

Drainage Reports

Abbreviated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application



Engineering and Environmental Consultants, Inc.

7740 N. 16th Street, Suite 135 | Phoenix, Arizona 85020 | P: 602.248.7702

WATER DISTRIBUTION SYSTEM

BASIS OF DESIGN REPORT

FOR

SCOTTSDALE FIRE STATION 616

10905 E. Loving Tree Lane
Scottsdale, Arizona 85262

FINAL Basis of Design Report

- ☐ APPROVED
☒ APPROVED AS NOTED
☐ REVISE AND RESUBMIT



Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rrahman

DATE 10/2/2018

OWNER:

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



March 9, 2018
Revised March 12, 2018
Revised April 26, 2018
Revised May 16, 2018

PREPARED BY:

ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.

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INTRODUCTION

The proposed Scottsdale Fire Station # 616 is located at 10905 E. Loving Tree Lane and lies within the North Half of Section 28, Township 6 North, Range 5 East of the Gila and Salt River Base & Meridian, Maricopa County Arizona. The legal description for the property is as follows: **Lot 2A "Minor Subdivision Plat Linsenmeyer West Land Division 2", as recorded in Book 1110, Page 13, Records of Maricopa County, Arizona.** The site is bordered to the north by Cave Creek Road, to the east, south and west by existing residential properties. The Assessor's Parcel Number for this property is 219-60-912A. Based on the information provided on the Maricopa County Assessor's Maps, the site has a Latitude of 33.838909°N and a Longitude 111.848099°W at the approximate center of the site. The elevations of the site range from 3013.00 to 3049.00 above sea level. A vicinity map is provided in the "FIGURES" section of this report.

EXISTING CONDITIONS

The property is currently zoned R1-43 ESL single family and is approximately 144,687 square feet, or 3.32 acres (net area). There is an existing 8" DIP waterline pipe located on the north side of Loving Tree Lane adjacent to the proposed site. The 8" waterline flows south along the east property line of the Fire Station site and then west along the south property line before exiting in a southwesterly direction at the approximate mid-point of the south property line. The waterline continues southwesterly within 107th Place along the south side of the centerline of 107th Place. A City of Scottsdale Sewer Quarter Section Map has been provided within the "FIGURES" section of this report.

PROPOSED CONDITIONS

The proposed Fire Station will require a new 6" DIP fireline tap to be located at the northeast corner of the site near the Loving Tree Land cul-de-dac. The new fireline will provide service to the new Fire Station. A new onsite fire hydrant will also be installed on the Fire Station site. The fire hydrant will be served by a new 6" DIP tap located along the south boundary of the site. Domestic and landscape water services and meters will also be provided for the Fire Station site.

WATER ANALYSIS DATA

Per City of Scottsdale DS&PM manual, Figure 6-1.2 Average Day Water Demands in Gallons per day, this projects Commercial/Retail Demand is based on 0.7 gpd/sf for inside use and 0.1 gpd/sf for outside use for a total of 0.8 gpd/sf.

Building Area = 7,100 sf

Average Day Demand = $0.8 \text{ gpd} \times 7,100 \text{ sf} = 5680 \text{ gpd}$ or 3.94 gpm

Maximum Day Demand = Average Day Demand $\times 2 = 11,360 \text{ gpd}$ or 7.88 gpm

Peak Hour = Maximum Day Demand $\times 3.5 = 19,880 \text{ gpd}$ or 13.79 gpm

Fire Flow Demand = 1500 gpm with 30 psi residual

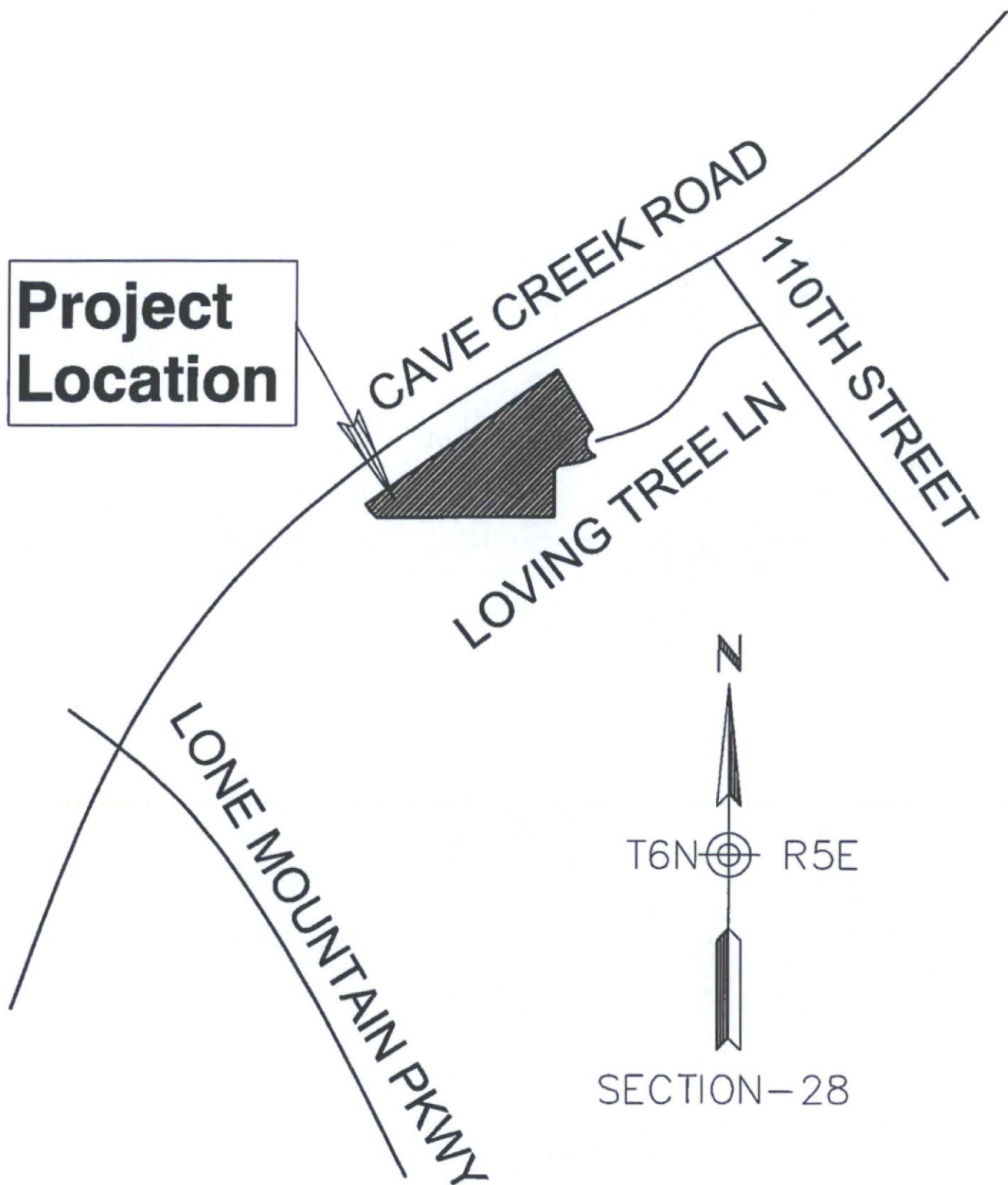
Maximum Day with Fire Demand = 1507.88 gpm

The City of Scottsdale requirement for fire flow conditions is 1500 GPM at 30 psi. Based on the existing Fire Hydrant Flow Test Results and an EPANET water model, at 1500 GPM the resulting pressure at the proposed fire hydrant will be 24 psi which does not meet the 30 psi requirement.

Per DSPM Section 6-1.406, the 30 psi requirement accounts for 10 psi of safety factor for aging infrastructure and flexibility in locating pressure zone boundaries. The resulting 24 psi at 1500 gpm flow accounts for 4 psi of safety factor only. It is anticipated that once the construction of BPS 157 and BPS 158 are completed (tentatively by December 2018) and are in operation, the residual pressure condition at the site will be improved and City's hydraulic model supports this assumption. Water Resources (WR) also assumes that the Construction of the Fire Station will start after BPSs 157 & 158 are in operation and the residual pressure condition at the site has improved. Based on these assumptions, the residual pressure of 24 psi under current condition may be acceptable and WR approves the Basis of Design Report. WR suggests that the fire line and the sprinkler system shall be designed and sized based on current residual pressure condition and an 8" fire line may be warranted. Size and design of fire line and the sprinkler system will require coordination with City's Fire Department.

APPENDIX "A"

**Project
Location**



Vicinity Map
N.T.S.

