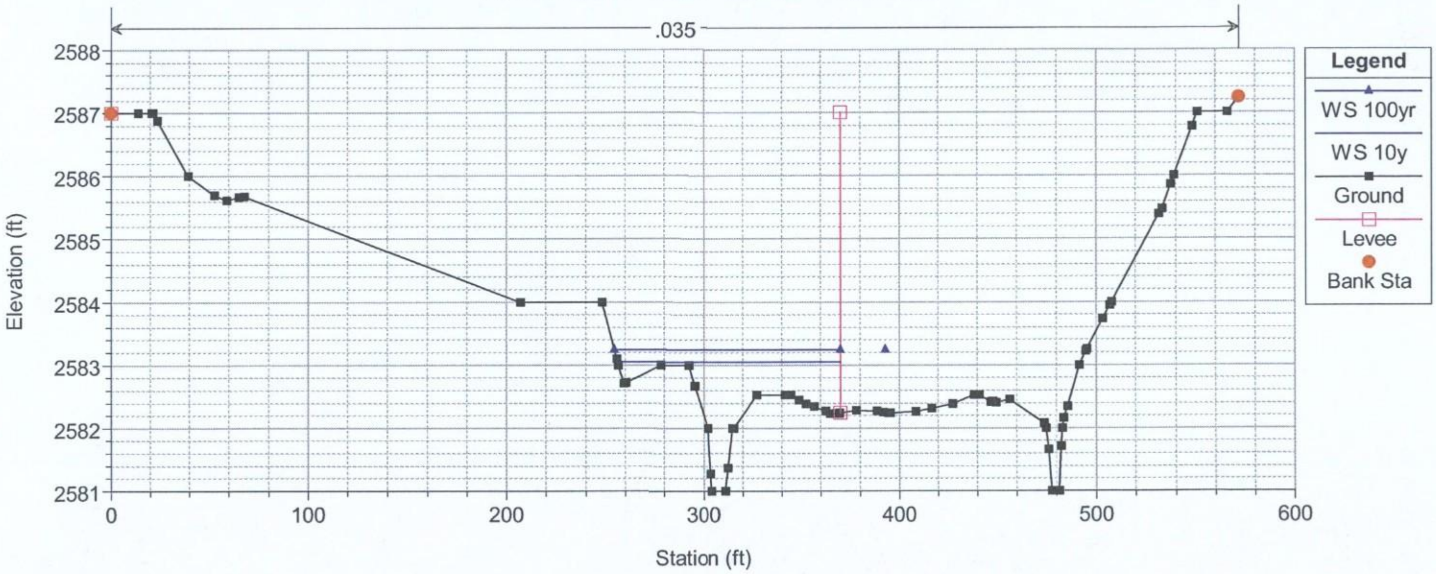


Greasewood Plan: Greasewood_PR 6/2/2014
Stream2 Reach1
Legend
WS 100yr
WS 10y
Ground
Left Levee
Right Levee
Elevation (ft)
2590
2588
2586
2584
2582
2580
2578
2576
2574
165
226
321
471
633
100
200
300
400
500
600
700
Main Channel Distance (ft)

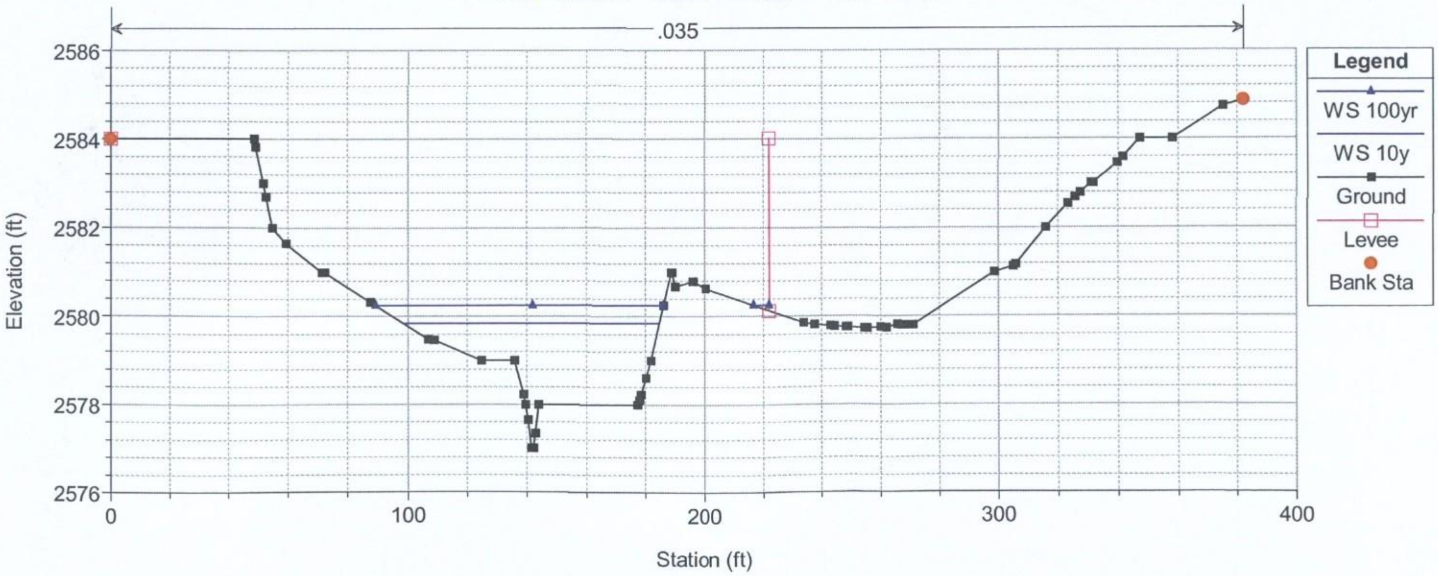
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2932



Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2686

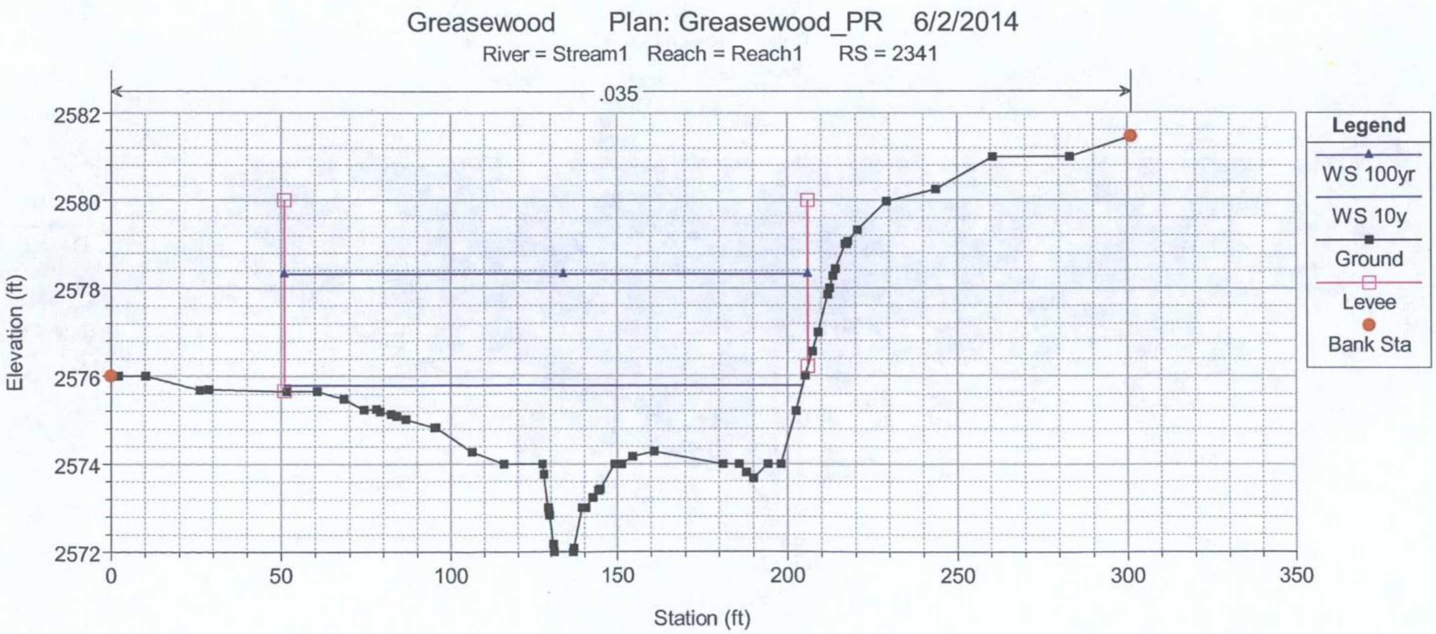


Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2575

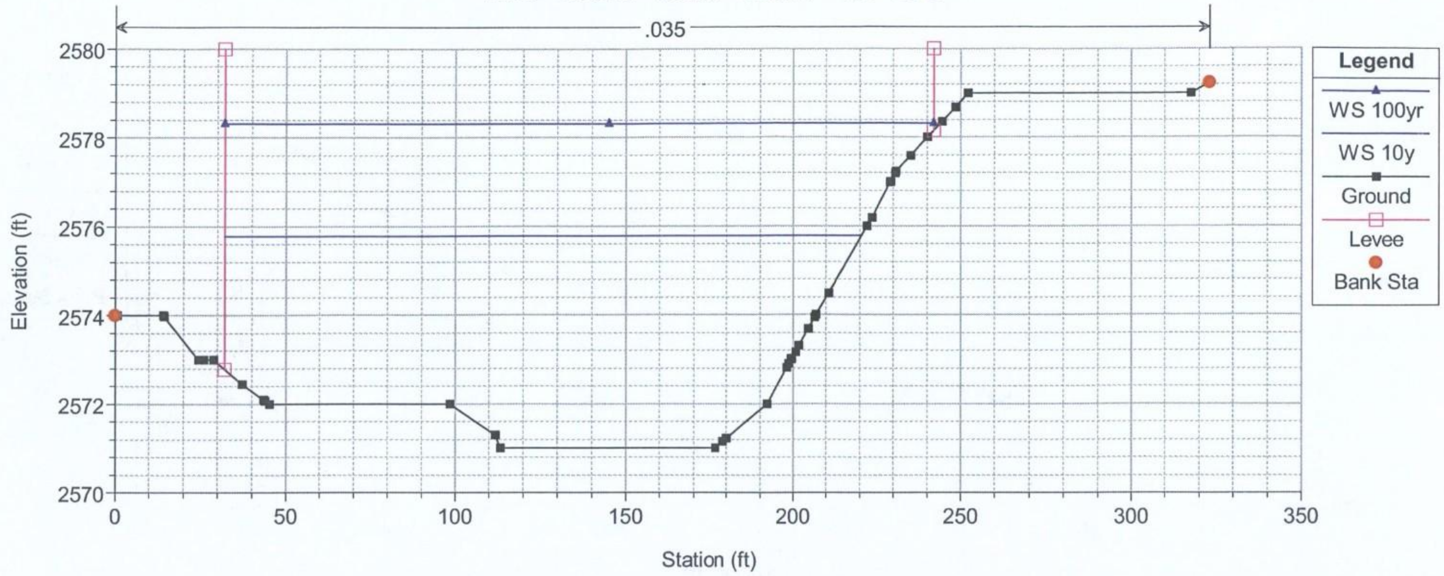



Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2496
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta

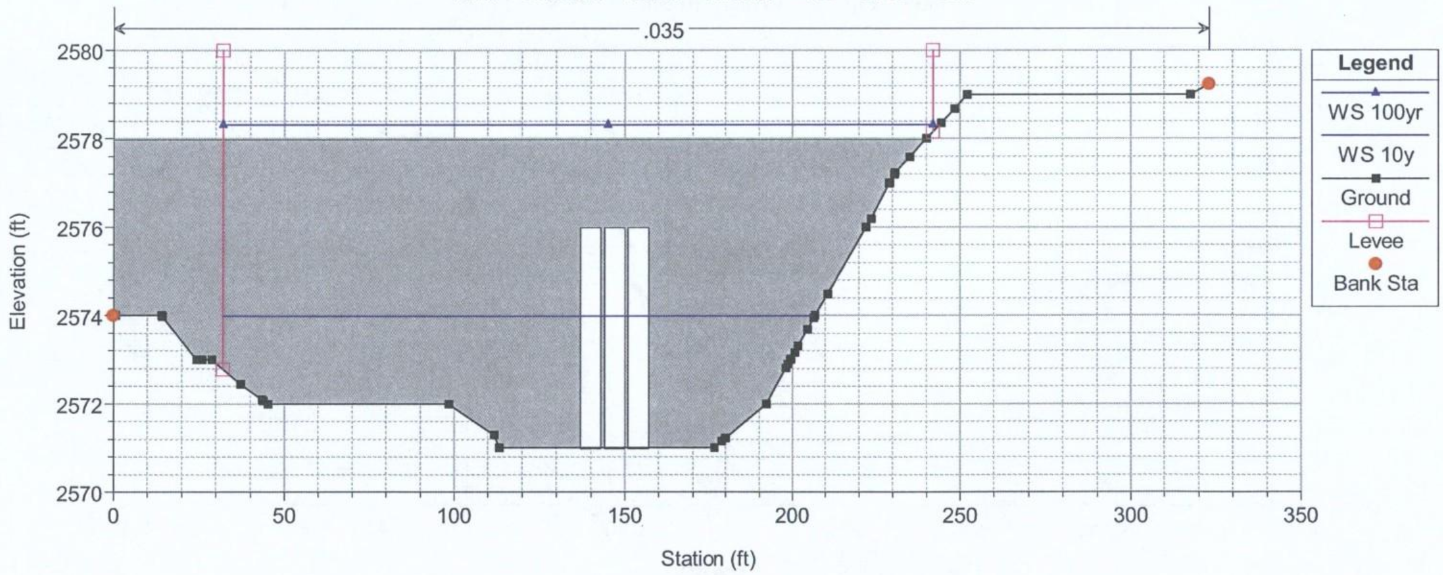

Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2436
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta


Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2341
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta

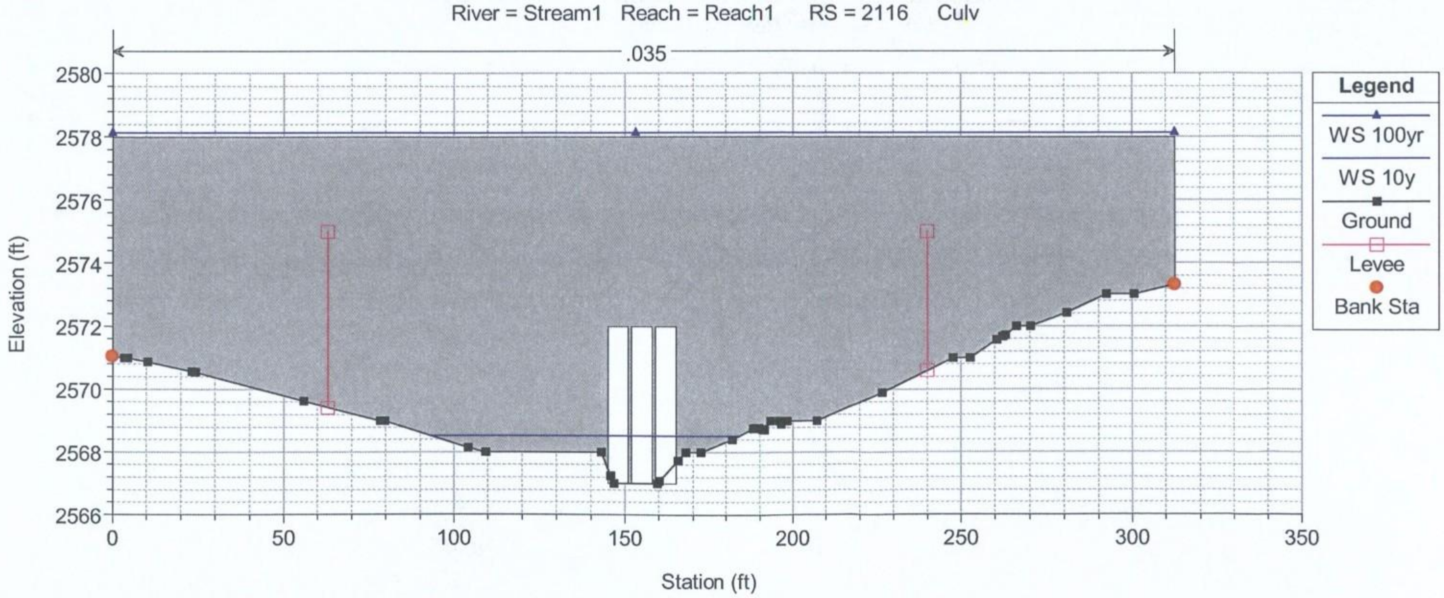
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2163

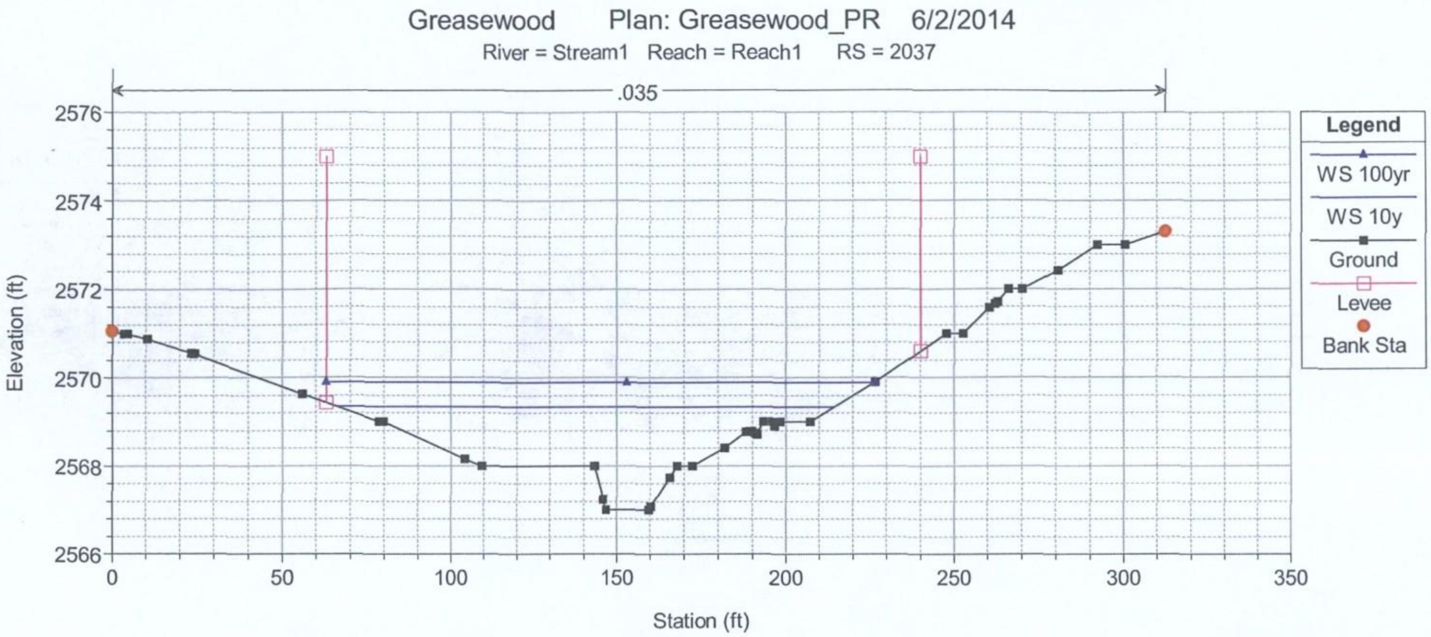


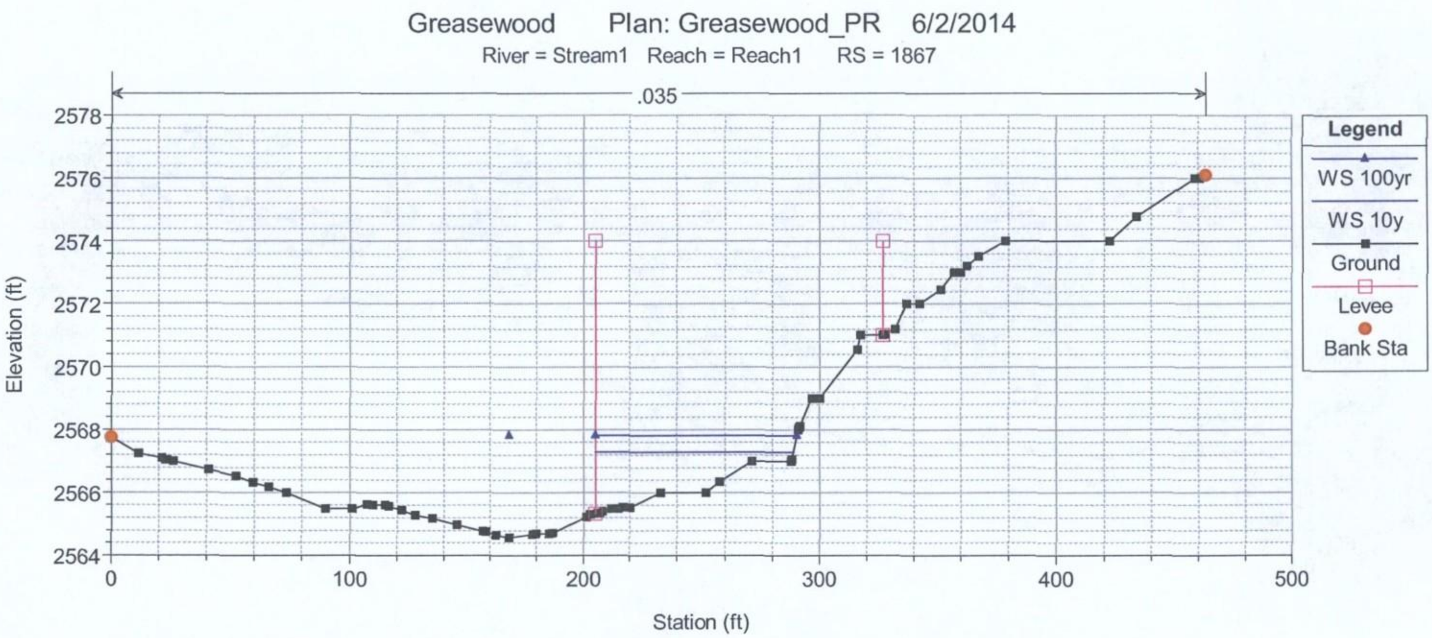
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2116 Culv

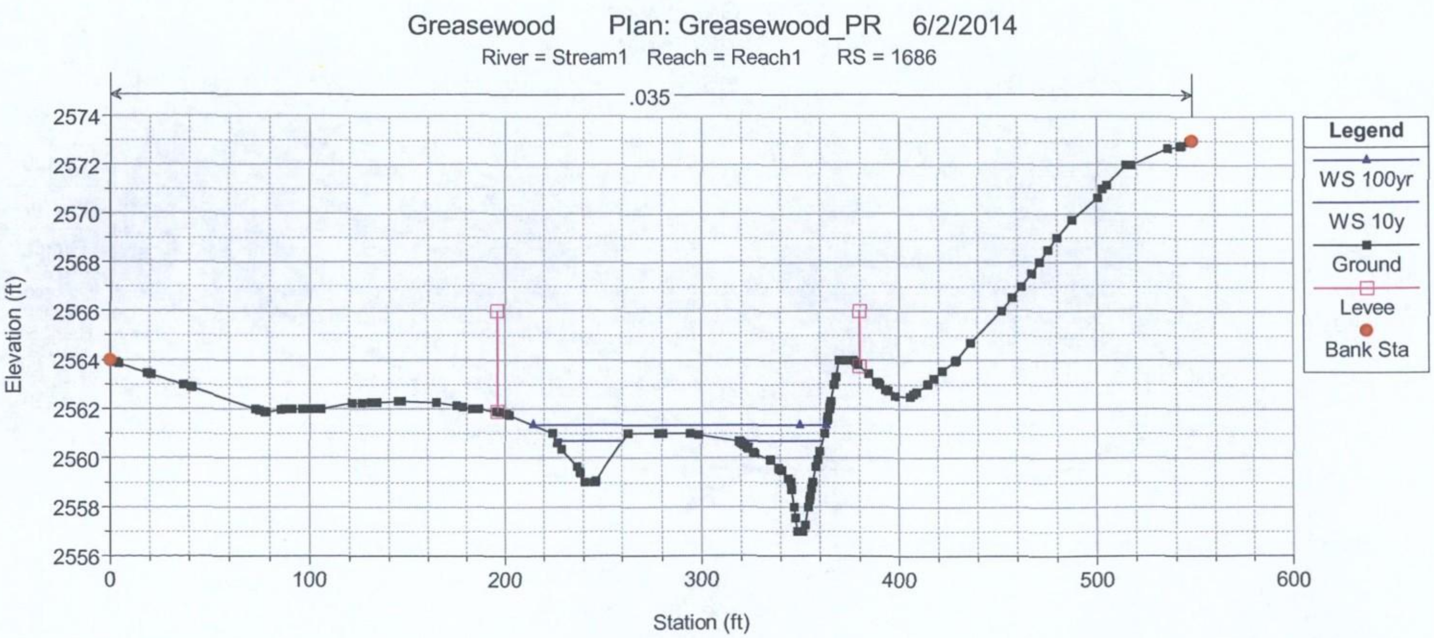


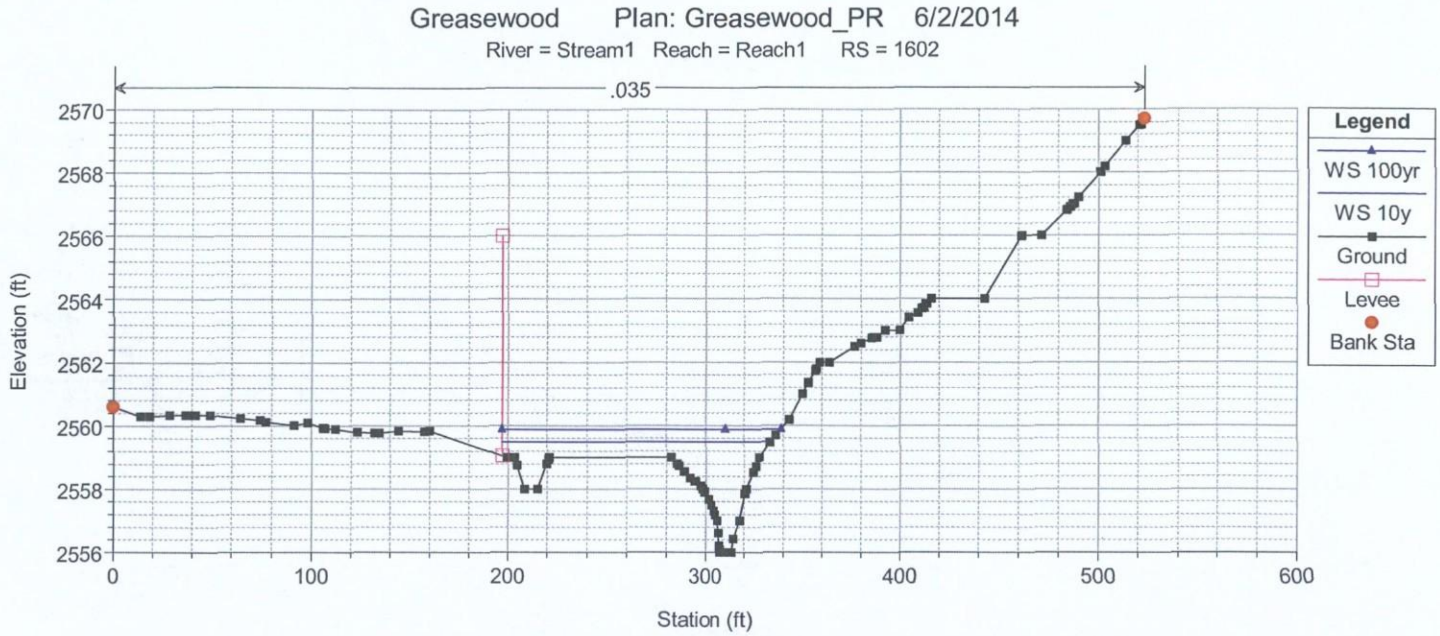
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2116 Culv

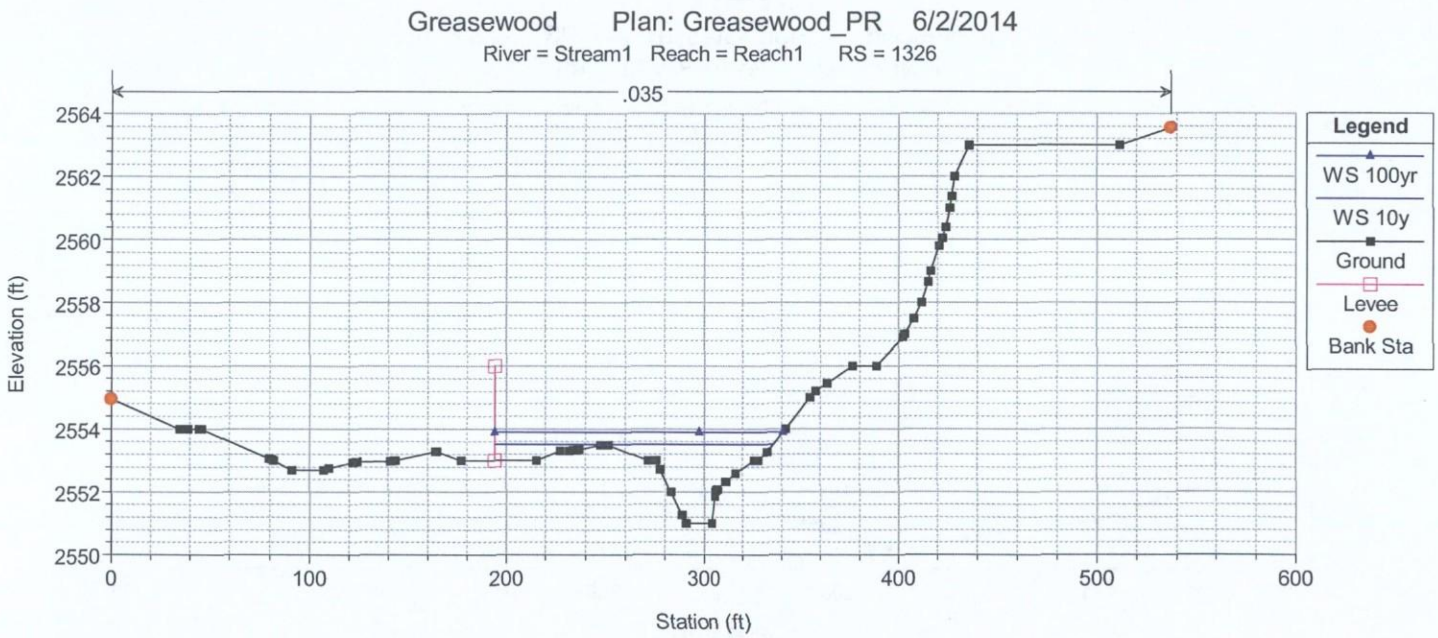


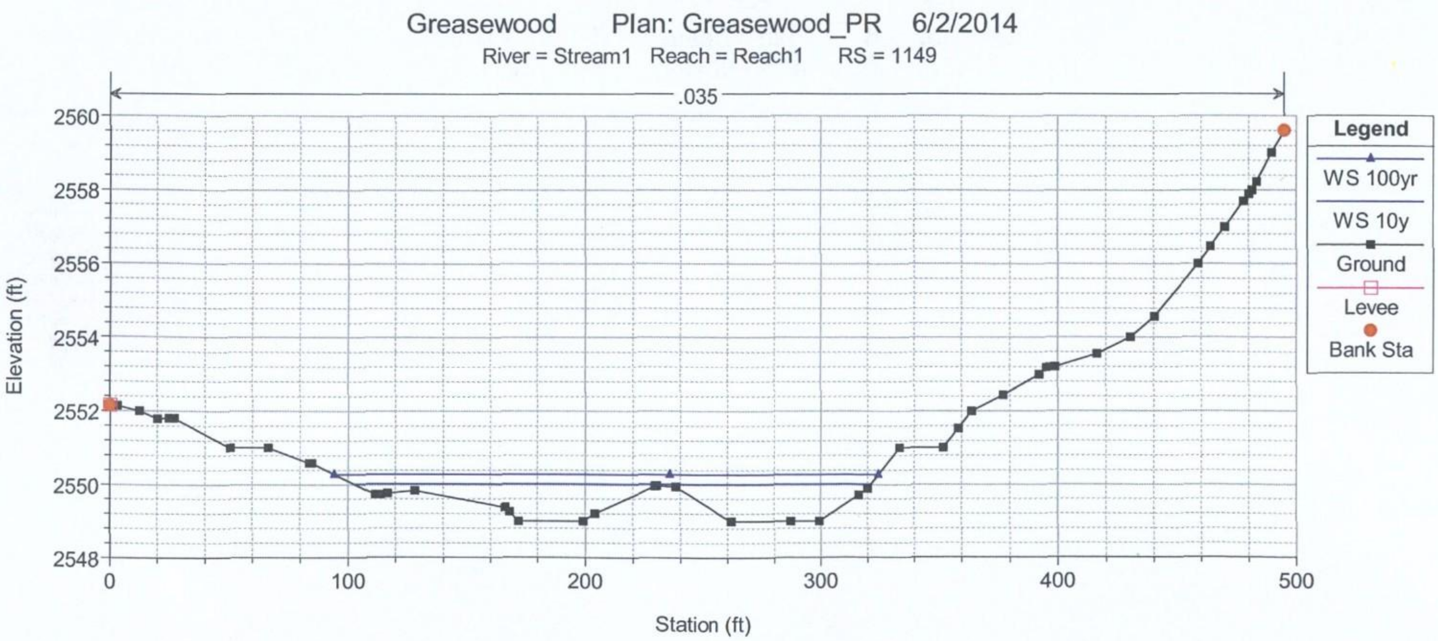

Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 2037
.035
Elevation (ft)
2576
2574
2572
2570
2568
2566
Station (ft)
0
50
100
150
200
250
300
350
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta

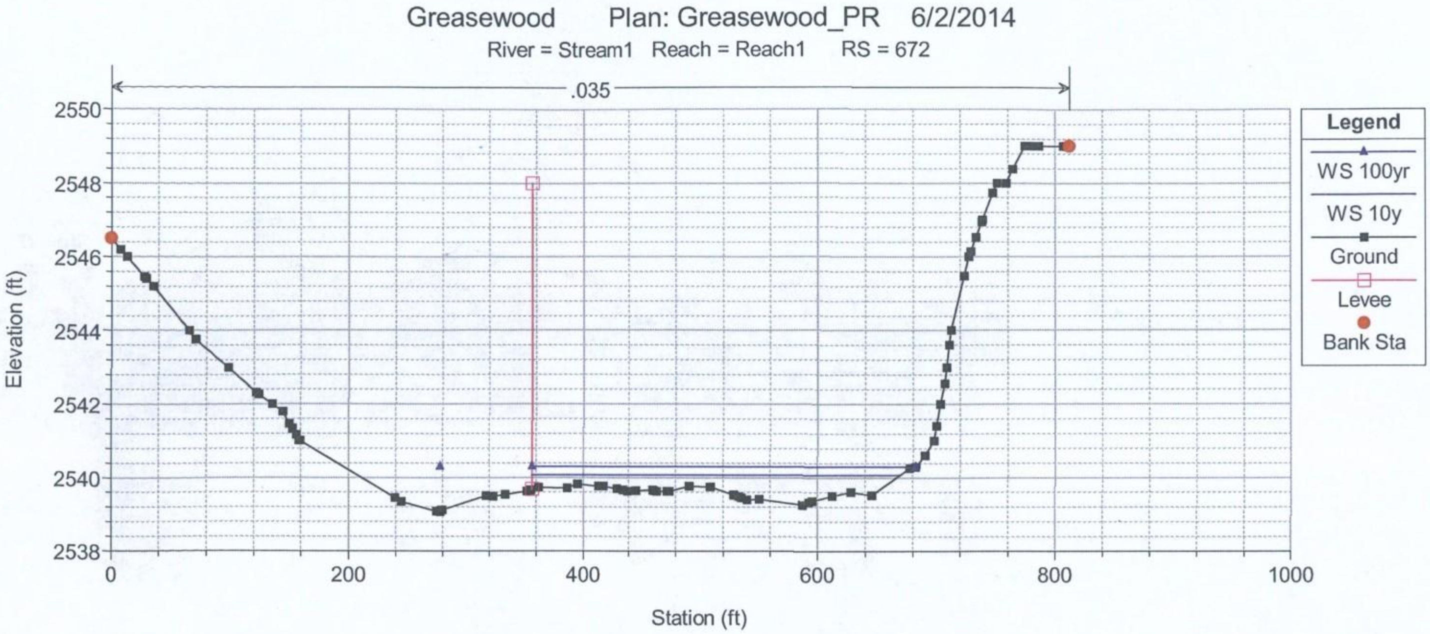

Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 1867
.035
Elevation (ft)
2578
2576
2574
2572
2570
2568
2566
2564
Station (ft)
0
100
200
300
400
500
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta


Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 1686
.035
Elevation (ft)
2574
2572
2570
2568
2566
2564
2562
2560
2558
2556
Station (ft)
0
100
200
300
400
500
600
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta

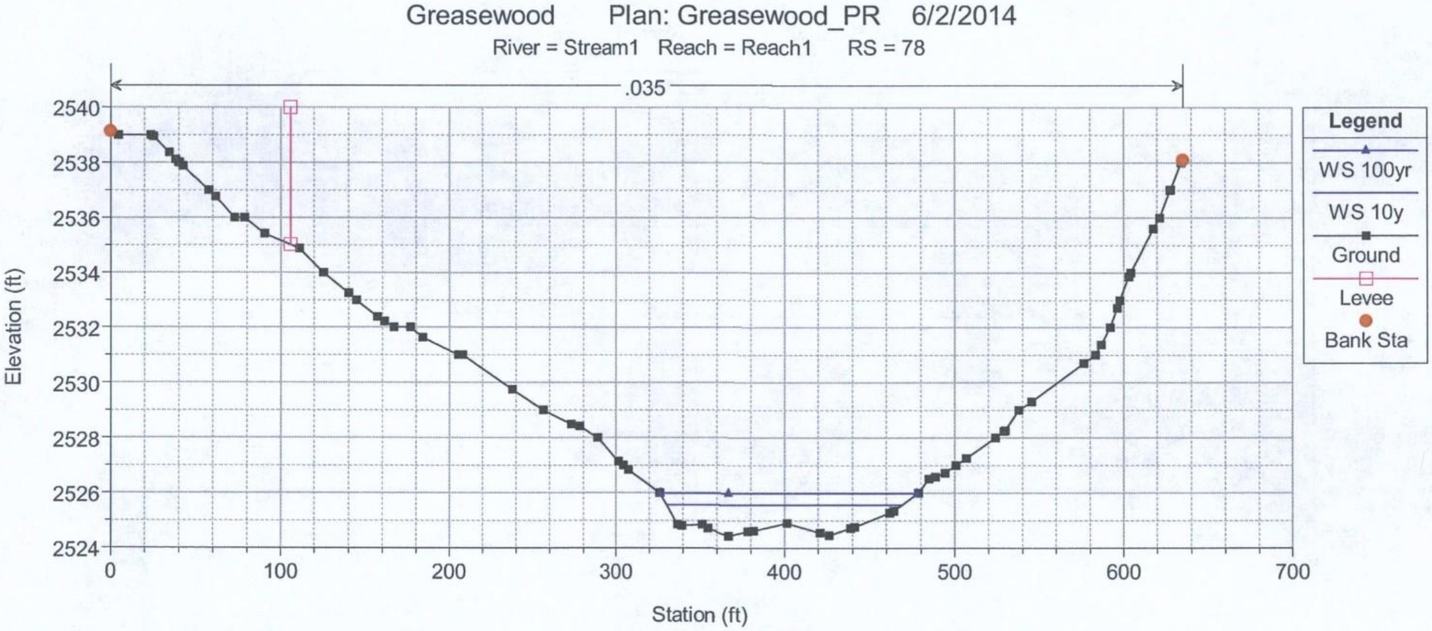

Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 1602
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta


Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 1326
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta


Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 1149
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta



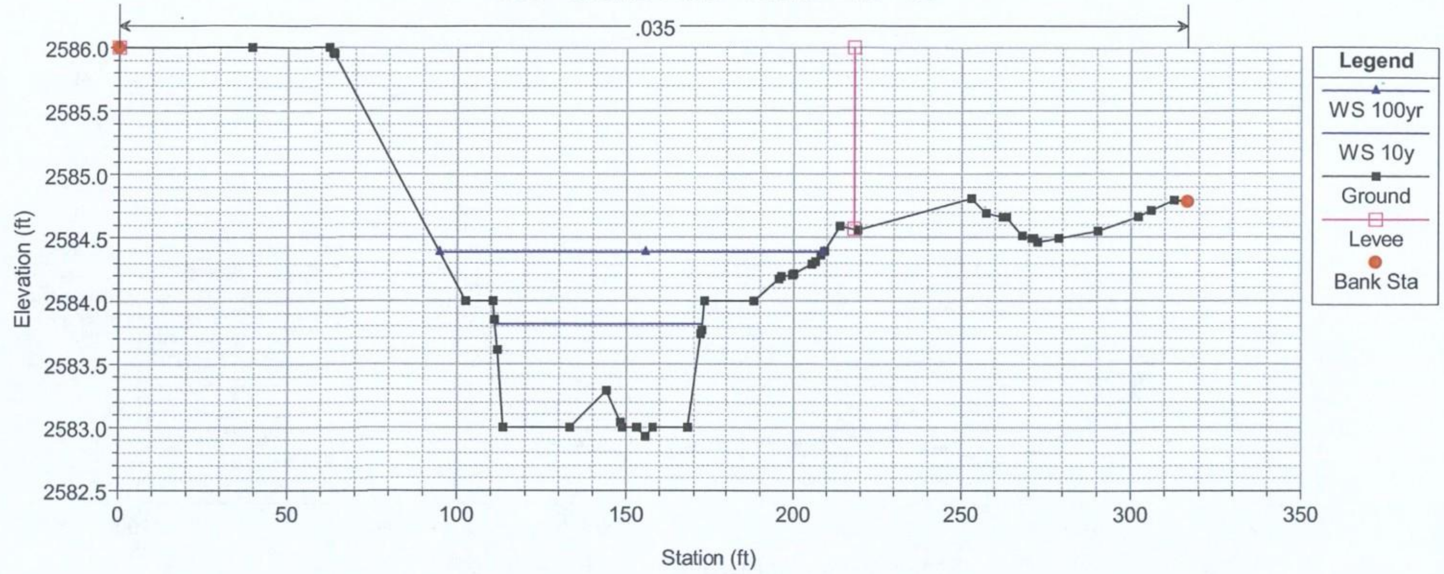
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 672
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta



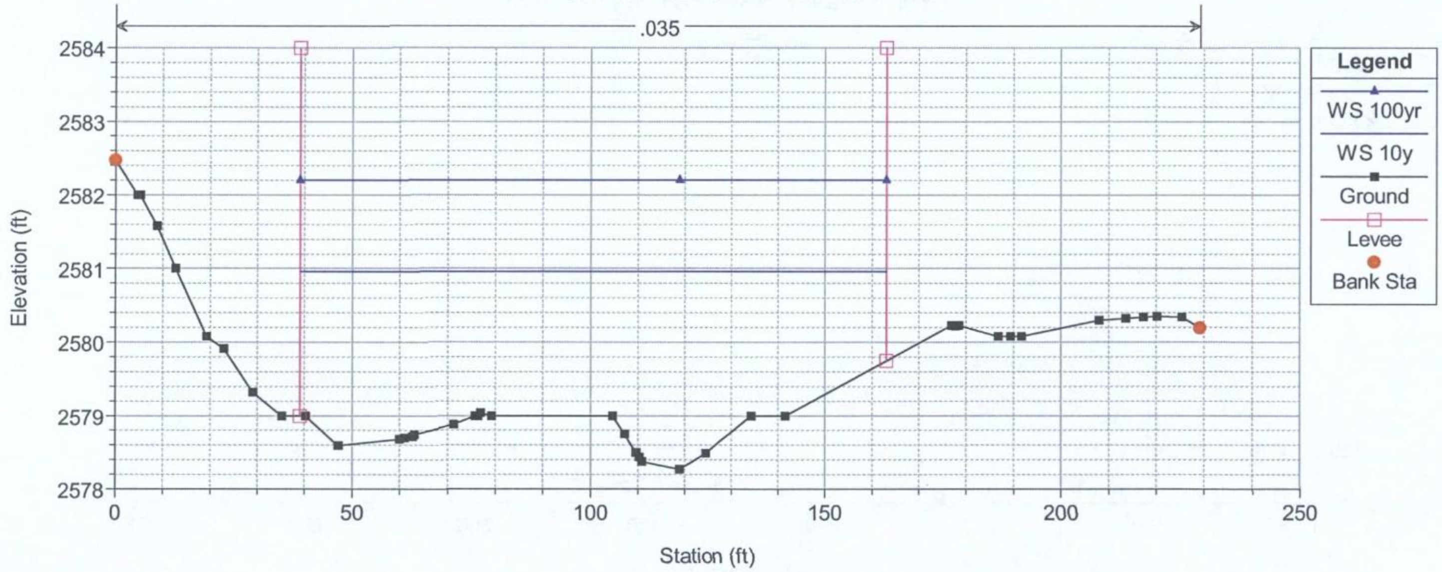
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream1 Reach = Reach1 RS = 78
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta

Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 633
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Bank Sta

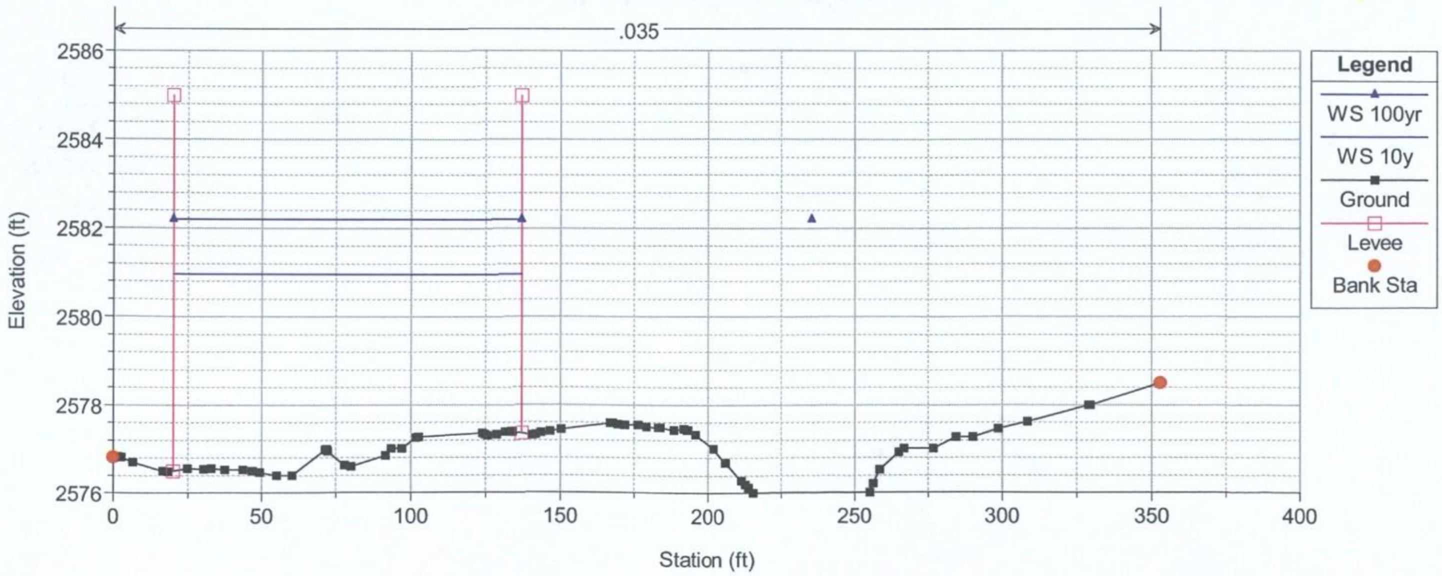
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 471



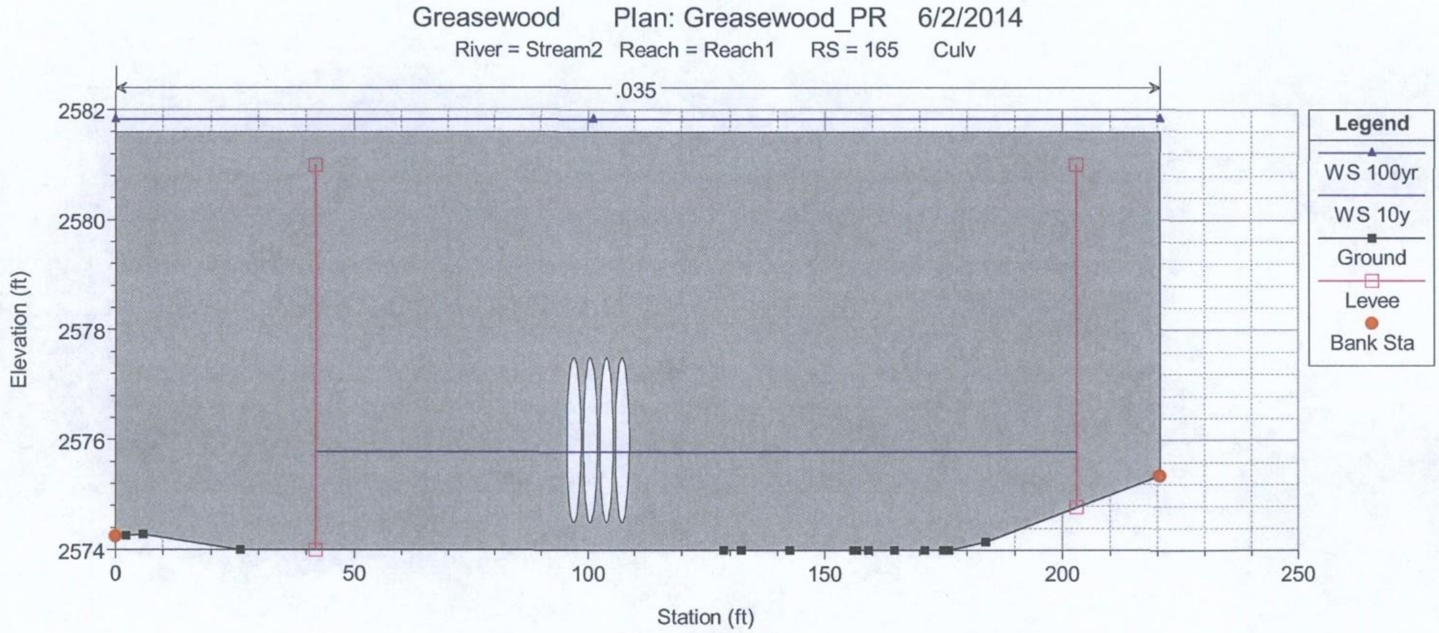
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 321