APPENDIX "B"



Flow Test Summary

Project Name: EJFT 18042-4
Project Address: 10905 E Loving Tree Ln, Scottsdale, AZ 85262
Date of Flow Test: 2018-03-09
Time of Flow Test: 8:56 AM
Data Reliable Until: 2018-09-09
Conducted By: Austin Gourley & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By: Jim Demarblex (City of Scottsdale) 602.541.0586
City Forces Contacted: City of Scottsdale (602.541.0586)
Permit Number: C54851

Note

Scottsdale requires a max static pressure of 72 psi for safety factor

Raw Flow Test Data

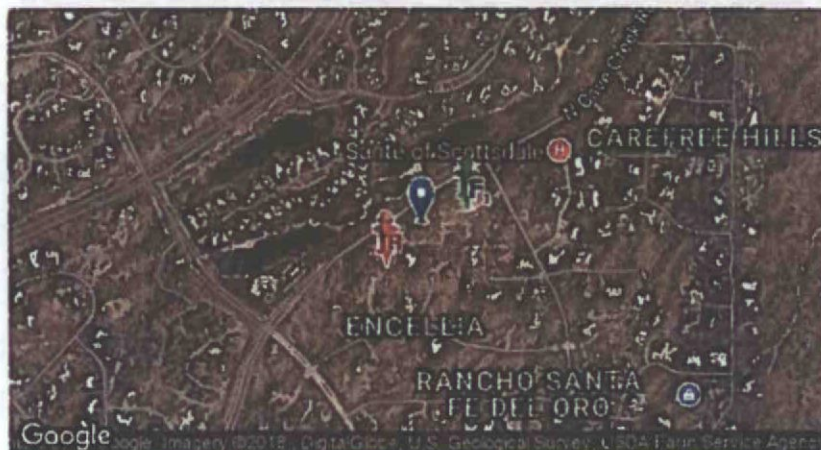
Static Pressure: 93.0 PSI
Residual Pressure: 66.0 PSI
Flowing GPM: 1,101
GPM @ 20 PSI: 1,883

Data with a 21 PSI Safety Factor

Static Pressure: 72.0 PSI
Residual Pressure: 45.0 PSI
Flowing GPM: 1,101
GPM @ 20 PSI: 1,568

Hydrant F₁

Pilot Pressure (1): 43 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 2.5 Inches



Project Site



Static-Residual Hydrant



Flow Hydrant

Distance Between F₁ and R
776 ft (measured linearly)

Static-Residual Elevation
3009 ft (above sea level)

Flow Hydrant (F₁) Elevation
3041 ft (above sea level)

Elevation & distance values are approximate

EJ Flow Tests, LLC

21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 | www.ejengineering.com
John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

E·J | Flow Test Summary

Static-Residual Hydrant



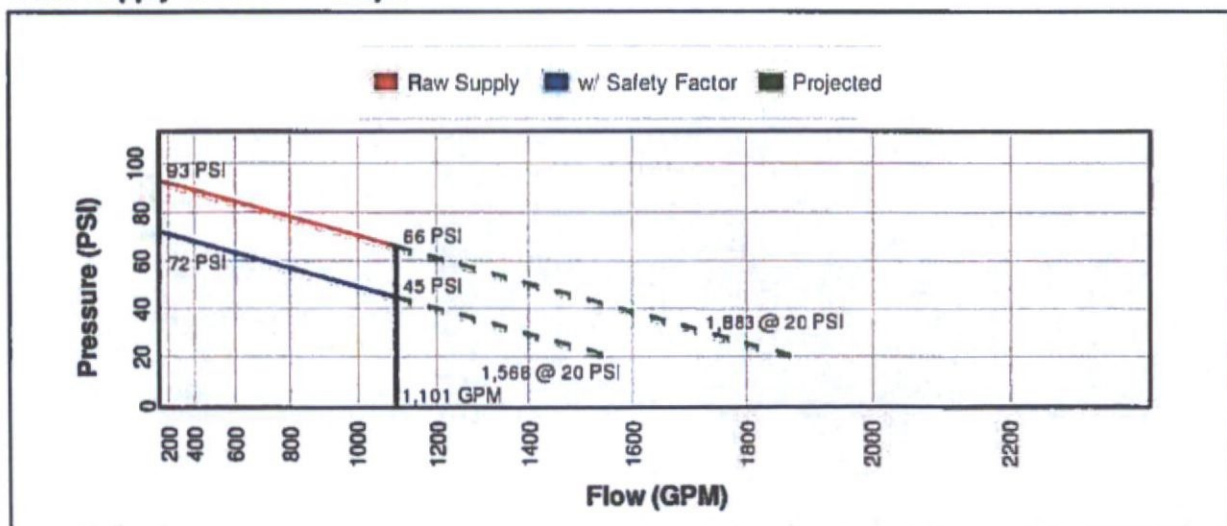
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve N^{1.85} Graph





Flow Test Summary

Project Name: EJFT 18042-3
Project Address: 10905 E Loving Tree Ln, Scottsdale, AZ 85262
Date of Flow Test: 2018-03-09
Time of Flow Test: 8:50 AM
Data Reliable Until: 2018-09-09
Conducted By: Austin Gourley & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By: Jim Demarblex (City of Scottsdale) 602.541.0586
City Forces Contacted: City of Scottsdale (602.541.0586)
Permit Number: C54851

Note

Scottsdale requires a max static pressure of 72 psi for safety factor

Raw Flow Test Data

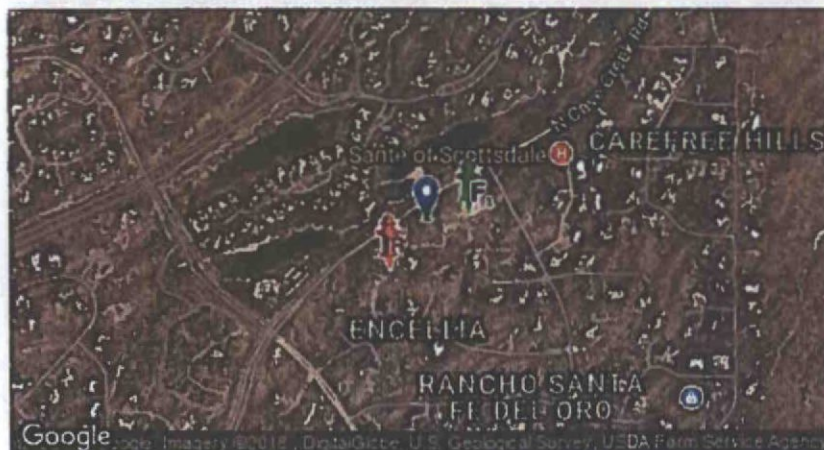
Static Pressure: 103.0 PSI
Residual Pressure: 40.0 PSI
Flowing GPM: 1,183
GPM @ 20 PSI: 1,373

Data with a 31 PSI Safety Factor

Static Pressure: 72.0 PSI
Residual Pressure: 9.0 PSI
Flowing GPM: 1,183
GPM @ 20 PSI: 1,066

Hydrant F₁

Pilot Pressure (1): 11 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 4 inches
Additional Coefficient 0.83 on orifice #1



Project Site



Static-Residual Hydrant



Flow Hydrant

Distance Between F₁ and R
778 ft (measured linearly)

Static-Residual Elevation
3009 ft (above sea level)

Flow Hydrant (F₁) Elevation
3041 ft (above sea level)

Elevation & distance values are approximate

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EJ | Flow Test Summary

Static-Residual Hydrant



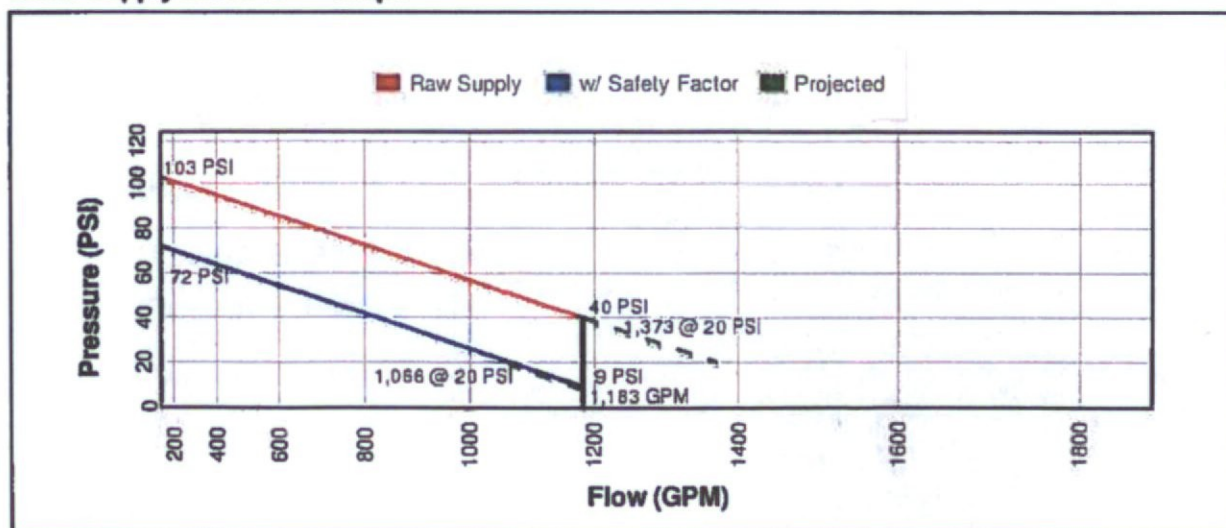
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve $N^{1.85}$ Graph





Flow Test Summary

Project Name: EJFT 18042-2
Project Address: 10905 E Loving Tree Ln, Scottsdale, AZ 85262
Date of Flow Test: 2018-03-09
Time of Flow Test: 8:20 AM
Data Reliable Until: 2018-09-09
Conducted By: Austin Gourley & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By: Jim Demarblex (City of Scottsdale) 602.541.0586
City Forces Contacted: City of Scottsdale (602.541.0586)
Permit Number: C54851

Note

Closed valves were found after this flow test was conducted.