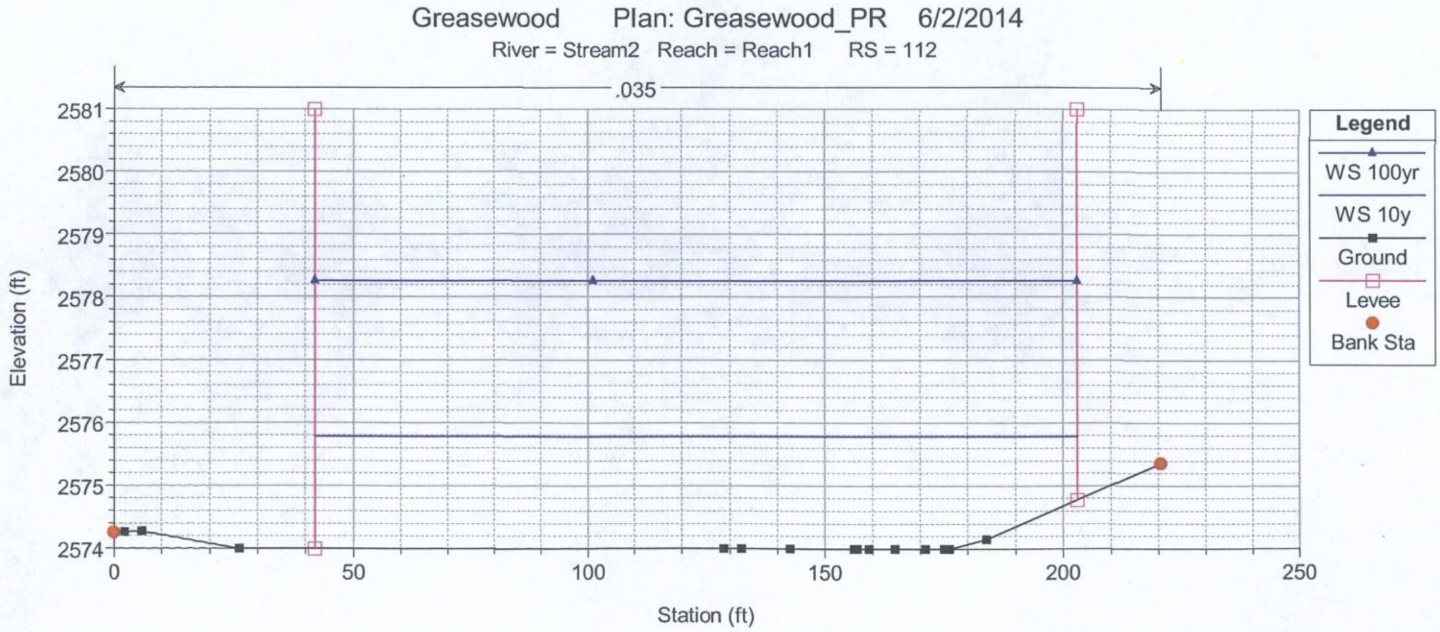
Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 226



Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 165 Culv
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta



Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 165 Culv
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta



Greasewood Plan: Greasewood_PR 6/2/2014
River = Stream2 Reach = Reach1 RS = 112
.035
Elevation (ft)
Station (ft)
Legend
WS 100yr
WS 10y
Ground
Levee
Bank Sta

HY-8 Culvert Analysis Report

Table 1 - Summary of Culvert Flows at Crossing: Off-site Crossing - 36" pipe

Headwater Elevation (ft)	Total Discharge (cfs)	Off-site Crossing - 36" pipe Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2534.50	0.00	0.00	0.00	1
2536.01	11.90	11.90	0.00	1
2536.82	23.80	23.80	0.00	1
2537.52	35.70	35.70	0.00	1
2538.31	47.60	47.60	0.00	1
2538.89	55.00	55.00	0.00	1
2539.11	71.40	57.55	13.71	8
2539.17	83.30	58.16	24.85	4
2539.22	95.20	58.70	36.37	4
2539.26	107.10	59.17	47.88	4
2539.30	119.00	59.59	59.22	3
2539.00	56.25	56.25	0.00	Overtopping

Rating Curve Plot for Crossing: Off-site Crossing - 36" pipe

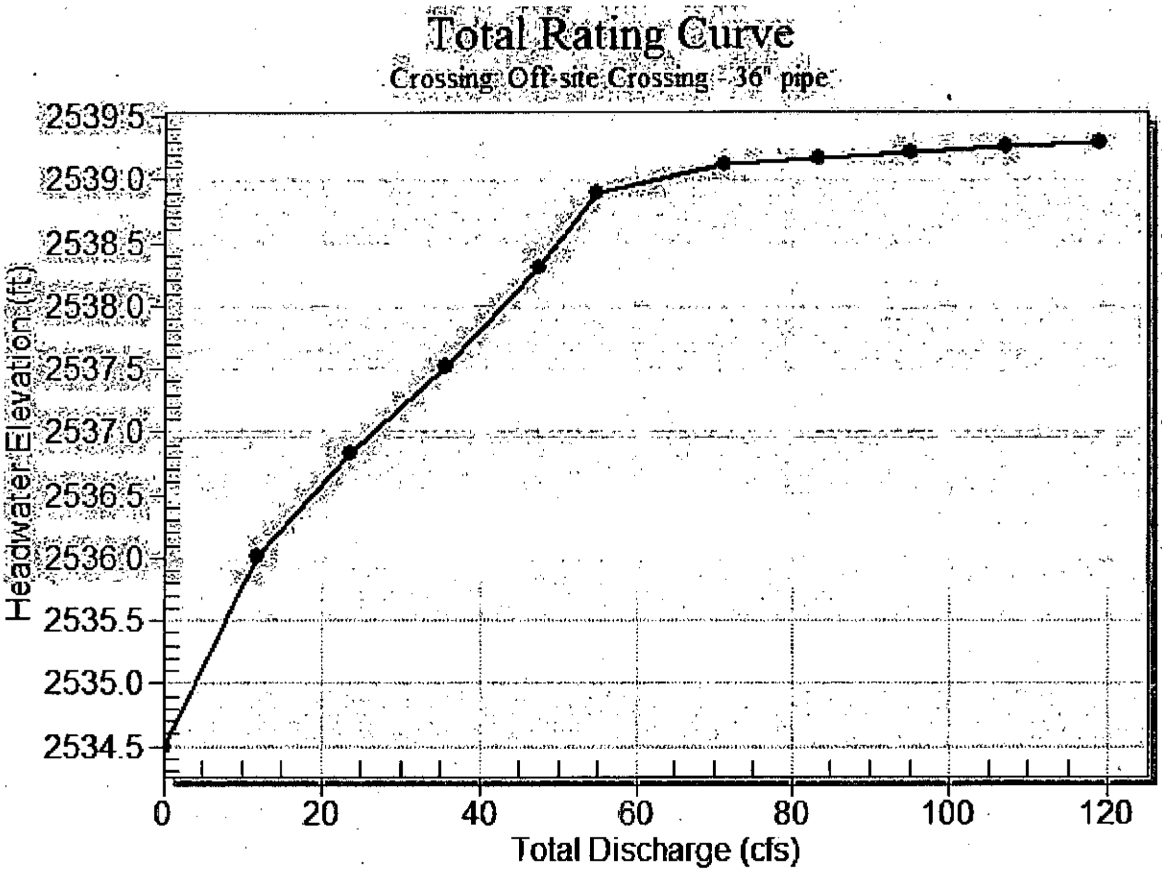


Table 2 - Culvert Summary Table: Off-site Crossing - 36" pipe

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2534.50	0.000	0.0*	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
11.90	11.90	2536.01	1.507	0.0*	1-S2n	0.835	1.086	0.836	0.332	7.357	3.357
23.80	23.80	2536.82	2.324	0.001	1-S2n	1.214	1.567	1.277	0.501	8.292	4.319
35.70	35.70	2537.52	3.023	0.136	5-S2n	1.530	1.936	1.618	0.636	9.190	4.983
47.60	47.60	2538.31	3.807	0.252	5-S2n	1.832	2.238	1.930	0.752	9.918	5.503
55.00	55.00	2538.89	4.392	0.318	5-S2n	2.027	2.405	2.115	0.818	10.322	5.779
71.40	57.55	2539.11	4.614	0.451	5-S2n	2.093	2.446	2.193	0.951	10.414	6.307
83.30	58.16	2539.17	4.670	0.539	5-S2n	2.111	2.456	2.203	1.039	10.476	6.635
95.20	58.70	2539.22	4.718	0.622	5-S2n	2.128	2.465	2.218	1.122	10.501	6.929
107.10	59.17	2539.26	4.761	0.700	5-S2n	2.142	2.472	2.229	1.200	10.529	7.198
119.00	59.59	2539.30	4.801	0.774	5-S2n	2.156	2.479	2.241	1.274	10.548	7.444

* theoretical depth is impractical. Depth reported is corrected.

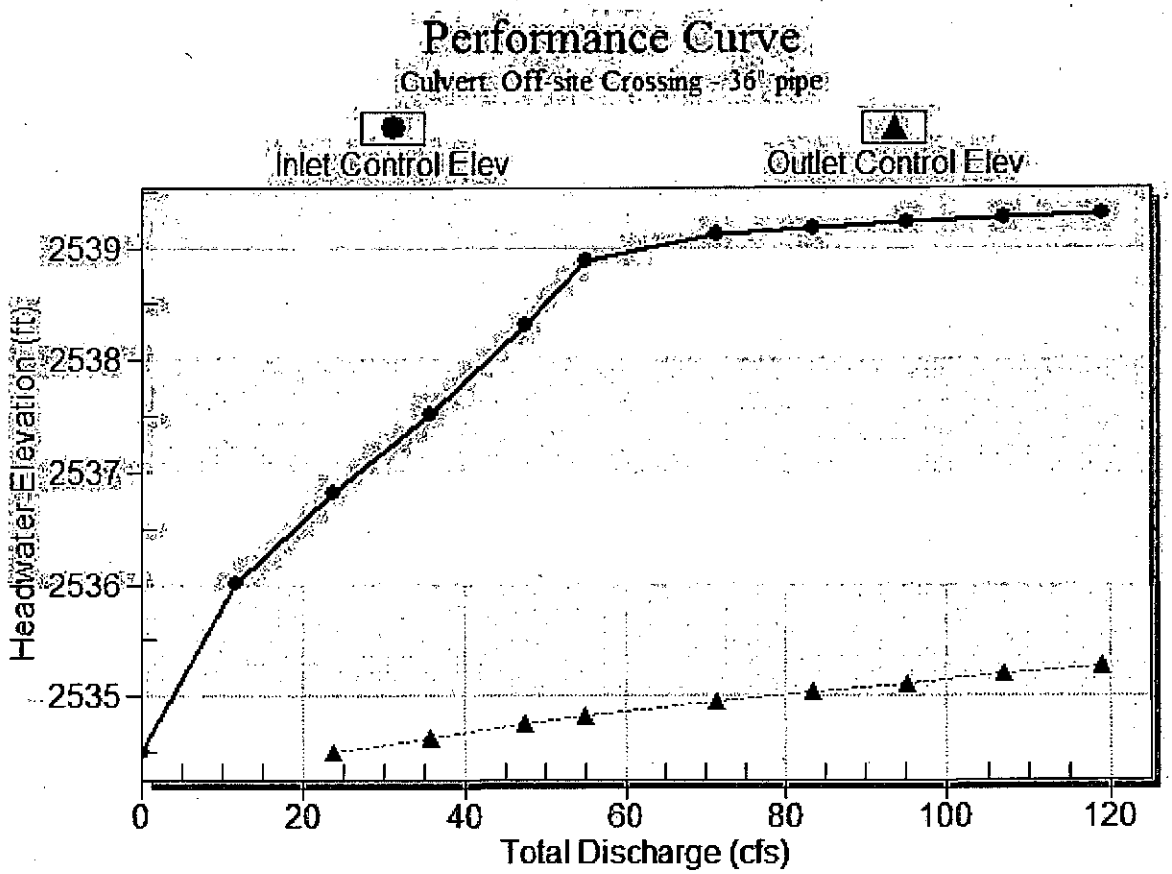
****

Inlet Elevation (invert): 2534.50 ft,   Outlet Elevation (invert): 2534.00 ft

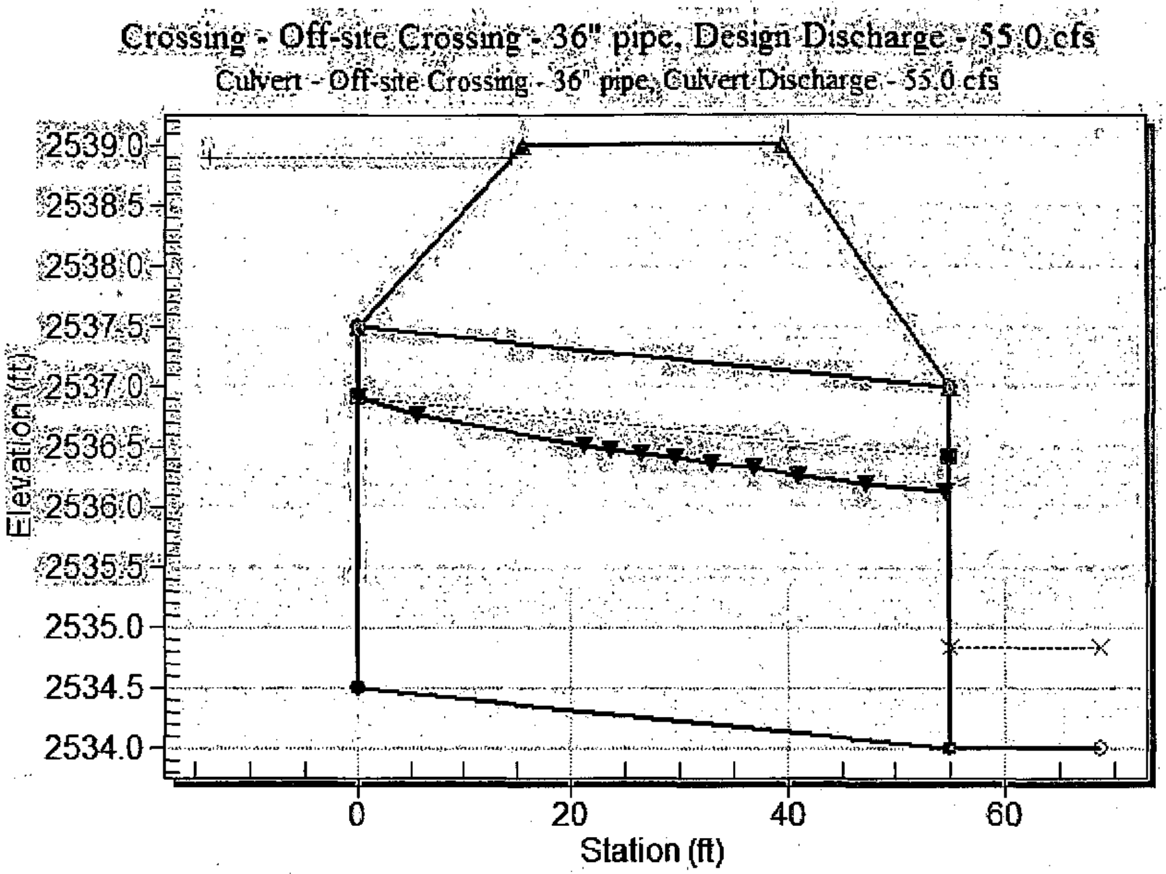
Culvert Length: 55.00 ft,   Culvert Slope: 0.0091

****

Culvert Performance Curve Plot: Off-site Crossing - 36" pipe



Water Surface Profile Plot for Culvert: Off-site Crossing - 36" pipe



Site Data - Off-site Crossing - 36" pipe

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2534.50 ft

Outlet Station: 55.00 ft

Outlet Elevation: 2534.00 ft

Number of Barrels: 1

Culvert Data Summary - Off-site Crossing - 36" pipe

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: Off-site Crossing - 36" pipe)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	2534.00	0.00	0.00	0.00	0.00
11.90	2534.33	0.33	3.36	0.62	1.06
23.80	2534.50	0.50	4.32	0.94	1.12
35.70	2534.64	0.64	4.98	1.19	1.16
47.60	2534.75	0.75	5.50	1.41	1.19
55.00	2534.82	0.82	5.78	1.53	1.20
71.40	2534.95	0.95	6.31	1.78	1.23
83.30	2535.04	1.04	6.64	1.95	1.24
95.20	2535.12	1.12	6.93	2.10	1.25
107.10	2535.20	1.20	7.20	2.25	1.27
119.00	2535.27	1.27	7.44	2.38	1.27

Tailwater Channel Data - Off-site Crossing - 36" pipe

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 10.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0300

Channel Manning's n: 0.0350

Channel Invert Elevation: 2534.00 ft

Roadway Data for Crossing: Off-site Crossing - 36" pipe

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 120.00 ft

Crest Elevation: 2539.00 ft

Roadway Surface: Paved

Roadway Top Width: 24.00 ft

Project: ***Cavalliere Flats***
Subject: **Erosion Setback Calculation**
Designed by: **MAW** Date: 6/2/2014
Checked by: Date:

Setback calculated according to *State Standard for Watercourse System System Sediment Balance* (SSA 5-96), Level 1 Analysis for straight channel reaches or reaches with minor curvature

$$\text{Setback} = 1 \times (\text{100-year Peak Discharge})^{0.5}$$

Calculate Erosion Setbacks

Wash ID	**Peak Discharge[1] (cfs)**	**Setback (ft)**
North Wash, upstream of confluence	463	22
North Wash, downstream of confluence	973	31
East Wash	484	22

Notes:
[1] Proposed conditions peak discharge used for calculation

Appendix E– STORMWATER STORAGE WAIVER

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#________

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request ***before submitting improvement plans***. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 8/28/14 **Project Name** Cavalliere Flats

Project Location South of Pinnacle Vista Drive and east of Alma School Parkway

Applicant Contact Jason Burm **Company Name** Kimley-Horn and Associates, Inc.

Phone ____________ Fax ____________ E-mail Jason.Burm@kimley-horn.com

Address 7740 N. 16th Street, Suite 300, Phoenix, AZ 85020

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☐ 2. The development is on a parcel less than one-half acre in size.

☑ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

Partial waivers are available for projects or portions of properties within the Environmentally Sensitive Lands Zoning Overlay District, not meeting any of the three full waiver criteria above, if post-development peak discharge rates do not exceed pre-development conditions, based on the 10- and 100-year storm events.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

[signature] 8.28.14

Engineer Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#________

CITY STAFF TO COMPLETE THIS PAGE

Project Name Cavalliere Ranch

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3

☐ Recommend approve waiver.

☐ Recommend deny waiver:
- ☐ None of waiver criteria met.
- ☐ Downstream conditions prohibit waiver of any storage.
- ☐ Other:

Explain: ____________________

☐ Return waiver request:
- ☐ Insufficient data provided.
- ☐ Other: ____________________

Explain: ____________________

Recommended Conditions of Waiver:
- ☐ All storage requirements waived.
- ☐ Post-development peak discharge rates do not exceed pre-development conditions.
- ☐ Other:

Explain: ____________________

☐ **Waiver approved per above conditions.**

☐ **Waiver denied.**

______________________________ ______________

Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#________

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $1.87 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name Cavalliere Ranch

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where

V = stormwater storage volume required, in cubic feet,

ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),

R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and

A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where

V_w = volume waived,

V = volume required, and

V_p = volume provided

R = ____________

ΔC= ____________

A = ____________

V = ____________

V_p= ____________

V_w= ____________

☐ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $1.87 per cubic foot = ____________

☐ An in-kind contribution will be made, as follows:

____

____

____

☑ No in-lieu fee is required. Reason:
Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

____

Approved by:

______________________________ ____________

Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

2

Report No.________________

Archaeological Resources Certificate of No Effect

Application

RE: PROTECTION OF ARCHAEOLOGICAL RESOURCES ORDINANCE

Parcel Number(s): 216-80-007G Acres: approx. 5 Quarter Section(s): 58-45

Street Address or Intersection: NEC of the intersection of Scottsdale Road and Westland Drive in Scottsdale, Arizona

Applicant Name: Taylor Morrison/Arizona, Inc.

Applicant Address: 9000 E. Pima Center Parkway, Suite 350, Scottsdale, Arizona 85258

Telephone Number: (480) 344-7000 E-Mail: jdeason@taylormorrison.com

Owner Name: Taylor Morrison/Arizona, Inc.

Owner Address: 9000 E. Pima Center Parkway, Suite 350, Scottsdale, Arizona 85258

Telephone Number: (480) 344-7000 E-Mail: jdeason@taylormorrison.com

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Notes:

Development Project Application

☐ Rezoning	☐ Use Permit	☐ General Plan
☒ Preliminary Plat	☐ Final Plat	☐ Master Plan
☐ Development Rev Board	☐ Lot Split	☐ Building Permit
☐ Grading Permit	☐ Infrastructure Imp.	☐ Native Plant

Archaeological Survey & Report

☒ Class III Archaeological Survey and Report Submitted Date: June 2014

Name of Report: A CLASS I RECORDS SEARCH OF THE GREASEWOOD FLAT PROPERTY AND A CLASS III ARCHAEOLOGICAL SURVEY OF APPROXIMATELY 5 ACRES (PARCEL NO. 216-80-007G), SCOTTSDALE, MARICOPA COUNTY, ARIZONA

Archaeologist and Firm: Alan L. Bartholomew, SWCA Environmental Consultants

Applicants/Archaeologists Stop Here

Scottsdale Historic Preservation Program

7506 E Indian School Rd, Scottsdale, AZ 85251 • Phone: 480-312-2523 • Fax: 4

18-PP-2013#2
8/29/2014

Report No.____________________

THIS SIDE OF FORM TO BE COMPLETED BY CITY

Date report sent to on-call archaeology firm for review: ____________________

Name of firm reviewing report: ____________________

Date review comments received: ____________________

CERTIFICATE OF NO EFFECT

☐ Denied, report incomplete and does not meet city and state standards (see attached explanation)

☐ Approved, in accordance with the following findings:

______ No archaeological resources are located on the property.

______ No significant archaeological resources are impacted.

______ Significant archaeological resources are protected.

______ Type of permanent protection provided

______ Documentation of permanent protection provided and approved

☐ Denied, Certificate of Approval Application required (see attached explanation)

City Archaeologist Signature: ____________________ Date:__________

NOTICE:
Date a copy of this signed application was handed or e-mailed to the owner and/or the applicant by the City Archaeologist after approval or denial: ________________

APPEAL

Certificate of No Effect
Appeal Date:
HPC Hearing:
HPC Decision:
CC Hearing:
CC Decision:

Scottsdale Historic Preservation Program
7506 E Indian School Rd, Scottsdale, AZ 85251 • Phone: 480-312-2523 • Fax: 480-312-7314

SWCA®
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

A Class I Records Search of the Greasewood Flat Property and a Class III Archaeological Survey of Approximately 5 Acres (Parcel No. 216-80-007G), Scottsdale, Maricopa County, Arizona

Prepared for

Kimley-Horn and Associates

FILE COPY

Prepared by

SWCA Environmental Consultants

June 2014

12-ZN-2014
6/11/2014

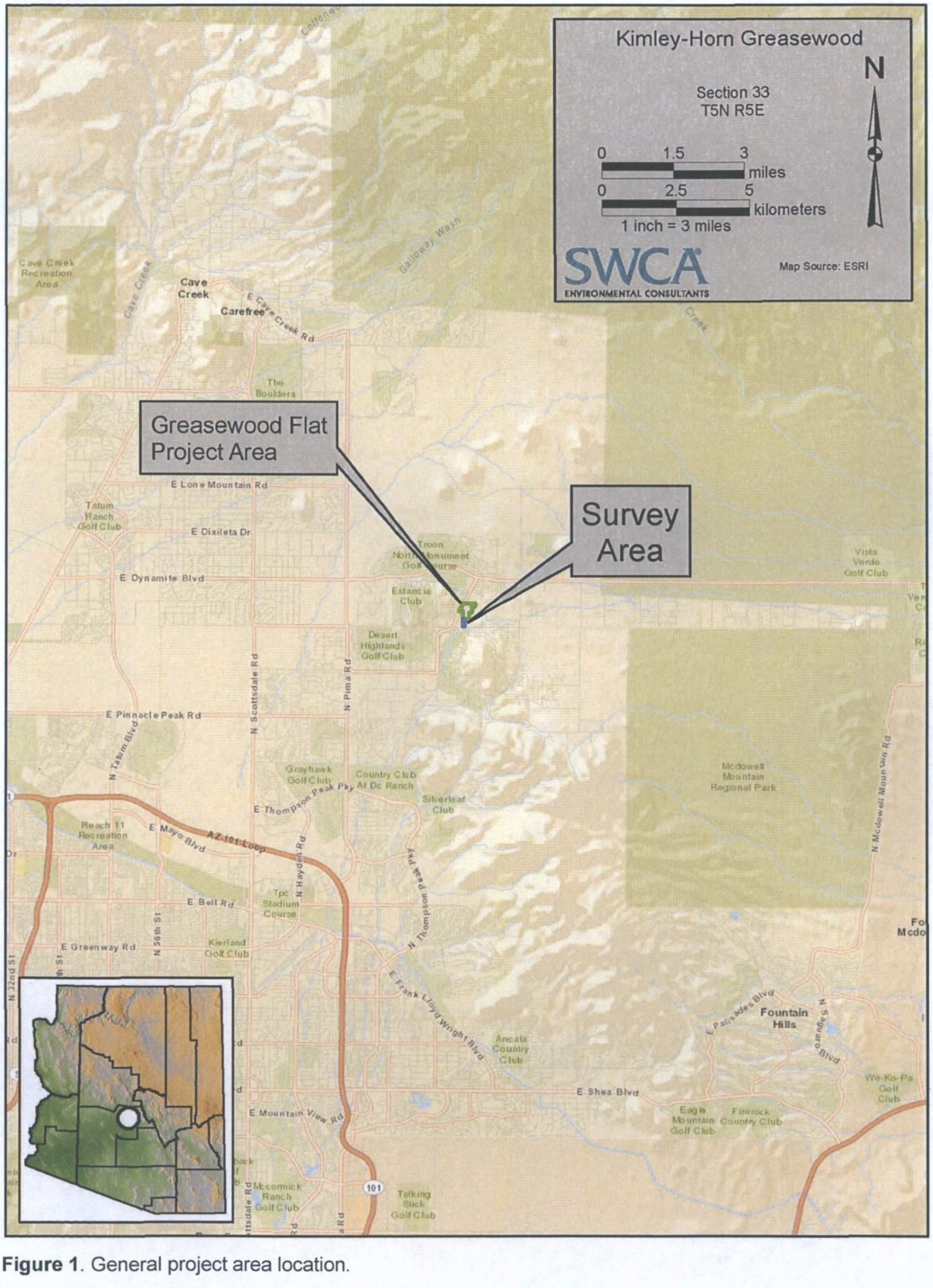

Figure 1. General project area location.

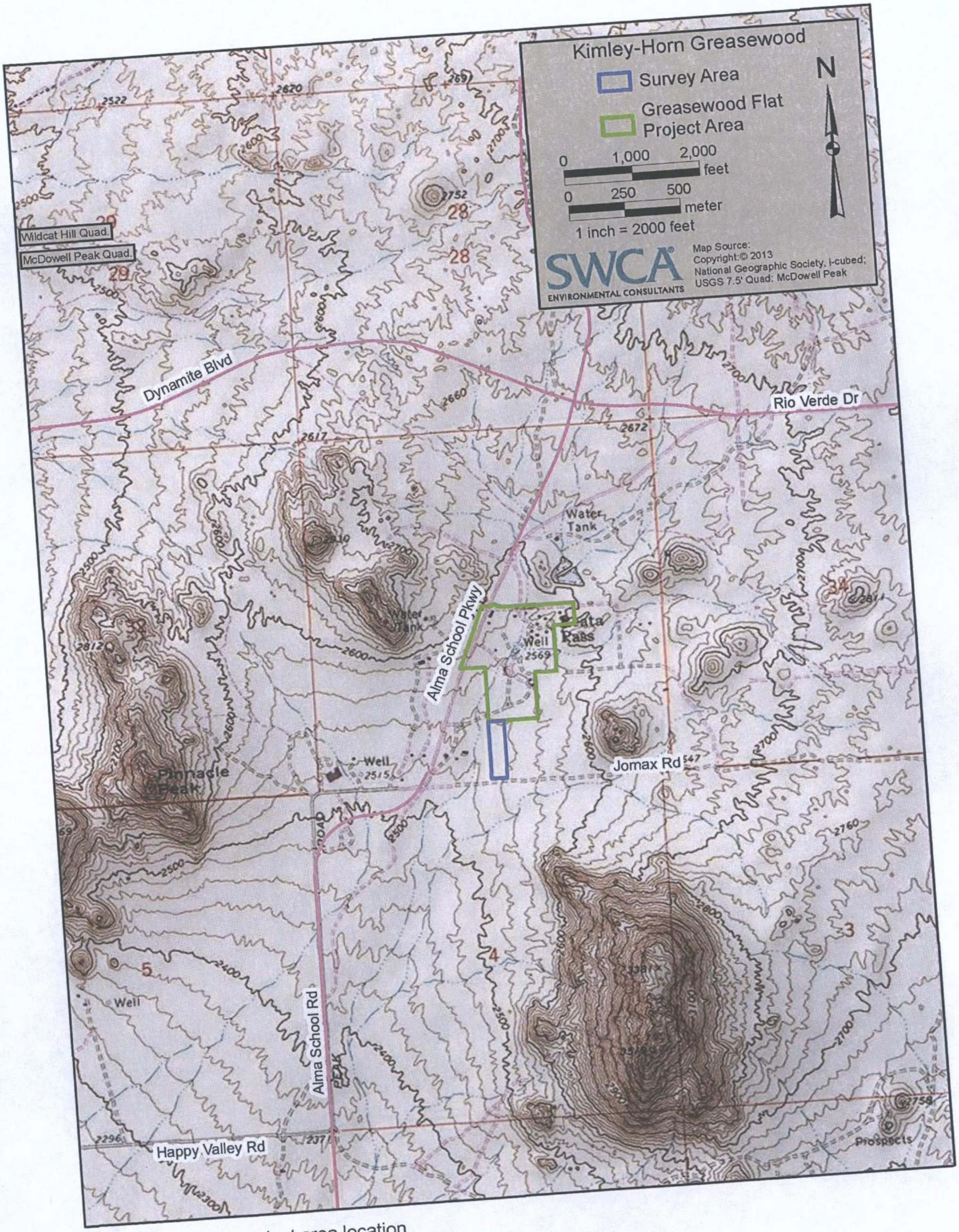

Figure 2. Specific project area location.

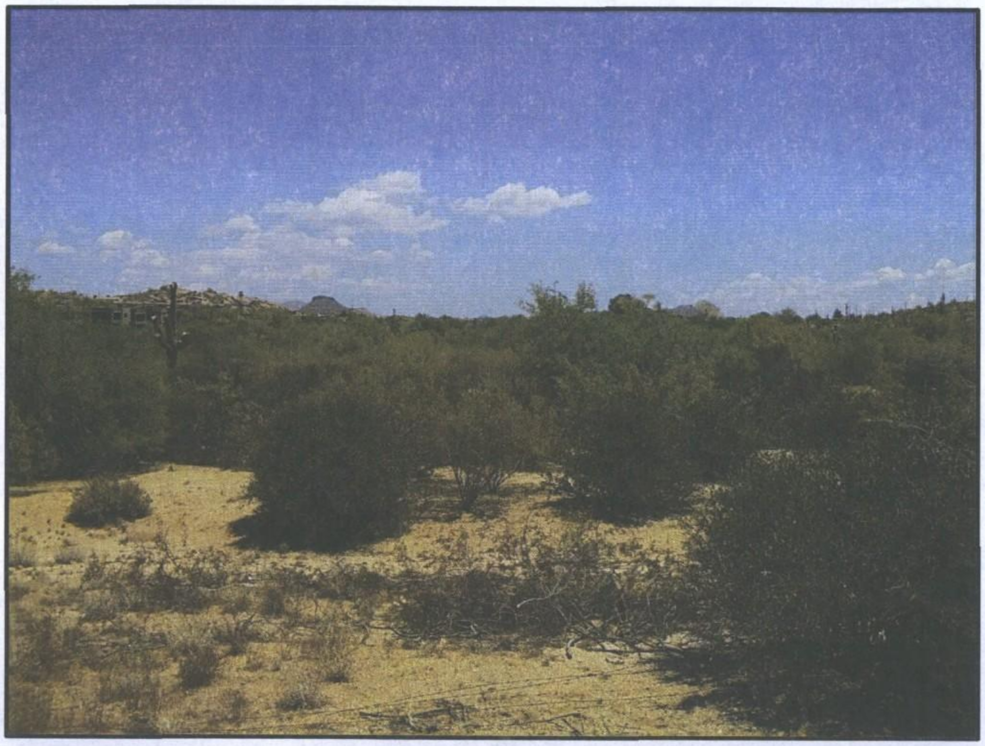

Figure 3. Project area overview, view facing northwest.

Hohokam cultural tradition is assigned to the Red Mountain phase (A.D. 1–500) of the Pioneer period (A.D. 1–750) (Cable and Doyel 1987; Dean 1991; Hackbarth 1992, 2001; Morris 1969). Evidence from Red Mountain phase sites indicates that people subsisted on a mix of wild resources and agricultural products. Corn was the dominant crop, along with beans, squash, and cotton. The first evidence for canal irrigation along the Salt River is attributed to this time, A.D. 400 (Ackerly and Henderson 1989). Identified house forms include small circular and "bean-shaped" pit houses (Mabry 2000).

The period between A.D. 500 and 650 is defined as the Vahki phase. It appears that by this time, irrigation had become well established. Vahki phase canals have been identified at Snaketown (Haury 1976), as well as along the edges of the Salt River floodplain (Ackerly and Henderson 1989). Domestic architecture of the Vahki phase consisted of square and rectangular pit houses of various sizes (Ciolek-Torrello et al. 2000; Crary and Craig 2001).

The Late Pioneer period (A.D. 650–750) saw the appearance of decorated pottery in southern Arizona. Hohokam decorated pottery had red painted designs on a light-colored buff or brown background (Abbott 2001; Haury 1976). The earliest decorated pottery types include Estrella, Sweetwater, and Snaketown Red-on-buff (Wallace 2001). House types associated with the Late Pioneer period vary greatly. Small, domed field houses made from bent poles and covered with brush served as temporary shelters in agricultural fields or at resource procurement and processing sites. Few artifacts are associated with the remains of these structures. Late Pioneer period habitation sites, on the other hand, contain moderately sized pit structures with square or rectangular floor plans and formal, plastered hearths. These are far more substantial than the field houses and were occupied for extended periods.

Late Pioneer period subsistence was based on a mixture of wild resources and agricultural produce. The use of irrigation expanded from the floodplains to include lands on terraces above rivers (Ackerly and Henderson 1989).

The Gila Butte and Santa Cruz phases make up the Colonial period (A.D. 750–950). This was a time of expansion and elaboration of the Hohokam culture, where the number and distribution of sites across the landscape increased considerably. Colonial period Hohokam artifacts have been found as far north as Prescott in north-central Arizona and as far south as northern Mexico, extending to the west of Gila Bend in southwestern Arizona and into New Mexico to the east (Haury 1976). Abbott (1994, 2001) argues that the center for most of the decorated buff ware vessels produced during this time was the middle Gila River valley. Not only did the Hohokam expand their territory, they also intensified contact with their neighbors. Intrusive ceramics from the north, east, and west have been found at Hohokam sites dating to this time. It has been argued that Colonial period Hohokam social organization was tied to the exchange of ritual and subsistence goods (Doyel 1985). Across Arizona, networks of interaction spheres dominated the social landscape and facilitated exchange across the region. It was during this time that the Hohokam achieved their highest level of arts and crafts production. Ceramics and shell jewelry dating to this period are well made and elaborately decorated.