Raw Flow Test Data

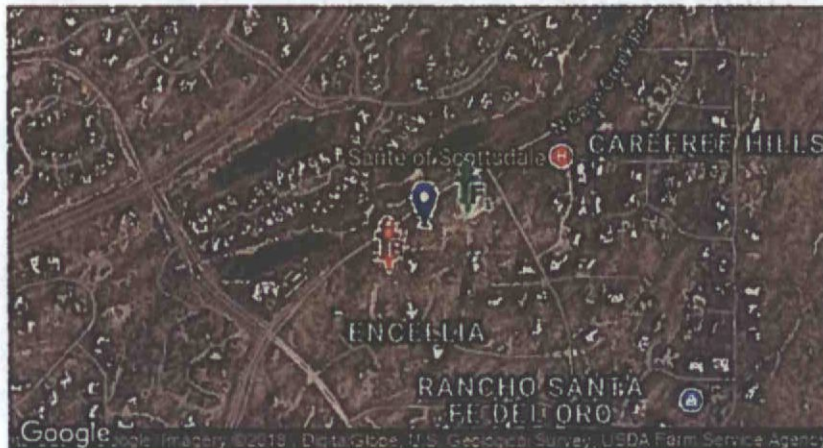
Static Pressure: 93.0 PSI
Residual Pressure: 40.0 PSI
Flowing GPM: 1,128
GPM @ 20 PSI: 1,341

Data with a 21 PSI Safety Factor

Static Pressure: 72.0 PSI
Residual Pressure: 19.0 PSI
Flowing GPM: 1,128
GPM @ 20 PSI: 1,116

Hydrant F₁

Pilot Pressure (1): 10 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 4 inches
Additional Coefficient 0.83 on orifice #1



Project Site



Static-Residual Hydrant



Flow Hydrant

Distance Between F₁ and R
778 ft (measured linearly)

Static-Residual Elevation
3009 ft (above sea level)

Flow Hydrant (F₁) Elevation
3041 ft (above sea level)

Elevation & distance values are approximate

EJ Flow Tests, LLC

21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 | www.ejengineering.com
John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

E·J | Flow Test Summary

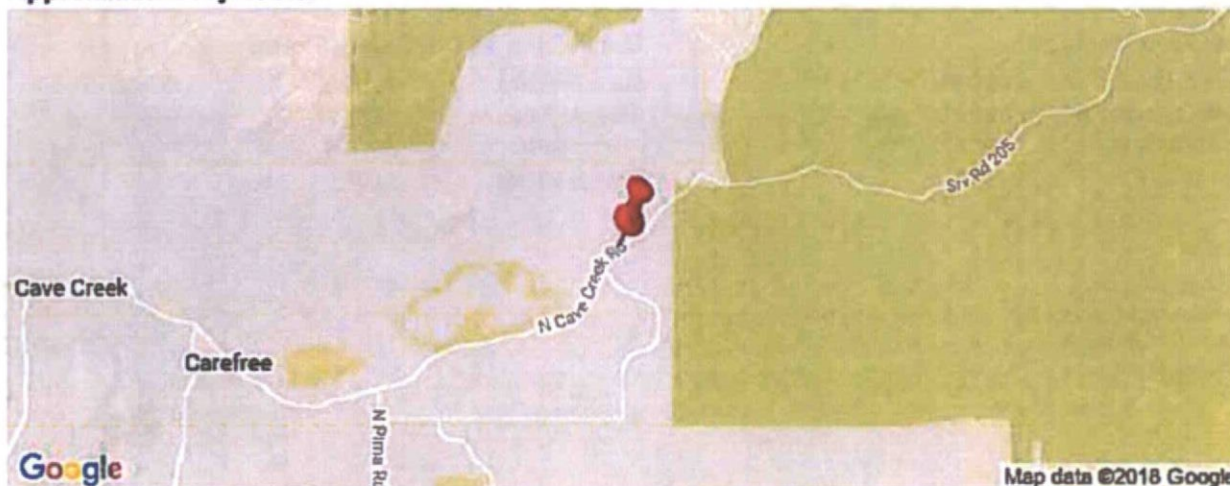
Static-Residual Hydrant



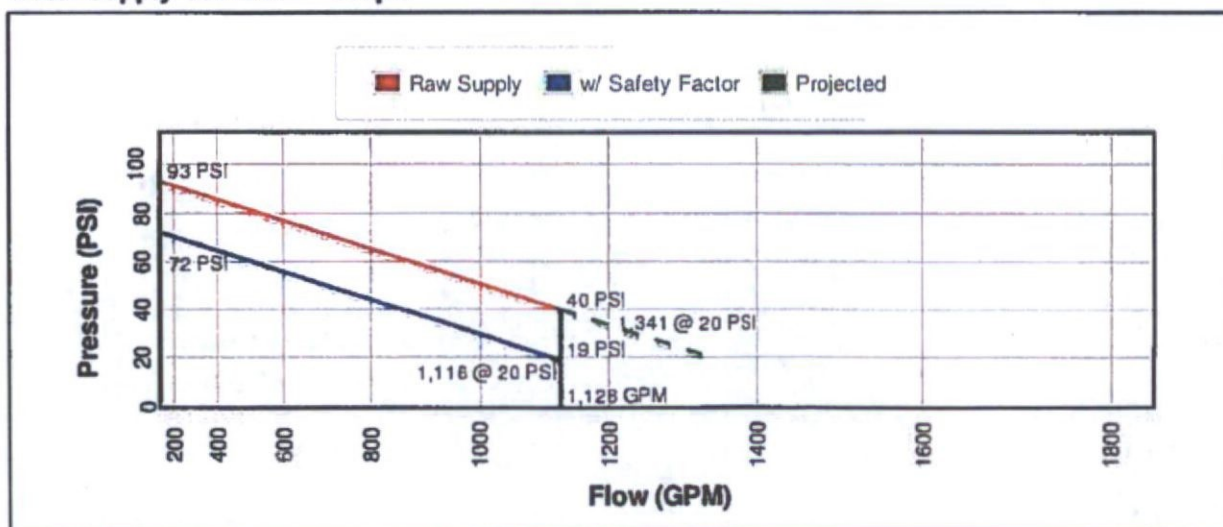
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve N^{1.85} Graph





Flow Test Summary

Project Name: EJFT 18042-1
Project Address: 10905 E Loving Tree Ln, Scottsdale, AZ 85262
Date of Flow Test: 2018-03-09
Time of Flow Test: 8:15 AM
Data Reliable Until: 2018-09-09
Conducted By: Austin Gourley & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By: Jim Demarblex (City of Scottsdale) 602.541.0586
City Forces Contacted: City of Scottsdale (602.541.0586)
Permit Number: C54851

Note

Closed valves were found after this flow test was conducted.

Raw Flow Test Data

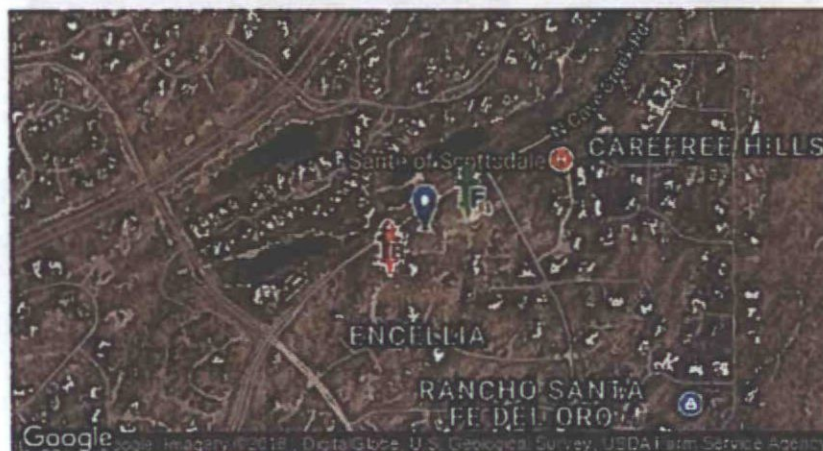
Static Pressure: 96.0 PSI
Residual Pressure: 56.0 PSI
Flowing GPM: 874
GPM @ 20 PSI: 1,235

Data with a 24 PSI Safety Factor

Static Pressure: 72.0 PSI
Residual Pressure: 32.0 PSI
Flowing GPM: 874
GPM @ 20 PSI: 1,007

Hydrant F₁

Pilot Pressure (1): 6 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 4 Inches
Additional Coefficient 0.83 on orifice #1



Project Site



Static-Residual Hydrant



Flow Hydrant

Distance Between F₁ and R
777 ft (measured linearly)

Static-Residual Elevation
3009 ft (above sea level)

Flow Hydrant (F₁) Elevation
3041 ft (above sea level)

Elevation & distance values are approximate

EJ Flow Tests, LLC

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John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

EJ | Flow Test Summary

Static-Residual Hydrant



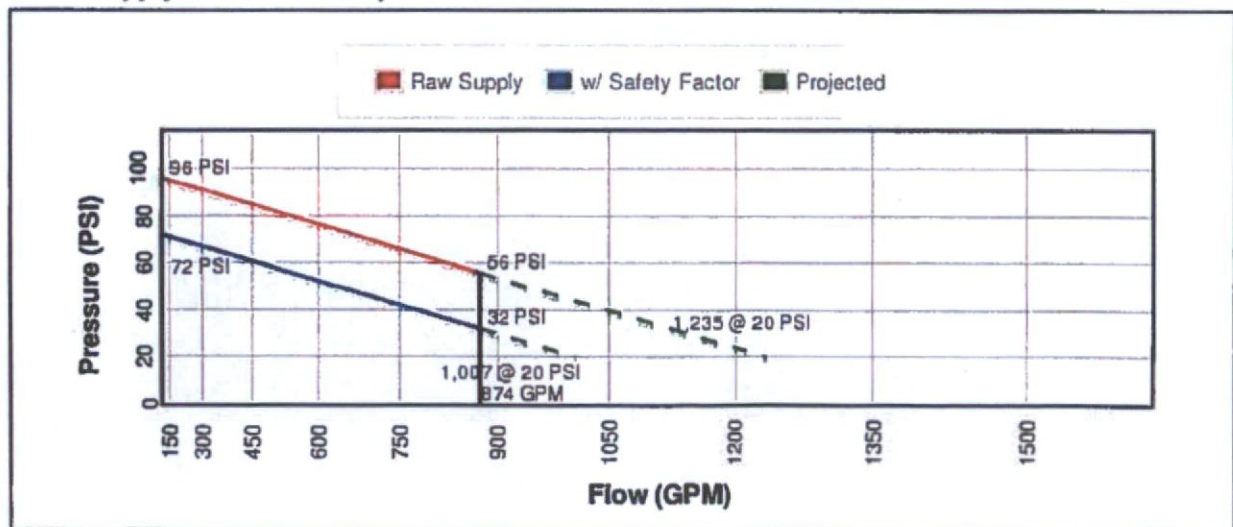
Flow Hydrant (only hydrant F1 shown for clarity)