The large, square communal structures found in earlier times ceased to be built during the Colonial period. Instead, ball courts, which were probably first built in the early A.D. 800s, became the dominant form of public architecture (Wallace 2001). Their appearance in southern Arizona has been thought to mark the emergence of a regional system with religious, economic, and political links that crosscut geographical boundaries (Abbott 2001; Wilcox and Shenk 1977). Subsistence was based on a mixture of wild resources and agricultural crops. Some wild species (e.g., little barley [*Hordeum pusillum*]) were so intensively exploited they became as important as some domesticated species (Bohrer 1987). The use of irrigation expanded significantly throughout the Salt and Gila River valleys, and the construction and maintenance of canals had a significant impact on Hohokam social and political organization (e.g., Abbott 2000; Hunt et al. 2005).

With the onset of the Sedentary period (Sacaton phase, A.D. 950–1150), there was a decline in the quality of Hohokam material culture, especially in the production of ceramics and shell ornaments. Ball courts were still the dominant form of public architecture during the Early Sedentary period; however, by its end, few were being built. As the construction of ball courts diminished, the construction of capped mounds or platform mounds became more common. Platform mounds were built near village centers around plazas that were surrounded by domestic features. House types exhibited significant variability and were aggregated within courtyard groups or village segments (Wilcox et al. 1981).

Subsistence continued to be based on agriculture, although there was some emphasis on collecting certain wild plant species, such as cholla. Cotton was also of major importance: its fiber was used for weaving textiles and its seeds were eaten.

By the end of the Sedentary period, a major reorganization of Hohokam society had occurred. After a period of intensive growth and expansion, many villages and areas were abandoned. Populations began aggregating in larger villages along the Salt River. These changes in the social and political environment were reflected in changes in public architecture and ceramic and shell production.

The Sedentary period was followed by the Classic period, which is divided into the Soho (A.D. 1150–1300) and the Civano phases (A.D. 1300–1450). Differences in ceramic decoration and architectural styles separate these two phases. Red-on-buff ceramics continued to be produced during the Soho phase, although they occurred with lower frequency. Red wares became increasingly common during the Civano phase, and the introduction of long-necked jars marks a clear contrast with earlier ceramic styles.

Structures with post-reinforced adobe walls and surface structures were common during the Soho phase. However, during the Civano phase, adobe compounds—often containing small plazas—and adobe structures were built and used to the near exclusion of semi-subterranean structures. Puddled and coursed adobe construction generally replaced the use of structures with pole-reinforced walls, and the number and proximity of rooms within compounds increased.

Public architecture also underwent a change during the Early Classic period. There was a significant increase in the construction and use of platform mounds (Gregory et al. 1988). At the same time, the construction of ball courts declined to its lowest point. The apex of Hohokam public architecture was achieved during the Civano phase with the building of "big houses." The only remaining example of a big house is found today at the Casa Grande Ruins on the outskirts of Coolidge. These structures probably served multiple functions. It has been argued that they were clear symbols of elite status within Hohokam society (Wilcox and Shenk 1977). Big houses often co-occur with platform mounds, with a central plaza separating the two. The introduction of big houses is as mysterious as their disappearance. The construction and use of big houses may have been the result of changes within Hohokam society, and their abandonment may have been tied to attacks from outsiders (e.g., Teague 1989).

Increase in red wares and the disappearance of buff wares mark the Civano phase, although plain wares continue to dominate the total ceramic assemblage. Polychrome pottery (in particular, Gila and Tonto polychromes) and local imitations were present after A.D. 1320 (Reid and Whittlesey 1992).

Canal irrigation was still very important during the Civano phase. Civano phase Hohokam depended greatly on corn, beans, and squash as the mainstays of their diet, although agave and cholla were also significant dietary components. Corn was certainly the most common domesticate, and the abundance of agave at many sites indicates that it, too, was extremely important. As evidenced at some sites, during the Late Classic period, the use of agave became increasingly important and the availability of agricultural produce declined (e.g., Miller 1994).

Hohokam social organization during the Civano phase was clearly different from what preceded and followed it. Population size and density at many of the large sites in the Salt River valley reached never-before-seen levels. Although the level of social and political organization actually achieved by the Hohokam has been much debated, some increase in social complexity was undoubtedly necessary to manage the higher population densities that developed. This greater social complexity may have been reflected in the construction and use of platform mounds and big houses.

The post-Classic period (A.D. 1450–1540) in the Phoenix Basin, referred to by some as the Polvorón phase, constitutes a somewhat hazy gap in occupation between the Late Classic period Hohokam and the first Europeans to arrive in the area (e.g., Bayman 2001; Chenault 2000; Henderson and Hackbarth 2000). Nevertheless, the traits used to identify the Polvorón phase include jacal structures, polychrome ceramics, and an abundance of obsidian. Many have argued that these characteristics are not sufficient to distinguish the Polvorón phase from the late Civano phase. Additionally, available chronological dates make it difficult to distinguish between Civano and Polvorón phase sites (Dean 1991:87).

By the late Civano phase, the success enjoyed by the Hohokam had vanished. High population densities, a decline in agricultural productivity, the failure of many irrigation systems, and the depletion of food resources, along with the presence of disease, malnutrition, flooding, and drought, are cited as reasons for the collapse of the Hohokam (e.g., Bayman 2001; Van Gerven and Sheridan 1994). Nevertheless, Bayman (2001) points out that the Hohokam may have continued to occupy the area until the early 1500s and that the debate over the cause or causes for the decline and disappearance of the Hohokam is far from resolved. Some have even argued that Hohokam and Salado may have directly encountered the Spanish (Reff 1992).

The ceramic period in the Cave Creek area can be divided into two basic time periods: the Preclassic period (A.D. 700–1150) and Classic period (A.D. 1150–1425). Preclassic period sites consist of small, dispersed communities that include Hohokam-style pit houses or semi-subterranean structures with a masonry foundation and pole-and-brush superstructure. These Preclassic period sites are not unlike contemporaneous sites in other areas that are often considered peripheral to the Hohokam heartland in the Phoenix Basin. Many sites dating to this period appear to be composed of one or a few extended families which probably formed a primary economic unit.

Community-level integrative architecture is absent in the Cave Creek area, although a few ball courts have been documented slightly to the south in the bajada of the McDowell Mountains (e.g., Wilcox and Sternberg 1983:104). The general absence of public architecture, combined with the generally small size of settlements, may indicate a lower degree of social integration across the vast territory attributed to the Central Arizona Tradition, particularly when compared to the Phoenix Basin or Colorado Plateau.

A mixed farmer-forager subsistence economy was employed during the Preclassic period. Detailed studies of botanical remains from Preclassic period sites in the foothills bordering the Phoenix Basin suggest that maize, mesquite, and cacti were staple foods (Smith 2002:119). Given the abundance of wild plant and animal resources and minimal opportunity for irrigation agriculture in many areas, domesticates were probably less important here than in the broad desert valleys of southern Arizona.

Preclassic period sites in the Cave Creek area typically contain a handful of Hohokam red-on-buff sherds. A few Tusayan White Ware, Little Colorado White Ware, or San Juan Red Ware sherds are also occasionally present. A local decorated ceramic tradition does not appear to be present, and locally produced plain wares usually account for more than 90 percent of a site's ceramic assemblage. Likewise, exotic artifacts such as shell and turquoise are relatively rare at these sites.

During the Classic period, numerous villages consisting of one or two nucleated room blocks were present throughout central Arizona. There is a trend toward increasing aggregation through time, particularly after A.D. 1275. Early Classic period sites (A.D. 1100–1275) commonly contain fewer than 20 rooms. Prominent examples near Cave Creek include Sears Kay Ruin and Brazaletes Pueblo, the latter of which contains approximately 100 rooms (Valehrach and Valehrach 1971). Two structure types are present in Early Classic period sites and sometimes occur at the same site in contexts that appear to be contemporaneous. The first type consists of detached rooms or small room blocks with low masonry footings and ephemeral superstructures. Larger nucleated room blocks with full-height masonry walls are the second type. Although Preclassic period sites do not appear to be located with obvious concerns for defense, Classic period sites are commonly located on prominent land forms with commanding views of surrounding topography. In fact, some sites are located on pinnacles or knolls that are so difficult to access that it is hard to imagine a reason other than defense for their location.

Similar to the Preclassic period, examples of public architecture are rare or absent at Classic period sites. Exceptions include large "community" rooms (measuring approximately 30 square meters [323 square feet]), plazas, and courtyard areas. At the larger sites, several lineages may have co-resided. This aggregation of people implies that more complex forms of social organization developed during the Classic period.

Subsistence strategies continued to employ a mixed farmer-forager economy. Despite the larger size of some communities, more intensive forms of food production are not evident during the Classic period. Rather, it appears that larger Classic period communities were placed in areas that offered abundant agricultural land capable of supporting a sizable community. Like earlier times, *ak chin*, or floodwater agricultural strategies, were widespread and irrigation agriculture may have been practiced along Cave Creek.

Plain ware and red ware ceramic vessels constructed from local clay and temper sources dominate Classic period ceramics assemblages. However, Puebloan black-on-white and orange ware sherds are also present in small quantities.

During the late Classic period (A.D. 1275–1425), the Cave Creek area was abandoned along with the New River area and the Lower Verde River south of Horseshoe Basin. At this time, some residents of the Cave Creek area may have migrated back to the Salt River Valley to join the large village sites such as Pueblo Grande and Los Colinas. Others may have moved north to the large aggregated villages that appeared on Perry Mesa, in Bloody Basin, and throughout the Lower Verde River north of Horseshoe Dam. Regardless of where the prehistoric occupants migrated, the Cave Creek area was heavily depopulated or totally abandoned by A.D. 1300. Environmental factors, social conditions, or both have traditionally been invoked as causal factors in the regional abandonment during the 1400s. Wilcox et al. (2001) recently proposed that this buffer zone was necessary to help minimize conflict between the large sites farther north in the Transition Zone and the large Hohokam village sites to the south along the Salt River.

Following the collapse of the Hohokam regional system, Akimel O'odham (Pima) and Tohono O'odham (Papago) groups lived in the middle Gila River valley. For unknown reasons, the Salt River valley was either used sparingly or was abandoned following the Hohokam collapse. Akimel O'odham and Tohono O'odham groups lived in small rancherías, subsisting on agricultural products, wild plant foods, and game. The Pee Posh (Maricopa), who were migrants from the Gulf of California area, formed an alliance with the Pima in the early 1800s and have lived in the Salt-Gila Basin ever since. All these groups continue to occupy the area, living on several reservations.

During the protohistoric and historic periods, Northeastern Yavapai groups used the Cave Creek area on a seasonal basis. An occupational gap of three or more centuries likely characterized the period between the prehistoric abandonment and the appearance of the Yavapai in this area. Yavapai bands visited the Cave Creek area during the historic period primarily to collect saguaro fruit and palo verde seeds (Gifford 1936:255). Very little is known about Yavapai subsistence strategies prior to Euro-American colonization of their territory and accompanying encounters with the U.S. military ca. 1860 to 1890.

Historic Period – Phoenix/Scottsdale Area

The Spanish were the first Europeans to enter what is now Arizona. Most of their early expeditions followed either the Santa Cruz or San Pedro Rivers up to the Gila River before turning westward. In 1826, Sylvester Pattie and James Ohio Pattie were the first Euro-Americans to pass through the Phoenix Basin. On February 2, 1848, the Treaty of Guadalupe Hidalgo was signed. Its provisions called for Mexico to cede 55 percent of its territory (present-day Arizona, California, New Mexico, Texas, and parts of Colorado, Nevada, and Utah) in exchange for $15 million in compensation. Thus, in 1848, the United States acquired most of what is now Arizona, and the rest was bought with the Gadsden Purchase in 1854. In the mid-1800s, numerous Euro-American explorers and surveyors crossed Arizona, but again, the Phoenix Basin was bypassed (Cross et al. 1960; Trimble 1977; Wagoner 1989; Walker and Bufkin 1979).

The early development and growth of central Arizona during the late 1800s and early 1900s was a direct response to national economic stimuli. The discovery of gold in the Bradshaw Mountains in 1863 drew miners, the military, ranchers, and entrepreneurs to the region (Mawn 1977; Zarbin 1978). In 1899, Phoenix became the permanent capital, and in 1912, Arizona became a state (Luckingham 1989).

The genesis of modern Phoenix lies with Jack Swilling of Wickenburg. After organizing the Swilling Irrigation Canal Company, he moved to the valley in 1867 and began digging a canal to divert water from the Salt River (Zarbin 1997). Most canals in the Phoenix Basin were constructed and operated by companies. Approximately 15 major canals appeared by 1888, with more than 400,000 acres under cultivation. Components of these systems were acquired by the federal government beginning in 1902, and under a 1917 agreement, the system is now managed by the Salt River Project.

By 1868, a small colony had arisen about 4 miles east of where Phoenix is centered today. On May 4, 1868, Phoenix was officially recognized when it became an election precinct within Yavapai County. A post office was established on June 15 of the same year, with Jack Swilling as the postmaster. In the early 1870s, the town center officially shifted to the area around present-day Washington Street and Central Avenue. By 1880, Phoenix had a population of approximately 1,700 and Mesa about 1,000. Hayden's Ferry, which later became known as Tempe, was emerging as a farming and trading center. The entire area developed into an extensive farmland of citrus orchards and cotton and lettuce fields. Territorial Governor John C. Fremont signed a bill incorporating the City of Phoenix on February 25, 1881.

The first transcontinental railroad (Southern Pacific) ran south of Phoenix. However, goods were transported to the Phoenix area via freight teams. It was not until July 1887 that the railroad arrived in Phoenix. In 1895, a second railroad linked Phoenix with the northern transcontinental railroad (Atlantic-Pacific). These railroads greatly reduced the costs of goods coming into the area. Construction of flood controls on Cave Creek prompted further development of the western valley in the early 1900s (Hackbarth 1995). During the 1870s and 1880s, demand for Arizona's gold and silver grew, as did the demand for the valley's agricultural produce (Morrow 1943).

In the 1880s, Phoenix began to take on the aura of a city as sewer and water systems were started and roadways expanded. In the late 1800s and early 1900s, national demand for Arizona's resources once again stimulated economic growth in the area (Morrow 1943). The construction of Roosevelt Dam in the early 1900s resulted in a boom in agriculture in the Phoenix Basin (Luckingham 1989), and the Enlarged Homestead Act of 1909 encouraged settlement of the arid lands around Phoenix. The area also benefited from the demand of mineral and agricultural resources during World War I. The national economic downturn in 1919–1920 and the Great Depression (1929–1939) slowed economic development in the Phoenix area. The regional economy grew, although mutedly, during World War II. With the end of the war, the area's population and economy once again rebounded (Luckingham 1989). Increased agricultural production and industrialization led to a significant and ongoing increase in the valley's population.

Ironically, much of the agricultural land has been lost to residential development, and much of the water for agriculture has been usurped for domestic, recreational, and industrial purposes. The Native Americans of the area, displaced and marginalized by the influx of Europeans and Euro-Americans, have in recent years regained some economic leverage through agriculture, water settlements, and the operation of casinos.

Scottsdale was originally established in 1868, with the Swilling Irrigation Canal Company working on improving and upgrading Hohokam Canals in the region. Scottsdale's name was changed from Orangedale in 1894 in honor of brothers George and Winfield Scott, who were major landowners and businessmen in the area. In 1937, internationally famous architect Frank Lloyd Wright established his "winter camp," which is now known as Taliesin West, in Scottsdale. Scottsdale was officially incorporated in 1951.

CLASS I RECORDS REVIEW OF THE GREASEWOOD FLAT PROJECT AREA AND THE SURVEY AREA (PARCEL NO. 216-80-007G)

Prior to the Class III pedestrian survey, SWCA consulted the AZSITE database, which includes records from the Arizona State Museum (ASM), Arizona State University, the Arizona State Historic Preservation Office (SHPO), and the Bureau of Land Management, for previously conducted surveys and previously recorded sites within a 1-mile radius of the project area.

An archaeological records search of the Greasewood Flat project area, the survey area, and of a 1-mile radius surrounding the project area indicates that 33 archaeological surveys have been conducted within 1 mile of the project area (Table 1; Figure 4).

The 42-acre Greasewood Flat project area has been previously surveyed (Bartholomew 2014). No archaeological sites were recorded.

The additional 5-acre survey area has never been previously surveyed for cultural resources.