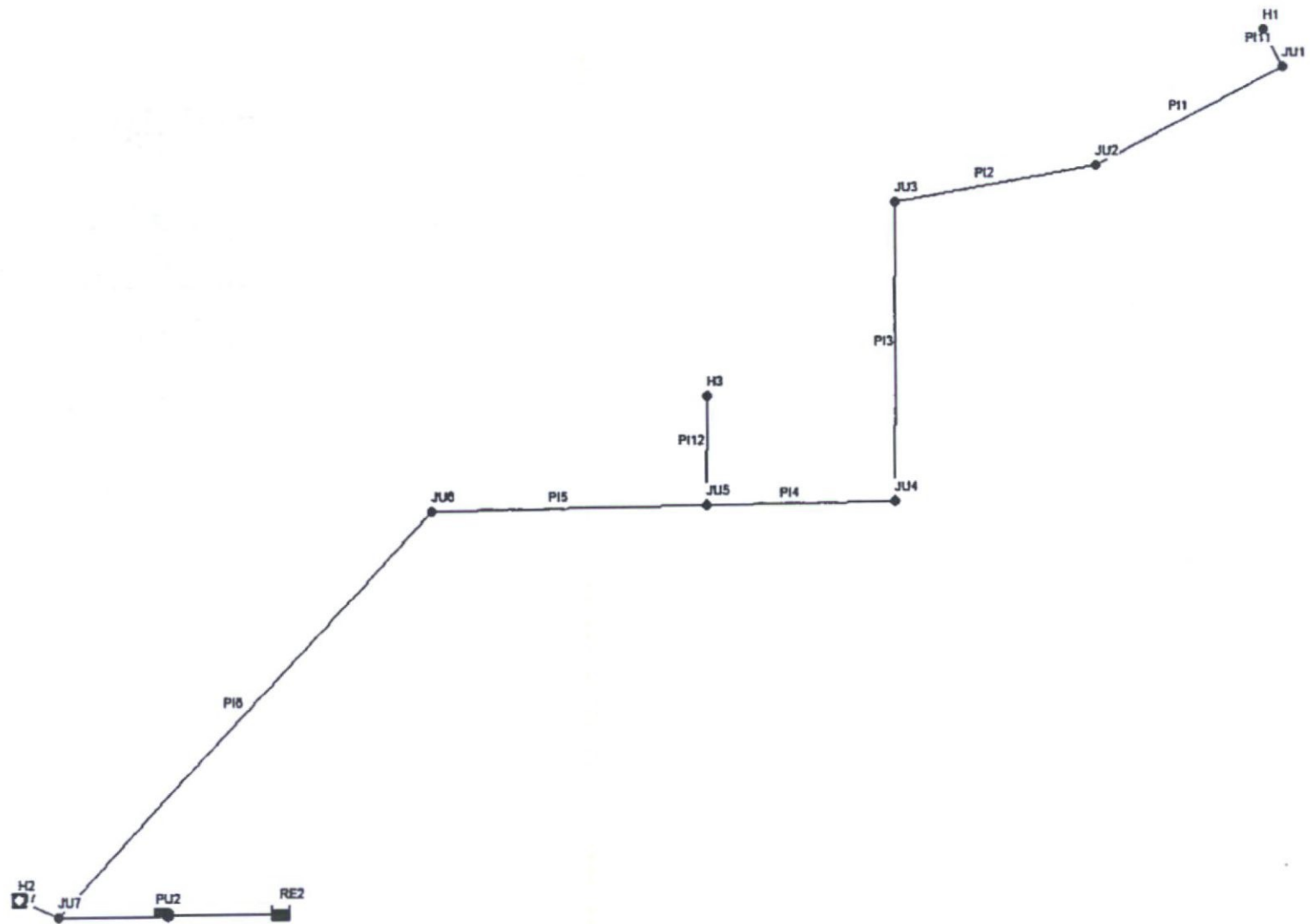
Approximate Project Site



Water Supply Curve $N^{1.85}$ Graph



APPENDIX "C"



 Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc H2	3004	0.00	3218.78	93.06
Junc JU6	3016	0.00	3218.78	87.86
Junc JU5	3016	0.00	3218.78	87.86
Junc H3	3027	0.00	3218.78	83.10
Junc JU4	3020	0.00	3218.78	86.13
Junc JU3	3034	0.00	3218.78	80.07
Junc JU2	3034	0.00	3218.78	80.07
Junc JU1	3037	0.00	3218.78	78.77
Junc H1	3037	0.00	3218.78	78.77
Junc JU7	3004	0.00	3218.78	93.06
Resvr RE2	3004	-0.01	3004.00	0.00

 * E P A N E T *
 * Hydraulic and Water Quality *
 * Analysis for Pipe Networks *
 * Version 2.0 *

Input File: 16535_WM (BASE) 051518.net

AVERAGE DAY DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	JU1	JU2	106.62	8
PI2	JU2	JU3	102.48	8
PI3	JU3	JU4	151.31	8
PI4	JU4	JU5	94.84	8
PI5	JU5	JU6	138.12	8
PI11	JU1	H1	21.47	6
PI12	JU5	H3	53.28	6
PI6	JU6	JU7	278.48	8
PI7	JU7	H2	21.74	6
PU2	RE2	JU7	#N/A	#N/A Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
PU2	100.00	75.00	899.68	0.21	0.21	0.00
Demand Charge:						0.00
Total Cost:						0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
H2	0.00	3218.78	93.06	0.00
JU6	0.00	3218.78	87.86	0.00
JU5	0.00	3218.78	87.86	0.00
H3	0.00	3218.78	83.10	0.00
JU4	0.00	3218.78	86.13	0.00
JU3	3.94	3218.78	80.06	0.00
JU2	0.00	3218.78	80.06	0.00
JU1	0.00	3218.78	78.76	0.00
H1	0.00	3218.78	78.76	0.00
JU7	0.00	3218.78	93.06	0.00
RE2	-3.94	3004.00	0.00	0.00 Reservoir

¶

Link Results:

16535_WM (BASE) 051518 AD.rpt				
Link	Flow	Velocity	Unit Headloss	Status
ID	GPM	fps	ft/Kft	
PI1	0.00	0.00	0.00	Open
PI2	0.00	0.00	0.00	Open
PI3	-3.94	0.03	0.00	Open
PI4	-3.94	0.03	0.00	Open
PI5	-3.94	0.03	0.00	Open
PI11	0.00	0.00	0.00	Open
PI12	0.00	0.00	0.00	Open
PI6	-3.94	0.03	0.00	Open
PI7	0.00	0.00	0.00	Open
PU2	3.94	0.00	-214.78	Open Pump

 * E P A N E T *
 * Hydraulic and Water Quality *
 * Analysis for Pipe Networks *
 * Version 2.0 *

Input File: 16535_WM (BASE) 051518.net

MAXIMUM DAY DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	JU1	JU2	106.62	8
PI2	JU2	JU3	102.48	8
PI3	JU3	JU4	151.31	8
PI4	JU4	JU5	94.84	8
PI5	JU5	JU6	138.12	8
PI11	JU1	H1	21.47	6
PI12	JU5	H3	53.28	6
PI6	JU6	JU7	278.48	8
PI7	JU7	H2	21.74	6
PU2	RE2	JU7	#N/A	#N/A Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
PU2	100.00	75.00	899.66	0.43	0.43	0.00
Demand Charge:						0.00
Total Cost:						0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
H2	0.00	3218.77	93.06	0.00
JU6	0.00	3218.77	87.86	0.00
JU5	0.00	3218.77	87.86	0.00
H3	0.00	3218.77	83.10	0.00
JU4	0.00	3218.77	86.13	0.00
JU3	7.88	3218.77	80.06	0.00
JU2	0.00	3218.77	80.06	0.00
JU1	0.00	3218.77	78.76	0.00
H1	0.00	3218.77	78.76	0.00
JU7	0.00	3218.77	93.06	0.00
RE2	-7.89	3004.00	0.00	0.00 Reservoir

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Link Results:

16535_WM (BASE) 051518 MD.rpt

Link ID	Flow GPM	velocity fps	Unit Headloss ft/Kft	Status
PI1	0.00	0.00	0.00	Open
PI2	0.00	0.00	0.00	Open
PI3	-7.88	0.05	0.00	Open
PI4	-7.88	0.05	0.00	Open
PI5	-7.88	0.05	0.00	Open
PI11	0.00	0.00	0.00	Open
PI12	0.00	0.00	0.00	Open
PI6	-7.88	0.05	0.00	Open
PI7	0.00	0.00	0.00	Open
PU2	7.89	0.00	-214.77	Open Pump

 * E P A N E T *
 * Hydraulic and Water Quality *
 * Analysis for Pipe Networks *
 * Version 2.0 *

Input File: 16535_WM (BASE) 051518.net

PEAK HOUR DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	JU1	JU2	106.62	8
PI2	JU2	JU3	102.48	8
PI3	JU3	JU4	151.31	8
PI4	JU4	JU5	94.84	8
PI5	JU5	JU6	138.12	8
PI11	JU1	H1	21.47	6
PI12	JU5	H3	53.28	6
PI6	JU6	JU7	278.48	8
PI7	JU7	H2	21.74	6
PU2	RE2	JU7	#N/A	#N/A Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
PU2	100.00	75.00	899.61	0.74	0.74	0.00
Demand Charge:						0.00
Total Cost:						0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
H2	0.00	3218.76	93.06	0.00
JU6	0.00	3218.76	87.86	0.00
JU5	0.00	3218.76	87.86	0.00
H3	0.00	3218.76	83.09	0.00
JU4	0.00	3218.76	86.12	0.00
JU3	13.79	3218.76	80.06	0.00
JU2	0.00	3218.76	80.06	0.00
JU1	0.00	3218.76	78.76	0.00
H1	0.00	3218.76	78.76	0.00
JU7	0.00	3218.76	93.06	0.00
RE2	-13.80	3004.00	0.00	0.00 Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
---------	----------	--------------	----------------------	--------

	16535_WM	(BASE)	051518	PH.rpt	
PI1	0.00	0.00	0.00	Open	
PI2	0.00	0.00	0.00	Open	
PI3	-13.79	0.09	0.01	Open	
PI4	-13.79	0.09	0.01	Open	
PI5	-13.80	0.09	0.01	Open	
PI11	0.00	0.00	0.00	Open	
PI12	0.00	0.00	0.00	Open	
PI6	-13.80	0.09	0.01	Open	
PI7	0.00	0.00	0.00	Open	
PU2	13.80	0.00	-214.76	Open	Pump

 * E P A N E T *
 * Hydraulic and Water Quality *
 * Analysis for Pipe Networks *
 * Version 2.0 *

Input File: 16535_WM (BASE) 051518.net

MAXIMUM DAY DEMAND WITH FIRE FLOW (1500GPM)

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	JU1	JU2	106.62	8
PI2	JU2	JU3	102.48	8
PI3	JU3	JU4	151.31	8
PI4	JU4	JU5	94.84	8
PI5	JU5	JU6	138.12	8
PI11	JU1	H1	21.47	6
PI12	JU5	H3	53.28	6
PI6	JU6	JU7	278.48	8
PI7	JU7	H2	21.74	6
PU2	RE2	JU7	#N/A	#N/A Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
PU2	100.00	75.00	431.83	39.07	39.07	0.00
Demand Charge:						0.00
Total Cost:						0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
H2	0.00	3107.09	44.67	0.00
JU6	0.00	3096.21	34.75	0.00
JU5	0.00	3090.81	32.41	0.00
H3	1500.00	3082.44	24.02	0.00
JU4	0.00	3090.81	30.68	0.00
JU3	7.88	3090.81	24.62	0.00
JU2	0.00	3090.81	24.62	0.00
JU1	0.00	3090.81	23.32	0.00
H1	0.00	3090.81	23.32	0.00
JU7	0.00	3107.09	44.67	0.00
RE2	-1507.88	3004.00	0.00	0.00 Reservoir

♀

Page 2

Link Results:

16535_WM (BASE) 051518 MDF.rpt				
Link	Flow	Velocity	Unit Headloss	Status
ID	GPM	fps	ft/kft	
PI1	0.00	0.00	0.00	Open
PI2	0.00	0.00	0.00	Open
PI3	-7.88	0.05	0.00	Open
PI4	-7.88	0.05	0.00	Open
PI5	-1507.88	9.62	39.08	Open
PI11	0.00	0.00	0.00	Open
PI12	1500.00	17.02	157.16	Open
PI6	-1507.88	9.62	39.08	Open
PI7	0.00	0.00	0.00	Open
PU2	1507.88	0.00	-103.09	Open Pump

Input File: 16535_WM (BASE) 051518.net

MAXIMUM GPM AT 30 PSI

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	JU1	JU2	106.62	8
PI2	JU2	JU3	102.48	8
PI3	JU3	JU4	151.31	8
PI4	JU4	JU5	94.84	8
PI5	JU5	JU6	138.12	8
PI11	JU1	H1	21.47	6
PI12	JU5	H3	53.28	6
PI6	JU6	JU7	278.48	8
PI7	JU7	H2	21.74	6
PU2	RE2	JU7	#N/A	#N/A Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
PU2	100.00	75.00	479.47	40.94	40.94	0.00
Demand Charge:						0.00
Total Cost:						0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
H2	0.00	3118.46	49.60	0.00
JU6	0.00	3108.69	40.16	0.00
JU5	0.00	3103.84	38.06	0.00
H3	1423.00	3096.24	30.00	0.00
JU4	0.00	3103.84	36.33	0.00
JU3	0.00	3103.84	30.26	0.00
JU2	0.00	3103.84	30.26	0.00
JU1	0.00	3103.84	28.96	0.00
H1	0.00	3103.84	28.96	0.00
JU7	0.00	3118.46	49.60	0.00
RE2	-1423.01	3004.00	0.00	0.00 Reservoir

9

Page 2

Link Results:

Link	Flow	Velocity	Unit Headloss	Status
------	------	----------	---------------	--------

ID	16535_WM GPM	(BASE) fps	051518 ft/Kft	F30psi.rpt
PI1	0.00	0.00	0.00	Open
PI2	0.00	0.00	0.00	Open
PI3	0.00	0.00	0.00	Open
PI4	0.00	0.00	0.00	Open
PI5	-1423.00	9.08	35.11	Open
PI11	0.00	0.00	0.00	Open
PI12	1423.00	16.15	142.54	Open
PI6	-1423.00	9.08	35.11	Open
PI7	0.00	0.00	0.00	Open
PU2	1423.01	0.00	-114.46	Open Pump

APPENDIX "D"

- a. Node pressures (psi or HGL elevation)
- b. Pipe flow (gpm)
- c. Flow direction arrows
- d. Pipe flow velocity in feet per second (fps)
- e. Each pipe segment's head loss rate (ft. /1,000ft or psi/ft.)
- f. PRVs: Upstream and downstream pressures (psi or HGL elevation)
- g. Tanks: Inflow and outflow (gpm)
- h. Shows all units for the values presented or provide a legend on the diagram page that indicates the units used

AVERAGE DAY WATER DEMANDS ⁽¹⁾							
IN GALLONS PER DAY (GPD) ⁽²⁾				IN GALLONS PER MINUTE (GPM) ⁽²⁾⁽³⁾			
Land Use	Inside Use	Outside Use	Total Use	Inside Use	Outside Use	Total Use	Units
Residential Demand per Dwelling Unit							
< 2 dwelling unit per acre (DU/ac)	208.9	276.7	485.6	0.30	0.39	0.69	per unit
2 – 2.9 DU/ac	193.7	276.7	470.4	0.27	0.39	0.66	per unit
3 – 7.9 DU/ac	175.9	72.3	248.2	0.25	0.11	0.36	per unit
8 – 11.9 DU/ac	155.3	72.3	227.6	0.22	0.11	0.33	per unit
12 – 22 DU/ac	155.3	72.3	227.6	0.22	0.11	0.33	per unit
High Density Condominium (condo)	155.3	30	185.3	0.22	0.05	0.27	per unit
Resort Hotel (includes site amenities)	401.7	44.6	446.3	0.56	0.07	0.63	per room
Service and Employment							
Restaurant	1.2	0.1	1.3	1.67E-03	1.39E-04	1.81E-03	per square foot (sq.ft.)
Commercial/Retail	0.7	0.1	0.8	9.73E-04	1.39E-04	1.11E-03	per sq.ft.

AVERAGE DAY WATER DEMANDS ⁽¹⁾							
IN GALLONS PER DAY (GPD) ⁽²⁾				IN GALLONS PER MINUTE (GPM) ⁽²⁾⁽³⁾			
Commercial High Rise	0.5	0.1	0.6	6.95E-04	1.39E-04	8.34E-04	per sq.ft.
Office	0.5	0.1	0.6	6.95E-04	1.39E-04	8.34E-04	per sq.ft.
Institutional	670	670	1340	0.94	0.94	1.88	per acre
Industrial	873	154	1027	1.22	0.22	1.44	per acre
Research and Development	1092	192	1284	1.52	0.27	1.79	per acre
Special Use Areas							
Natural Area Open Space	0	0	0	0.0	0.0	0.0	per acre
Developed Open Space – Parks	0	1786	1786	0.0	2.49	2.49	per acre
Developed Open Space – Golf Course	0	4285	4285	0.0	5.96	5.96	per acre
Notes: (1) These values shall not be used directly for service line or water meter sizing. (2) Gallon per day values are provided for reference only. The instantaneous gallon per minute flow rates presented are intended for use in the required hydraulic modeling scenarios. The gpm values assume a 12-hour active water use period per 24-hour day. In large or specialty developments or master plans the hydraulic analysis criteria and parameters should be discussed with the Water Resources Department. Seasonal peaking should also be considered. Upon review, the Water Resources Department reserves the right to designate flows to be used in hydraulic modeling scenarios that may be different from those presented here. (3) The hydraulic modeling peaking factors used in select modeling scenarios are to be applied to the gpm values shown here. Max day and peak hour peaking factors can be found in Section 6-1.404.							

FIGURE 6-1.2 AVERAGE DAY WATER DEMANDS

I. Summary

$$Q_{max} = Q_{avg} \times [1 + (14 / (4 + P^{1/2}))]$$

P = Population / 1,000

Residential densities are to assume 2.5 persons per dwelling unit. Multifamily densities exceeding 22 dwelling units per acre can assume 1.7 to 2.2 persons per unit.

B. Commercial and Industrial

Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

LAND USE	DEMAND (gpd)	DESIGN PEAKING FACTOR
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium (Condo)	140 per unit	4.5
Resort Hotel (includes site amenities)	380 per room.	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3
Clubhouse for Subdivision	100 per patron x 2	4.5
Golf Course	patrons per du per day	
Fitness Center/ Spa/ Health club	0.8 per sq. ft.	3.5

FIGURE 7-1.2 AVERAGE DAY SEWER DEMAND IN GALLONS PER DAY & PEAKING FACTORS BY LAND USE

HYDRAULIC DESIGN

No public SS lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

SS lines shall be designed and constructed to give mean full flow velocities equal to or greater than 2.5 fps, based upon Manning's Formula, using an "n" value of 0.013.

To prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities shall be analyzed for minimum, average day and peak day design flow conditions for each reach of pipe.

The SS system shall be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope shall be evaluated for hydraulic jump.

The depth to diameter ratio (d/D) for gravity SS pipes 12 inches in diameter and less shall not exceed 0.65 in the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.

7-1.404

APPENDIX A - SEWER CAPACITY: CITY OF SCOTTSDALE FIRE STATION 616

TABLE 1
MINIMUM PIPE CAPACITY ANALYSIS

Analysis Condition	LINE SIZE	AREA (FT ²)	PERIMETER (FT)	R _H	SLOPE (FT./FT.)	CAPACITY (CFS)	CAPACITY (CFS) AT (d/D=0.65)	Velocity
Standard	8" LINE	0.349	2.094	0.167	0.0052	0.874	0.601	2.50

Minimum Line Slope
8" = 0.0052 ft./ft.

MAXIMUM PIPE CAPACITY ANALYSIS

Analysis Condition	LINE SIZE	AREA (FT ²)	PERIMETER (FT)	R _H	SLOPE (FT./FT.)	CAPACITY (CFS)	CAPACITY (CFS) AT (d/D=0.65)	Velocity
Standard	8" LINE	0.349	2.094	0.167	0.082	3.470	2.387	9.94

Maximum Line Slope
8" = 0.0820 ft./ft.

PEAK FLOWS VS. PIPE CAPACITY ANALYSIS

PIPE (MH# - MH#)	LINE SIZE (IN.)	# OF UNITS	POPULATION	AVE. DAILY FLOW (GPD)	PEAKING FACTOR	PEAK FLOW (CFS)	CAPACITY (CFS) MIN SLOPE	CAPACITY (CFS) AT (d/D=0.65)
EXMH#A - EXMH#B	8			3,550	3.00	0.0165	0.874	0.601



Engineering and Environmental Consultants, Inc.

7740 N. 16th Street, Suite 135 | Phoenix, Arizona 85020 | P: 602.248.7702

DRAINAGE REPORT

FOR

SCOTTSDALE FIRE STATION # 616

10905 E. Loving Tree Lane
Scottsdale, Arizona 85262

OWNER:

City of Scottsdale
7447 E. Indian School Road; Suite 100
Scottsdale, AZ 85251

September 8, 2017

Revised December 13, 2017

Revised March 5, 2018

Revised December 18, 2018



Prepared by:

ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.

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Phoenix, AZ 85020

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3.0	SITE DESCRIPTION.....	3
4.0	FEMA FLOODPLAIN CLASSIFICATION.....	4
5.0	OFFSITE DRAINAGE DESCRIPTION.....	5
6.0	ONSITE DRAINAGE DESIGN DESCRIPTION.....	6
7.0	HYDROLOGY/HYRAULICS.....	8
8.0	CONCLUSION AND RECOMMENDATIONS.....	9

FIGURES:

FIGURE 1: VICINITY MAP

FIGURE 2: SITE ASSESSOR'S MAP (maricopa.gov website)

FIGURE 3: FIRM MAP 04013C1305L (National Flood Insurance Program)

FIGURE 4: CITY ZONING MAP

FIGURE 5: GOOGLE AEIRAL PHOTO MAP (google)

FIGURE 6: FLO 2D DRAINAGE EXHIBIT BASED ON EXISTING CONDITIONS

FLO 2D DRAINAGE EXHIBIT BASED ON PROPOSED CONDITIONS

FIGURE 7: HYDROLOGY CALCULATIONS

RIVER STATION EXHIBITS

HEC-RAS SUMMARY TABLE (EXISTING AND PROPOSED CONDCTIONS)

HEC-RAS PROFILE AND CROSS SECTIONS

SOIL CLASSIFICATION DATA

HEC-RAS EXISTING CONDITION REPORT

HEC-RAS PROPOSED CONDCTIONS REPORT

RETENTION CRITERIA AND CALCULATIONS

PRE VS POST DEVELOPMENT RUNOFF CALCULATIONS

CULVERT CALCULATIONS

FIGURE 8: GRADING AND DRAINAGE PLAN

FIGURE 9: CD; HYDROLOGIC AND HYDRAULIC DIGITAL FILES

1.0 INTRODUCTION/PURPOSE

The purpose of this report is to provide a drainage narrative of the onsite and offsite drainage considerations for this proposed Scottsdale Fire Station # 616 located at 10905 E. Loving Tree Lane situated within Scottsdale, Arizona. The site is in Flood Zone X (Shaded), as depicted on the FEMA Flood Insurance Rate Map 04013C0903L dated October 16, 2013. The site is located on the south side of Cave Creek Road approximately 1,400 feet east of Lone Mountain Parkway.

2.0 LOCATION

This site lies within the North Half of Section 28, Township 6 North, Range 5 East of the Gila and Salt River Base & Meridian, Maricopa County Arizona. The legal description for the property is as follows: **Lot 2A "Minor Subdivision Plat Linsenmeyer West Land Division 2", as recorded in Book 1110, Page 13, Records of Maricopa County, Arizona.** The site is bordered to the north by Cave Creek Road, to the east, south and west by existing residential properties. The Assessor's Parcel Number for this property is 219-60-912A. Based on the information provided on the Maricopa County Assessor's Maps, the site has a Latitude of 33.838909°N and a Longitude 111.848099°W at the approximate center of the site. The elevations of the site range from 3013.00 to 3049.00 above sea level. A vicinity map is provided in the "FIGURES" section of this report.

3.0 SITE DESCRIPTION

The property is currently zoned R1-43 ESL single family and is approximately 144,687 square feet, or 3.32 acres (net area). The slope of the land is generally from northeast to southwest. There is approximately 36-feet of fall from the eastern edge of the site to the southwest corner of the site providing slopes ranging from 12.5% at the east side to just under 5.5% towards the southwest corner of the site. The property is primarily native desert with some rock outcroppings located near the top of the small ridge along the east side of the site. There is one notable wash that flows along the north property line paralleling Cave Creek Road. This wash flows from northeast to southwest within an existing drainage easement that is also located within a dedicated scenic corridor. Based on preliminary calculations and investigation, it appears as though this wash conveys a peak discharge of approximately 83 cfs. The site is in Flood Zone X (Shaded), as depicted on the FEMA Flood Insurance Rate Map. A site aerial map has been provided within the "FIGURES" section of this report.

4.0 FEMA FLOODPLAN CLASSIFICATION

The site lies within Zone "X" (shaded) as indicated on the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona, Map Number 04013C0903L, dated October 16, 2013. Zone "X" (shaded) is defined as "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". A copy of the FIRM is provided in the "FIGURES" section of this report.

5.0 OFFSITE DRAINAGE DESCRIPTION

As previously discussed, the site is in Flood Zone X (Shaded), defined as 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. There is one existing wash that enters the site along the east property line at the northeast corner of the site that conveys approximately 83 cfs (100-year peak) onto the proposed Scottsdale Fire Station site. For the most part, the drainage is contained within an existing drainage easement that is located along and parallel to the north property line. Approximately at the midpoint of the property, the wash and easement turn in a southerly direction towards the south property line. At this turning point, the wash changes from a more concentrated flow to a partial sheet flow. When the wash exits the south property line it outlets at two existing locations with a combined flow of approximately 94 cfs.

6.0 ONSITE DRAINAGE DESCRIPTION

In an effort to create a more substantial building pad for the Fire Station, provide natural NAOS desert landscape corridors and protect the native desert surroundings within this area, the site will require some very minor re-routing of the wash along the building frontage and to allow for access from the building to and from Cave Creek Road. The wash will be re-routed in such a manner that the existing/historical entrance locations and exit locations will be undisturbed. Additionally, the "first flush" retention shall be provided on the site for the areas of disturbance to ensure the post development discharge does not exceed the pre development discharge.

Along the building frontage, retaining walls will be utilized to allow the building to be located nearer to the Cave Creek Road access. At the main Fire Station exit, the 83 cfs will be routed through four 36-inch RCP culvert pipes. The 100-year peak discharge will be entirely contained within the pipe culverts with no overtopping onto the drives. An exhibit has been provided within this report illustrating the deltas between existing and proposed water surface elevations at specific river stations. At River Station 3+75 (upstream culvert inlet) there is a slight dip (approximately 1.5-feet) due to the sloped longitudinal inlet at the headwall entrance. Within 50-feet in an upstream direction, the proposed water surface elevation is less than, or matching existing (River Station 4+25), therefore eliminating any adverse impacts on upstream conditions. Decorative/natural looking headwalls will be constructed at both upstream and downstream locations. The headwalls are located within a scenic corridor, therefore, their aesthetic appearance and material pallet must be approved by the City of Scottsdale Planning Department.

The proposed wash modification will be designed to convey the 100-year peak discharges while maintaining near historical flow velocities and depths. Although the existing and proposed velocities are below 5 ft/sec, it may still be necessary to incorporate native angular rip-rap to assist in providing erosion protection along the banks and reducing flow velocities.

In addition to allowing offsite drainage to pass through the site, the development will provide onsite retention for the areas of proposed disturbance. Retention calculations will be based on the "first-

flush" rainfall event. Shallow retention basins will be located within landscape areas along the eastern and southern part of the building and will collect roof-top and parking runoff within the area. The basin will not exceed 1-foot in depth and will drain from basin to basin with an ultimate outfall to the existing wash. Surface retention basins will be maximum 1 foot deep and have side slopes not exceeding 4:1 unless otherwise shown as a vertical element at the gabions. Basins will be revegetated to provide a natural appearance. Basin will percolate or bleed-off within a 36-hour time frame. These onsite basins have been routed in the overall drainage analysis to quantify impacts (if any) the proposed development may have on existing upstream or downstream drainage considerations.