Table 1. Previously Conducted Archaeological Surveys within a 1-Mile Radius of the Project Area

Agency Number	Project Name	Project Type
11-19-4.BLM	Unknown	Block survey
7.3111.SHPO	Unknown	Block survey
SHPO-2002-772	ALLTEL Proposed Telecommunications Site AZ-Troon-North - 49000.00-ACI-22 Construction	Block survey
1985-50.ASM	Pinnacle Peak Urban Land Sale	Block survey
1987-243.ASM	North Scottsdale Reconnaissance	Block and linear survey
1992-170.ASM	Desert Sun North Survey	Block survey
1992-187.ASM	Dynamite Road Survey	Block survey
1994-150.ASM	Crescent Moon At Pinnacle Peak	Block survey
1996-137.ASM	Yearling Estates	Block survey
1999-65.ASM	Cook Shack	Block survey
1999-236.ASM	Dynamite/112th Street	Block survey
2000-32.ASM	Survey at 118th Street and Dynamite	Block survey
2000-76.ASM	116th Street and Dynamite	Block survey
2000-240.ASM	Mosaic Rest Archaeological Survey	Block survey
2001-61.ASM	Nextel Communications Tower Project	Block survey
2001-201.ASM	118th Street & Redbird Road	Block survey
2002-51.ASM	ERM #49012.00-ACI-38 & 49024.00-ACI-38, AZ Troon North (Maricopa County) communications tower survey	Block survey
2003-420.ASM	Jomax and Alma School	Block survey
2003-1586.ASM	Troon North Survey	Block survey
2004-714.ASM	Survey at 118th Street and Jomax Road Survey	Block survey
2005-198.ASM	Cultural Resources Survey of Approximately 30 Acres Located Near Rio Verde Drive and 118th Street, Northern Scottsdale, Maricopa County, Arizona	Block survey
2005-233.ASM	Scottsdale Waterline Survey	Linear survey
2005-327.ASM	Alma School Water Transmission Line	Linear survey
2005-586.ASM	Survey at 118th Street and Redbird Road	Block survey
2005-1055.ASM	Stoplight North	Block survey
2008-791.ASM	Pinnacle Peak Resort 10 Acres Survey	Block survey
2009-793.ASM	A Class I and Class III Cultural Resources Assessment Survey of a Proposed Wireless Telecommunications Facility AT&T Mobility H260 Located at 10791 East Dynamite Boulevard in Scottsdale, Maricopa County, Arizona	Block survey
2009-891.ASM	AT&T H066	Block survey
2009-893.ASM	AT&T H070	Block survey

Table 1. Previously Conducted Archaeological Surveys within a 1-Mile Radius of the Project Area (Continued)

Agency Number	Project Name	Project Type
2009-894.ASM	AT&T H072	Block survey
2009-895.ASM	AT&T H317	Block survey
2010-347.ASM	Dynamite Road (Pima to Alma School)	Linear survey
Bartholomew 2014	Greasewood Flat Survey	Block survey

No known archaeological sites are located within the project area; however, eight sites have been previously recorded within a 1-mile radius of the project area (Table 2). The sites range from prehistoric habitation sites and artifact scatters to historic-era trash dumps and features. Please note that according to guidance from the ASM, archaeological sites outside the project area are not depicted on a map within this report.

Table 2. Previously Recorded Archaeological Sites within a 1-Mile Radius of the Project Area

Site Number	Site Description	NRHP Eligibility
AZ U:5:19(ASM)	Artifact scatter and feature	Not Eligible – SHPO
AZ U:5:90(ASM)	Artifact scatter	Eligible – Recorder
AZ U:5:103(ASM)	Historical trash scatter	Not Evaluated – SHPO
AZ U:5:104(ASM)	Multicomponent artifact scatter	Not Evaluated – SHPO
AZ U:5:105(ASM)	Historical tank and associated artifacts	Not Evaluated – SHPO
AZ U:5:106(ASM)	Historical thermal feature	Not Evaluated – SHPO
AZ U:5:112(ASM)	Historical trash scatter	Not Evaluated – SHPO
AZ U:5:171(ASM)	Rockshelter with artifact scatter	Eligible – Recorder

General Land Office and Historical Topographic Map Research

The General Land Office (GLO) plat map filed in 1921 depicts one unnamed historic road within the Greasewood Flat project area and immediately adjacent to the survey area (Figure 5). The 1971 McDowell Peak, Arizona 7.5-minute U.S. Geological Survey topographic map does not depict any historical structures or features within the Greasewood Flat project area or the survey area.

SURVEY EXPECTATIONS

Based on the background records search, it was expected that no prehistoric archaeological sites would be encountered; however, given the large amount of historic use in the area as depicted on GLO and historical topographic maps, historic period trash and sites were expected. No prehistoric sites or artifacts were encountered, and one historical isolate was recorded, which met expectations.

SURVEY METHODS

SWCA archaeologist Alan Bartholomew surveyed the survey area on May 30, 2014, resulting in a total of one person–field day. A total of approximately 5 acres was surveyed. General conditions for the survey were

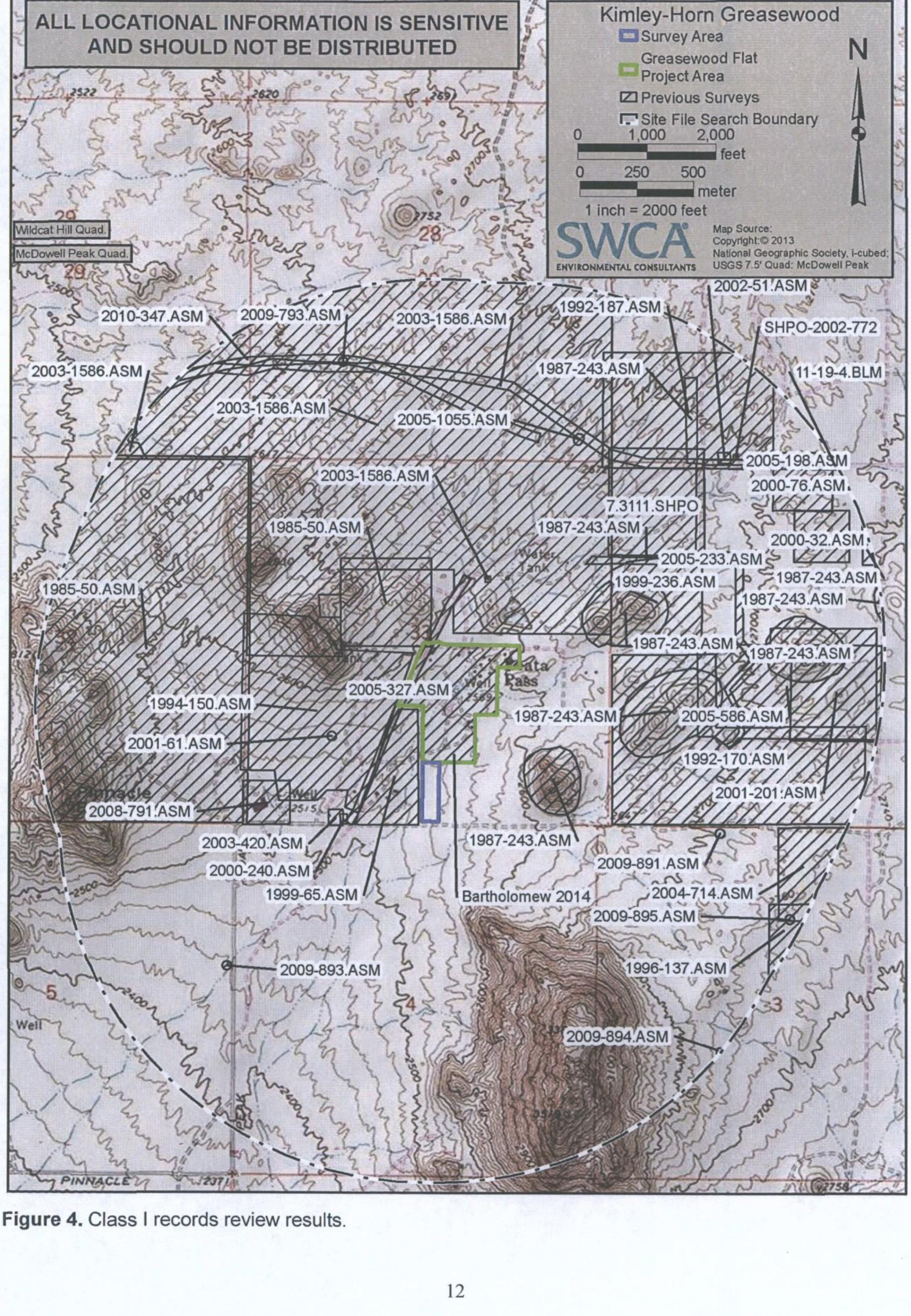

Figure 4. Class I records review results.

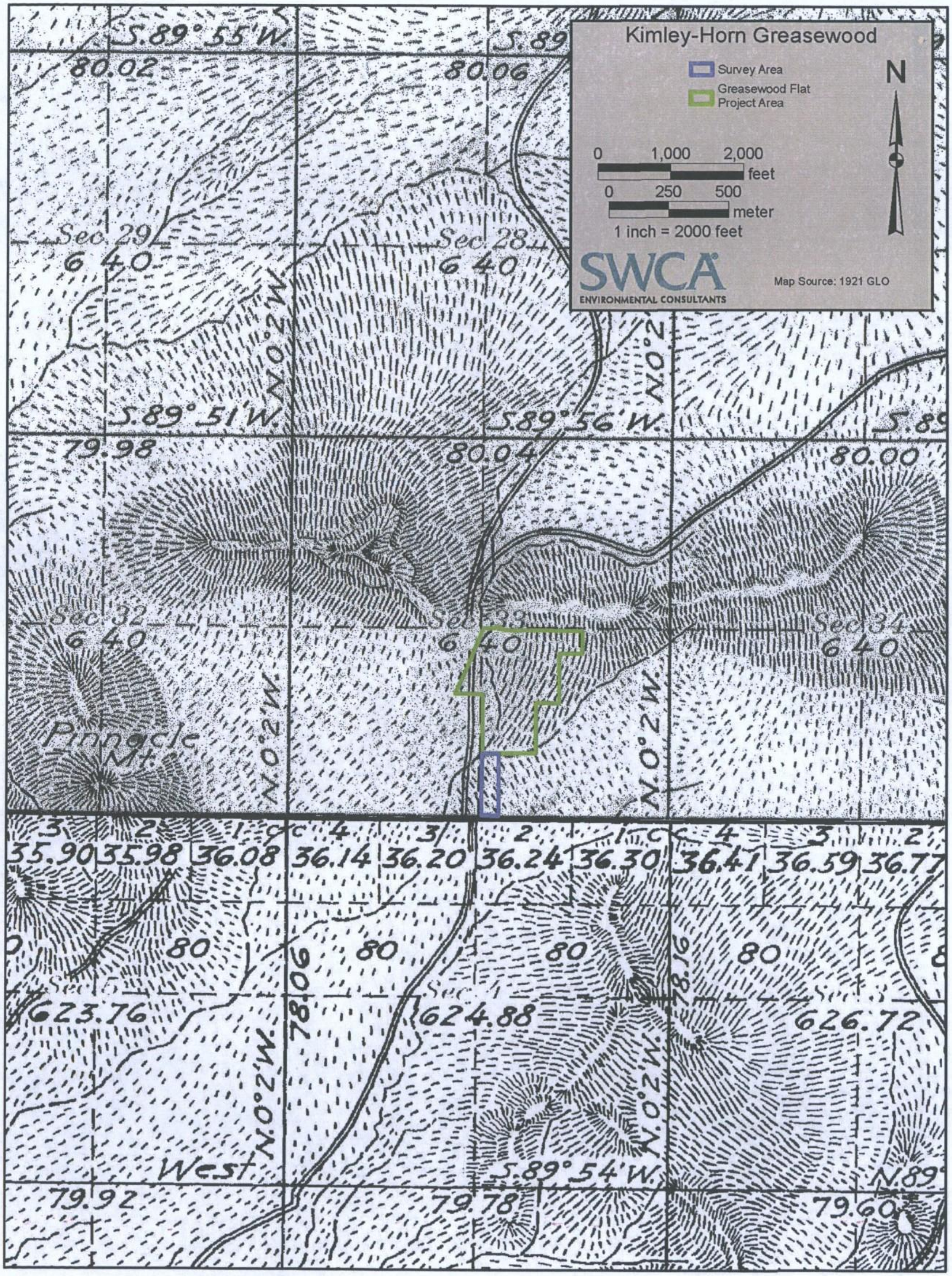

Figure 5. GLO map of the project area.

excellent, and ground visibility was generally 75 percent (see Figure 3). The survey was conducted using standard archaeological techniques following ASM guidelines for survey coverage and site recording methodologies. According to the standards for pedestrian survey established by ASM, a person conducting a pedestrian survey can achieve 100 percent coverage of a parcel by walking a series of systematic transects spaced no more than 20 meters (66 feet) apart. The survey entailed systematically walking the project area using 20-meter (66-foot) spacing in east-west and north-south directions. Evidence for cultural resources was sought in the form of artifacts (e.g., ceramics, lithics, historical metals, or glass) or features (concentrations of fire-affected rock, charcoal-stained soil, prehistoric or historic structures, or other cultural anomalies).

The ASM has established standards for evaluating materials identified during archaeological surveys. Briefly, properties of archaeological interest must contain the remains of past human activity that are at least 50 years old. Beyond this, two classes of findings are recognized: the site and the isolated occurrence (IO). To qualify as a site, a property must contain, within an area no more than 50 feet in diameter, 30 or more artifacts of a single type, unless all pieces originate from a single source (e.g., one broken bottle or ceramic vessel); or 20 or more artifacts when multiple types are present; or any number of artifacts, when a single fixed feature is present; or multiple fixed features, with or without any associated artifacts. The site can be larger than 50 feet in diameter as long as any 50-foot-diameter portion of the site meets one of these conditions. Artifact finds that do not meet these criteria but that are over 50 years old may be designated IOs. The precise locations of the IOs were point located and recorded using a handheld global positioning system (GPS) unit. Any identified artifacts were field-analyzed and then returned to their original locations.

SURVEY RESULTS

The Class III survey of the survey area resulted in the recording of one historical IO, a double punch–opened steel beverage can (Figure 6; Table 3). The IO is not eligible for listing on the NRHP.

Table 3. Isolated Occurrences

IO No.	IO Description	Easting*	Northing*
1	Double punch–opened steel beverage can	Appendix A	Appendix A

SUMMARY AND MANAGEMENT RECOMMENDATIONS

A Class I records search of the 42-acre Greasewood Flat property demonstrated that it has been completely surveyed (Bartholomew 2014). No archaeological sites have been recorded in that area.

A Class III archaeological survey of the survey area (Parcel No. 216-80-007G) resulted in the identification of one historical IO. The isolate does not meet the criteria for listing on the NRHP. No archaeological sites were recorded.

SWCA recommends a finding of No Historic Properties Affected for the proposed project. No further archaeological work is recommended for the project area. However, if previously undocumented buried cultural resources are identified during ground-disturbing activities, all work in the immediate vicinity of the discovery should stop until the find can be evaluated by a professional archaeologist.

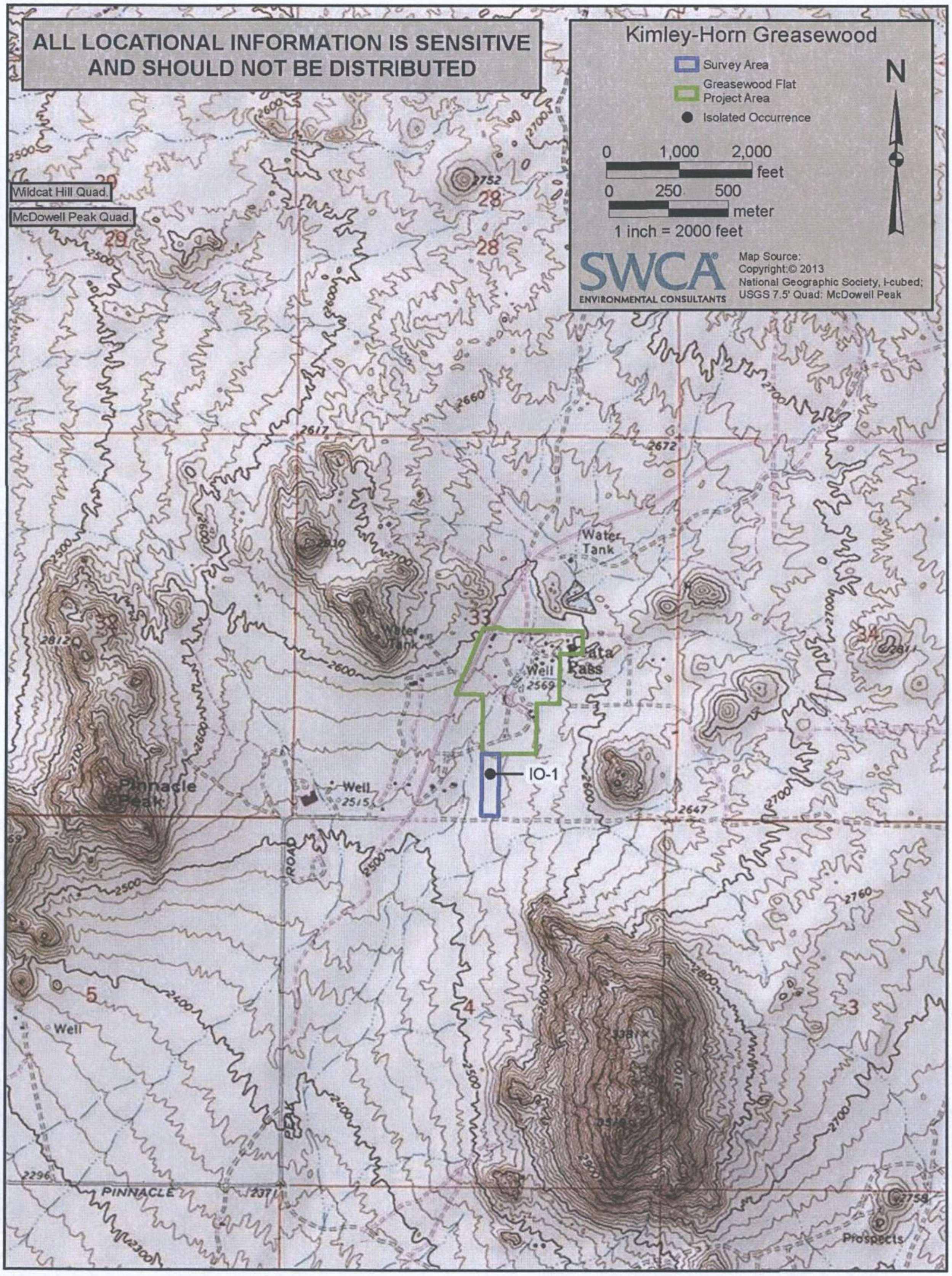

Figure 6. Class III cultural resources pedestrian survey results.