7.0 HYDROLOGY/HYDRAULICS

Onsite washes requiring re-routing will be designed in accordance with the City of Scottsdale Design Standards & Policies Manual for 100-year peak discharges. Portions of the wash requiring re-routing will be designed with maximum 3:1 side slopes and where velocities exceed 6 ft/sec will contain angular rip-rap bank protection and rip-rap within the bottom of the washes where necessary to reduce flow velocities and prevent erosion. The intent of the re-routed washes is to keep the flow velocities similar to historical rates. Calculations provided within the "Figures" section of the report conclude that the angular rip-rap will not be required because of the minimum increase and in some instances a reduction in channel velocities from historical velocities.

A HEC-RAS model has been developed to demonstrate that the existing and proposed conditions have no adverse impact on existing upstream and downstream conditions. The HEC-RAS Generate Report is provided within this report. A summary table depicting existing and proposed Water Surface Elevations and existing and proposed Velocities has also been provided to demonstrate a comparison for the existing and proposed site drainage conditions based on the HEC-RAS models. Refer to the Existing Conditions Floodplain Map and the Proposed Conditions Floodplain Map for specific cross section data from the HEC-RAS output model.

A Grading and Drainage Plan has been provided to schematically depict how the lot and surrounding areas will drain to the existing wash and any proposed retention areas. Erosion protection "cut off" walls at a minimum of 3-feet in depth shall be required at both the inlet and outlet pipe culvert structures. Additionally, a minimum of a 10-foot wide area of angular native rip-rap shall be placed upstream and downstream of the "cut off" walls to provide additional erosion protection at the culvert structures. This information shall be detailed more specifically on the final grading and drainage plans.

Onsite storm drain pipes shall be designed to handle the 100-year peak discharge. Headwalls will be constructed at both upstream and downstream ends for pipe sections. Native angular rip-rap will also be utilized to reduce velocities and erosion at the entrance and exit locations of pipe sections.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed developed site does have offsite flows impacting the proposed site characteristics. As a result, some wash re-routing will occur to create a more usable building pad, provide natural NAOS desert landscape corridors and protect the native desert surroundings within this area. Portions of the wash not requiring re-routing will remain undisturbed and be utilized as NAOS for the proposed development.

Wash entrance locations and exit locations will remain in their historical locations and conditions. The 100-year peak discharge will be entirely contained within the pipe culverts with no overtopping onto the drives.

Onsite retention for the "first flush" rainfall event will be provided for the areas of disturbance. Retention storage shall be provided in either surface/landscape basins adjacent to the building and parking to intercept this runoff. These storage locations will be established at low points within the lot to ensure onsite runoff can enter. Ultimately, the storage method will be designed with a metered bleed off to ensure it drain entirely within a 36-hour period. The "first flush" storage has been utilized to collect onsite runoff and minimize runoff impacts for the post development runoff conditions.

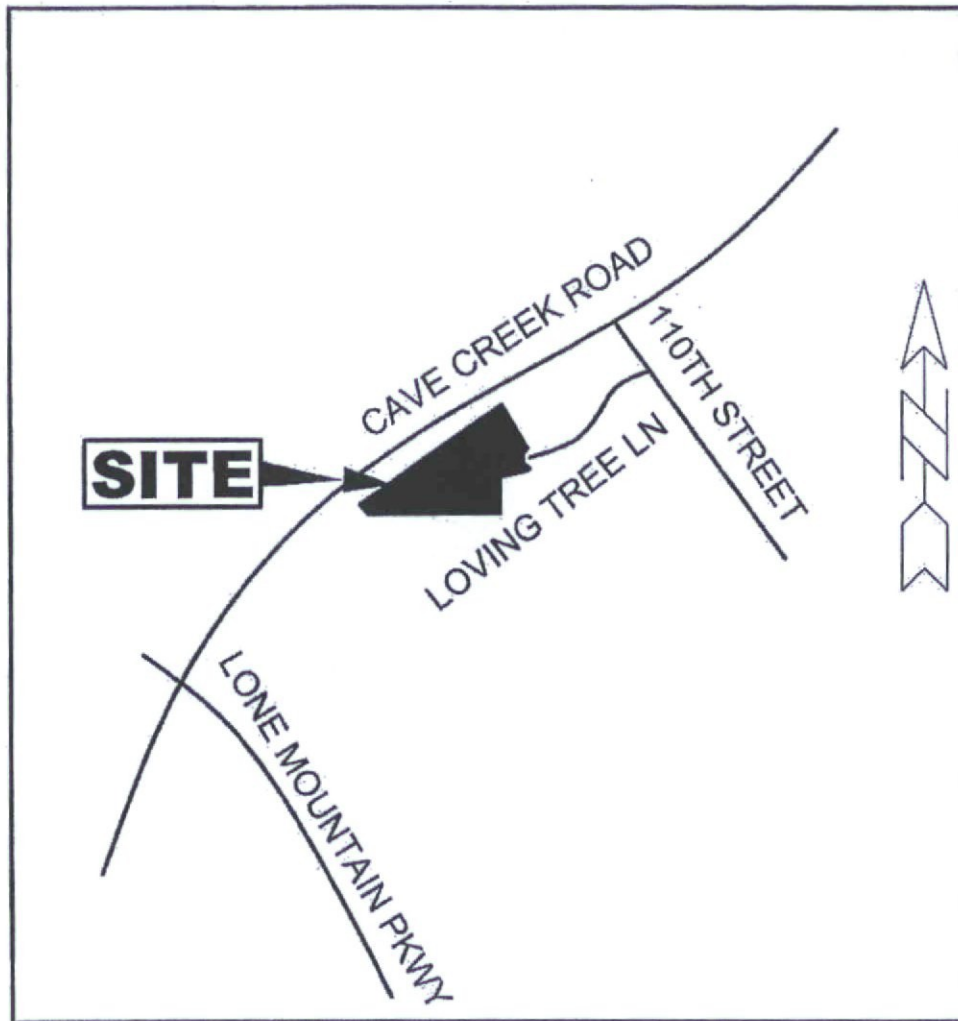
Within Figure 7 is a summary of the routing of both the existing conditions and proposed drainage considerations for the developed site. The results conclude that with the first-flush storage the runoff from the site has very little impact on existing conditions. There is a slight increase from 16.4 cfs to 17.6 cfs. The onsite peak will occur prior to the peak of the existing wash, therefore having no adverse impact on upstream or downstream conditions. The results also indicate that the peak discharge from the entire site at the downstream end increases slightly from 87.3 cfs to 88.7 cfs, therefore having no adverse impact on existing conditions.

The Flo-2D exhibits provided within Figure 6 of the report indicate that the proposed flow depths and velocities at the exit point (south property) are consistent with the existing flow depth and velocities

near the same points of concentration therefore summarizing that there is no adverse impact to upstream or downstream drainage considerations resulting from this proposed site development.

FIGURES

FIGURE 1



VICINITY MAP N.T.S.

FIGURE 2

FIGURE 3



OWN ON THIS PANEL IS LOCATED
NORTH, RANGE 5 EAST AND
RANGE 6 EAST.

CITY OF SCOTTSDALE
045012

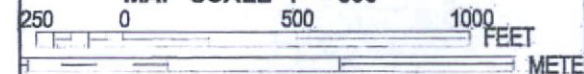
LIMIT OF STUDY
PROFILE BASE LINE

28

Stagecoach Pass Wash



MAP SCALE 1" = 500'



NFIP

PANEL 0903L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 903 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAREFREE TOWN OF	040126	0903	L
SCOTTSDALE CITY OF	045012	0903	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
04013C0903L