REFERENCES CITED

Abbott, David R.

1994 Chemical Analyses of Clay Fractions in Hohokam Pottery. In *The Pueblo Grande Project Vol. 3: Ceramics and the Production and Exchange of Pottery in the Central Phoenix Basin*, edited by David R. Abbott, pp. 91–148. Publications in Archaeology No. 20, Soil Systems, Inc., Phoenix.

2000 *Ceramics and Community Organization among the Hohokam*. University of Arizona Press, Tucson.

2001 Conclusions for the GARP Ceramic Analysis. In *The Grewe Archaeological Research Project, Volume 2, Part 1. Ceramic Studies*, edited by David R. Abbott, pp. 263–272. Anthropological Research Papers No. 99-01, Northland Research, Inc., Tempe, Arizona.

Ackerly, Neal W., and T. Kathleen Henderson (editors)

1989 *Prehistoric Agricultural Activities on the Lehi-Mesa Terrace: Perspectives on Hohokam Irrigation Cycles*. Northland Research, Inc., Flagstaff, Arizona.

Arizona Geological Survey

2014 Geologic map of Arizona. Available at: http://services.usgin.org/azgs/geologic-map-arizona.html. Accessed June 2, 2014.

Bartholomew, Alan

2014 *Archaeological Survey of Approximately 42 Acres of the Reata Pass/Greasewood Flat Property, Scottsdale, Maricopa County, Arizona*. SWCA Cultural Resources Report No. 14-78. SWCA Environmental Consultants, Phoenix.

Bayman, James M.

2001 The Hohokam of Southwest North America. *Journal of World Prehistory* 15:257–311.

Bohrer, Vorsila L.

1987 The Plant Remains from La Ciudad, a Hohokam Site in Phoenix. In *La Ciudad: Specialized Studies in the Economy, Environment, and Culture of La Ciudad, Part III*, edited by JoAnn E. Kisselburg, Glen E. Rice, and Brenda L. Shears, pp. 67–202. Anthropological Field Studies No. 20, Arizona State University, Tempe, Arizona.

Brown, David

1994 *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press, Salt Lake City.

Cable, John S., and David E. Doyel

1987 Pioneer Period Village Structure and Settlement Pattern in the Phoenix Basin. In *The Hohokam Village*, edited by David E. Doyel, pp. 21–70. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Glenwood Springs, Colorado.

Chenault, Mark C.

2000 In Defense of the Polvorón Phase. In *The Hohokam Village Revisited*, edited by David E. Doyel, Suzanne K. Fish, and Paul R. Fish, pp. 277–286. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Colorado State University, Fort Collins, Colorado.

Ciolek-Torello, Richard, Eric E. Klucas, and Stephanie M. Whittlesey
2000 Hohokam Households, Settlement Structure, and Economy in the Lower Verde Valley. In *The Hohokam Village Revisited*, edited by D. E. Doyel, S. K. Fish, and P. R. Fish, pp. 65–100. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Colorado State University, Fort Collins, Colorado.

Crary, Joseph S., and Douglas B. Craig
2001 The Design Mechanics of Hohokam Pithouses. In *The Grewe Archaeological Research Project, Vol. 1: Background and Feature Descriptions*, edited by Douglas B. Craig, pp. 39–62. Anthropological Papers 99-1, Northland Research, Inc., Tempe, Arizona.

Cross, Jack L., Elizabeth H. Shaw, and Kathleen Scheifele (editors)
1960 *Arizona, Its People and Resources*. University of Arizona Press, Tucson.

Crown, Patricia L., and W. James Judge (editors)
1991 *Chaco and the Hohokam: Prehistoric Regional Systems in the American Southwest*. School of American Research Advanced Seminary Series, School of American Research Press, Santa Fe.

Dean, Jeffrey S.
1991 Thoughts on Hohokam Chronology. In *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*, edited by G. J. Gumerman, pp. 61–149. New World Studies Series No. 1, Amerind Foundation, Dragoon, Arizona, and University of New Mexico Press, Albuquerque.

Doyel, David E.
1985 Summary and Discussion. In *Hohokam Settlement and Economic Systems in the Central New River Drainage, Arizona*, Vol. 1, edited by D. E. Doyel and M. D. Elson, pp. 727–734. Publications in Archaeology No. 4, Soil Systems, Inc., Phoenix.

Fish, Paul R.
1989 The Hohokam, 1,000 Years of Prehistory in the Sonoran Desert. In *Dynamics of Southwestern Prehistory*, edited by Linda S. Cordell and George J. Gumerman, pp. 19–63. Smithsonian Institution Press, Washington, D.C. A School of American Research Advanced Seminar Book, Santa Fe.

Gifford, E. W.
1936 Northeastern and Western Yavapai. *University of California Publications in American Archaeology and Ethnology* 34(4):247–354. University of California Press, Berkeley.

Gregory, David A., William L. Deaver, Suzanne K. Fish, Ronald Gardiner, Robert W. Layhe, Fred L. Nials, and Lynn S. Teague
1988 *The 1982–1984 Excavations at Las Colinas: The Site and its Features*. Archaeological Series 162, Vol. 2. Arizona State Museum, Tucson.

Gumerman, George J.
1991 *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*. Amerind Foundation, Dragoon, Arizona, and University of New Mexico Press, Albuquerque.

Hackbarth, Mark R.
1992 *Prehistoric and Historic Occupation of the Lower Verde River Valley: The State Route 87 Verde Bridge Project*. Northland Research, Inc., Flagstaff, Arizona.

1995 *The Historic Archaeology of Heritage Square*. Pueblo Grande Museum Anthropological Papers No. 2, Pueblo Grande Museum, Phoenix.

2001 Late Archaic and Red Mountain Phase Task Group Size in Paradise Valley, Arizona: Evidence from the Last Ditch Site. *Kiva* 67:81–106.

Haury, Emil W.
1976 *The Hohokam: Desert Farmers and Craftsman; Snaketown. 1964-1965*. University of Arizona Press, Tucson.

Henderson, T. Kathleen, and Mark R. Hackbarth
2000 What is Going on at the Hohokam Village? In *The Hohokam Village Revisited*, edited by David E. Doyel, Suzanne K. Fish, and Paul R. Fish, pp. 287–316. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Colorado State University, Fort Collins, Colorado.

Huckell, Bruce B.
1982 *The Distribution of Fluted Points in Arizona: A Review and an Update*. Archaeological Series No. 145, Arizona State Museum, Tucson.

Hunt, Robert C., David Guillet, David R. Abbott, James Bayman, Paul Fish, Suzanne Fish, Keith Kintigh, and James A. Neely
2005 Plausible Ethnographic Analogies for the Social Organization of Hohokam Canal Irrigation. *American Antiquity* 70:433–456.

Luckingham, Bradford
1989 *Phoenix: The History of a Southwestern Metropolis*. University of Arizona Press, Tucson.

Mabry, Jonathan B.
2000 The Red Mountain Phase and the Origins of Hohokam Villages. In *The Hohokam Village Revisited*, edited by D. E. Doyel, S. K. Fish, and P. R. Fish, pp. 37–64. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Colorado State University, Fort Collins, Colorado.

Mawn, Geoffrey P.
1977 Promoters, Speculators, and the Selection of the Phoenix Townsite. *Arizona and the West* 19:207–224.

Miller, JoAnne
1994 Pueblo Grande Flotation, Macrobotanical, and Wood Charcoal Analyses. In *The Pueblo Grande Project, Volume 5: Environment and Subsistence*, edited by S. Kwiatkowski, pp. 127–204. Publications in Archaeology No. 20, Soil Systems, Inc., Phoenix.

Morris, Donald H.
1969 Red Mountain: An Early Pioneer Period Hohokam Site in the Salt River Valley of Central Arizona. *American Antiquity* 34:40–54.

Morrow, Dwight W.
1943 *American Economic History*. Harper and Brothers Publishers, New York.

Potter, James M., and Lynn A. Neal
2000 *Tributaries, Terraces, and Tinajas: Prehistoric Cultural Variation on Three Drainages near New River, Maricopa County, Arizona.* Anthropological Research Paper No. 7, SWCA Environmental Consultants, Flagstaff, Arizona.

Reff, D. T.
1992 Contact Shock in Northwestern New Spain, 1518–1764. In *Disease and Demography in the Americas*, edited by J. Verano and D. Ubelaker, pp. 256–276. Smithsonian Institution Press, Washington, D.C.

Reid, J. Jefferson, and Stephanie Whittlesey
1992 New Evidence for Dating Gila Polychrome. In *Proceedings of the Second Salado Conference, Globe, AZ, 1992*, edited by R. C. Lang and S. Germick, pp. 223–229. Occasional Paper, Arizona Archaeological Society, Phoenix.

Smith, Susan J.
2002 Corn, Cacti, and Mesquite: Subsistence in the Northern Periphery. In *Phoenix Basin to Perry Mesa: Rethinking the "Northern Periphery,"* edited by Mark R. Hackbarth, Kelley Hays-Gilpin, and Lynn Neal, pp. 101–119. *The Arizona Archaeologist* 34.

Teague, Lynn S.
1989 The Postclassic and the Fate of the Hohokam. In *The 1982–1984 Excavations at Las Colinas, Synthesis and Conclusions*, edited by L. S. Teague and W. L. Deaver, pp. 145–168. Archaeological Series 162, Vol. 6, Arizona State Museum, Tucson.

Trimble, Marshall
1977 *Arizona.* Doubleday and Company, Garden City, New York.

Valehrach, Emil M., and Bruce S. Valehrach
1971 *Excavations at Brazaletes Pueblo.* Arizona Archaeologist Occasional Paper No. 6, Arizona Archaeological Society, Inc., Phoenix.

Van Gerven, Dennis P., and Susan Guise Sheridan
1994 A Biocultural Reconstruction of a Classic Period Hohokam Community. In *The Pueblo Grande Project: Volume 6: The Bioethnography of a Classic Period Hohokam Population*, edited by Dennis P. Van Gerven and Susan Guise Sheridan, pp. 123–128. Publications in Archaeology No. 20, Soil Systems, Inc., Phoenix.

Wagoner, Jay J.
1989 *Early Arizona: Prehistory to Civil War.* University of Arizona Press, Tucson.

Walker, Henry P., and Don Bufkin
1979 *Historical Atlas of Arizona.* University of Oklahoma Press, Norman.

Wallace, Henry D.
2001 Time Seriation and Typological Refinement of the Middle Gila Buffware Sequence: Snaketown through Soho Phase. In *The Grewe Archaeological Research Project, Vol. 2, Part 1: Ceramic Studies*, edited by D. R. Abbott, pp. 177–259. Anthropological Papers 99-1, Northland Research, Inc., Tempe, Arizona.

Wilcox, David R., Thomas R. McGuire, and Charles Sternberg
1981 *Snaketown Revisited.* Archaeological Series No. 155, Arizona State Museum, University of Arizona, Tucson.

Wilcox, David R., Gerald Robertson, Jr., and J. Scott Wood
2001 Organized for War: The Perry Mesa Settlement System. In *Deadly Landscapes: Case Studies in Prehistoric Southwestern Warfare*, edited by Glen E. Rice and Steven A. LeBlanc, pp. 141–194. University of Utah Press, Salt Lake City.

Wilcox, David R., and Lynette O. Shenk
1977 *The Architecture of the Casa Grande and its Interpretation.* Archaeological Series No. 115, Arizona State Museum, University of Arizona, Tucson.

Wilcox, David R., and Charles Sternberg
1983 *Hohokam Ballcourts and Their Interpretation.* Arizona State Museum Archaeological Series No. 160, University of Arizona, Tucson.

Wright, Thomas E.
2002 Windows to the Past: Three Rockshelters in the Northern Periphery. In *Phoenix Basin to Perry Mesa: Rethinking the "Northern Periphery,"* edited by Mark R. Hackbarth, Kelley Hays-Gilpin, and Lynn Neal, pp. 11–18. *The Arizona Archaeologist* 34.

Zarbin, Earl A.
1978 The Swilling Legacy. *Arizona Republic* August 13–August 30. On file, Luhrs Reading Room, Hayden Library, Arizona State University, Tempe.

1997 *Two Sides of the River: Salt River Valley Canals, 1867–1902.* Salt River Project, Phoenix.

APPENDIX A

Locational Data

Table A-1. Universal Transverse Mercator (UTM) Coordinates for IO1

IO No.	Artifact Description	Easting*	Northing*
1	Steel beverage can, double punch–opened	421499	373323376

* UTM Location (Zone 12, NAD 83)

Kimley»Horn

May 28, 2014

Mr. Jeff Deason
Taylor Morrison/Arizona, Inc.
9000 E. Pima Center Parkway, Suite 350
Scottsdale, Arizona 85258

RE: Cavalliere Flats - Alma School Parkway and Pinnacle Vista Drive – Scottsdale, Arizona Traffic Impact Statement

Dear Mr. Deason:

The purpose of this letter is to address site specific traffic issues for the proposed Cavalliere Flats residential development located near the southeast corner of the intersection of Alma School Parkway and Pinnacle Vista Drive in Scottsdale, Arizona. This letter outlines our findings regarding the traffic generation of the proposed plan for an 80 unit single family residential development on the east side of Alma School Parkway between Pinnacle Vista Drive and Jomax Road.

The development is proposed to consist of an 80 unit gated community on the parcel currently occupied by the existing Greasewood Flats restaurant. The residential development has a single main entrance onto Alma School Parkway approximately 560 feet south of the intersection with Pinnacle Vista Drive. A second emergency-only access is provided to Jomax Road. The proposed lots are oriented along two local streets parallel to Alma School Parkway on the east and west sides of the main drainage feature through the project.

Alma School Parkway has been constructed with a single northbound and a single southbound through lane plus a continuous two way left turn lane along the project frontage. Pinnacle Vista Drive and Jomax Road are both two lane paved roadways adjacent to the site.

The current land use consists of a restaurant with a relatively small building for food and beverage service and a significant amount of adjacent outdoor seating. For the purpose of estimating the trip generation a total equivalent building size of 6,000 square feet was assumed to represent the existing trip generation of both the building and the outdoor seating area. Due to the unique characteristics of the existing facility, it is recognized that the AM peak hour volumes predicted by the ITE rates may not be representative of the peak hour of the adjacent street but would likely be more comparable to the peak hour of the generator. The existing restaurant is proposed to be replaced by the 80 single family dwelling units. The trip generation rates published by the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 9th Edition were used to compare the trip generation characteristics of the existing and proposed land uses. The trip generation calculation for the existing use was based on the ITE Code 932 for High Turnover (Sit-Down) Restaurant. The trips for the proposed use were determined using ITE Code 210 for Single Family Detached Housing. The calculations are summarized in **Table 1 and Table 2.**

12-ZN-2014
6/11/2014

Table 1. Existing Trip Generation

Land Use Description	ITE Code	Quantity	Units	Daily Trips	AM			PM		
					In	Out	Total	In	Out	Total
High Turnover (Sit-Down) Restaurant	932	6	K sq. ft.	764	36	29	65	35	24	59

Table 2. Proposed Trip Generation

Land Use Description	ITE Code	Quantity	Units	Daily Trips	AM			PM		
					In	Out	Total	In	Out	Total
Single Family Detached Housing	210	80	D. U..	762	15	45	60	50	30	80

The trip generation calculations indicate that on an average weekday the proposed residential units would be expected to generate a similar number of daily trips as a 6,000 square foot restaurant. Peak hour and weekend trips for the restaurant use would likely be higher than the residential use.

The City of Scottsdale 2010 Design Standards & Policy Manual states that if a proposed development is anticipated to generate fewer trips than the existing land use and less than 100 peak hour trips a traffic impact and mitigation analysis (TIMA) is not required. The proposed development is anticipated to meet both of these requirements, therefore a TIMA report is not required.

While no additional traffic analysis was prepared, the configuration of the proposed site entrance was reviewed. With the single access on Alma School Parkway, up to 50 vehicles could potentially be turning right from northbound Alma School Parkway into the project entrance. Since it is likely that the northbound right turn volume at the site entrance will exceed the 30 vehicle per hour threshold for installation of a deceleration lane, it is recommended that a northbound exclusive right turn lane be provided. The right turn lane should consist of a minimum 100 foot storage length with the transition prior to the storage per the City of Scottsdale standard details. Since no other access points to adjacent roadways are provided to the project, no improvements to either Pinnacle Vista Drive or Jomax Road are recommended.

If you have any further questions please feel free to contact me at (602) 944-5500.

Very truly yours,

KIMLEY-HORN AND ASSOCIATES, INC.

Charles R. Wright

Charles R. Wright, P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 19271 Charles R. Wright DATE SIGNED 5/28/14 ARIZONA U.S.A. Exp. 12-31-16

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