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

FIGURE 4

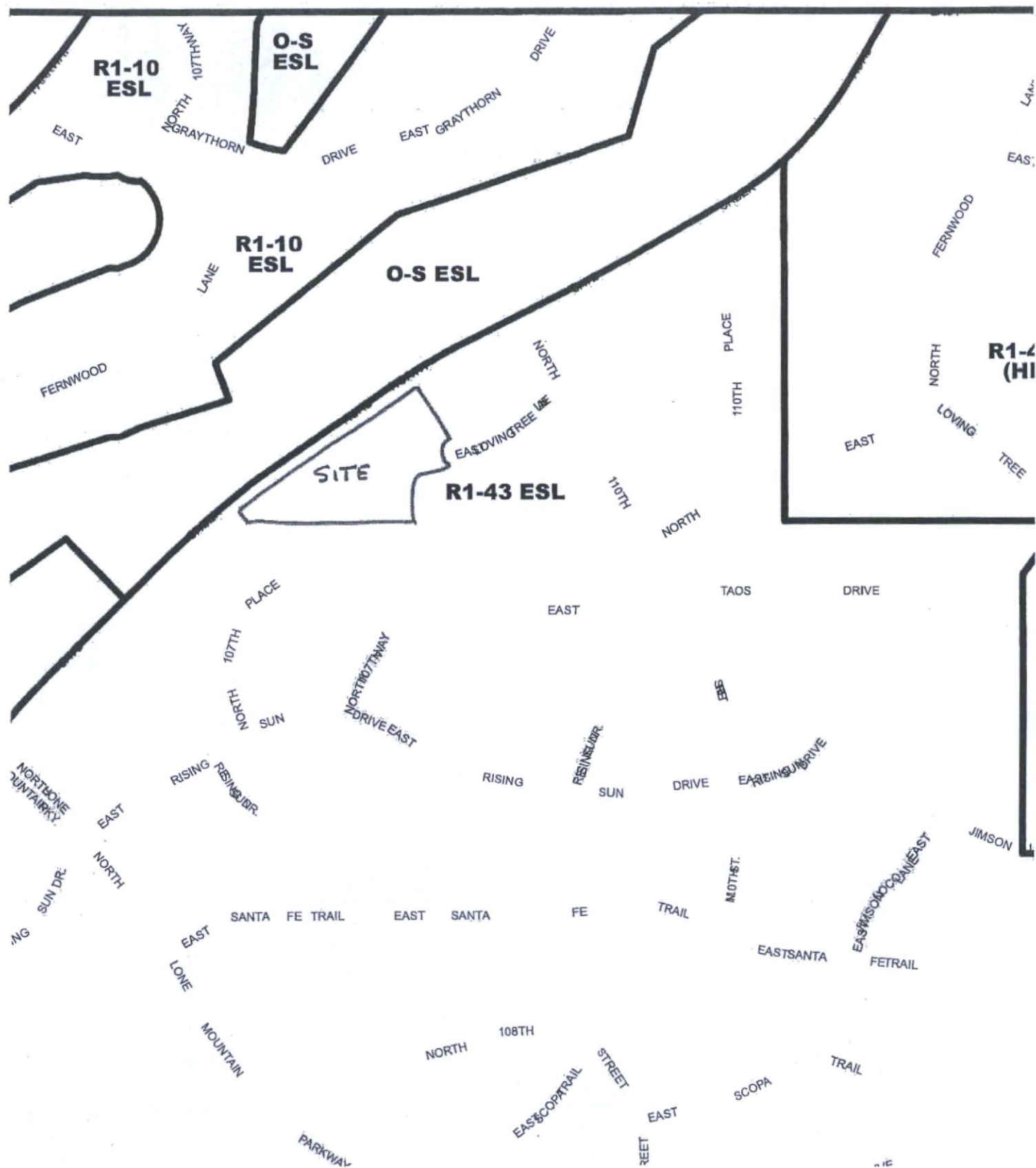
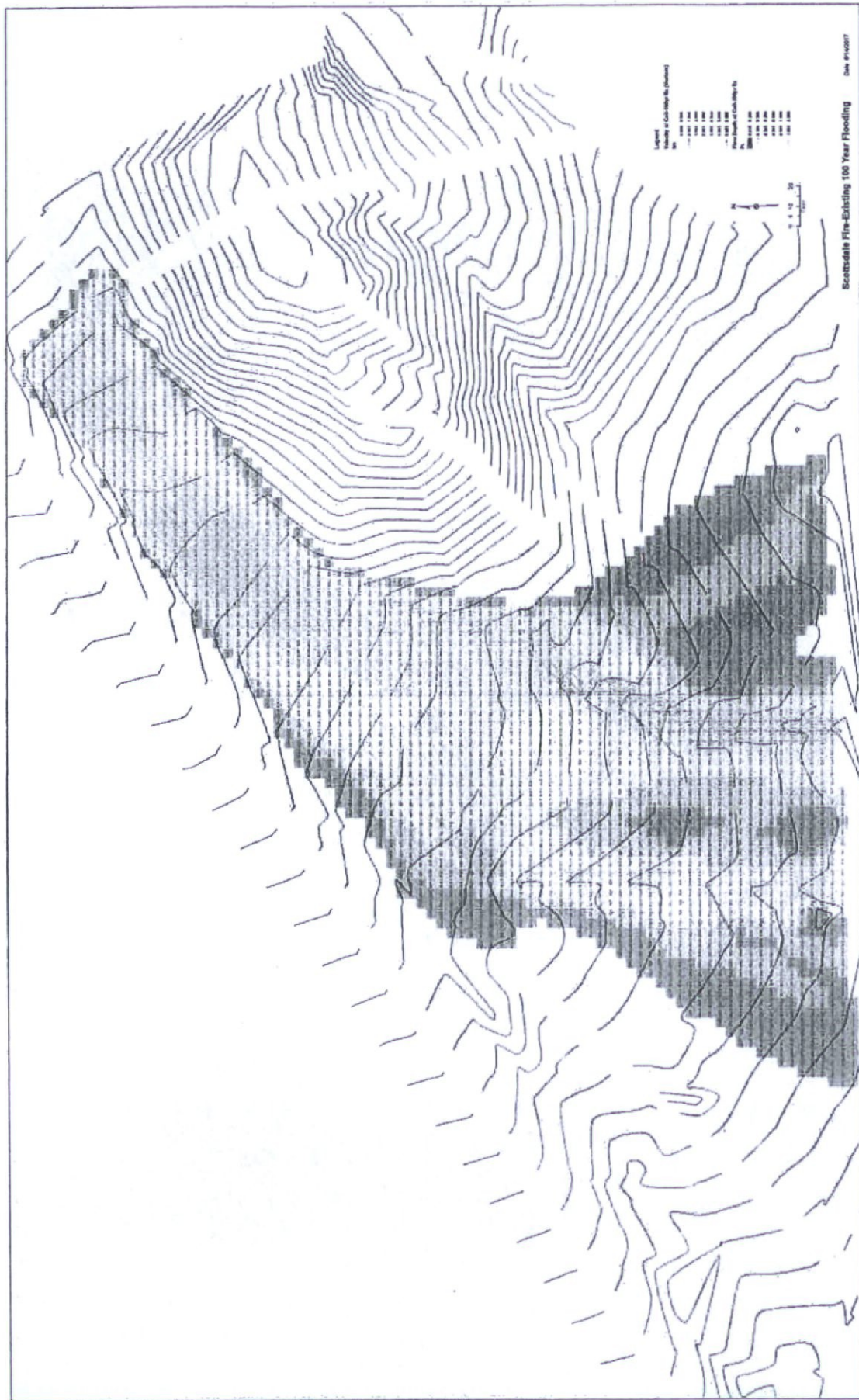


FIGURE 5



FIGURE 6



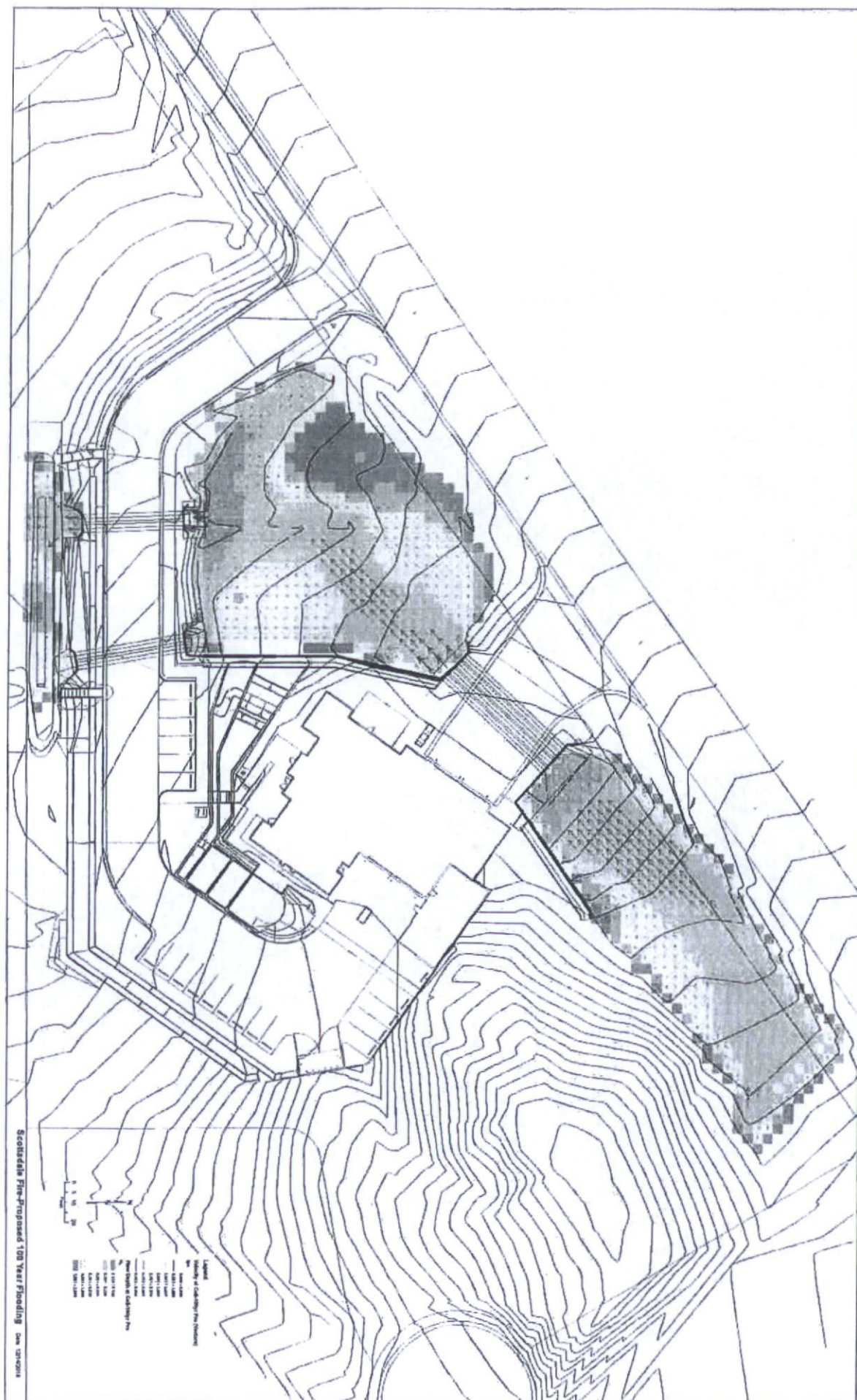
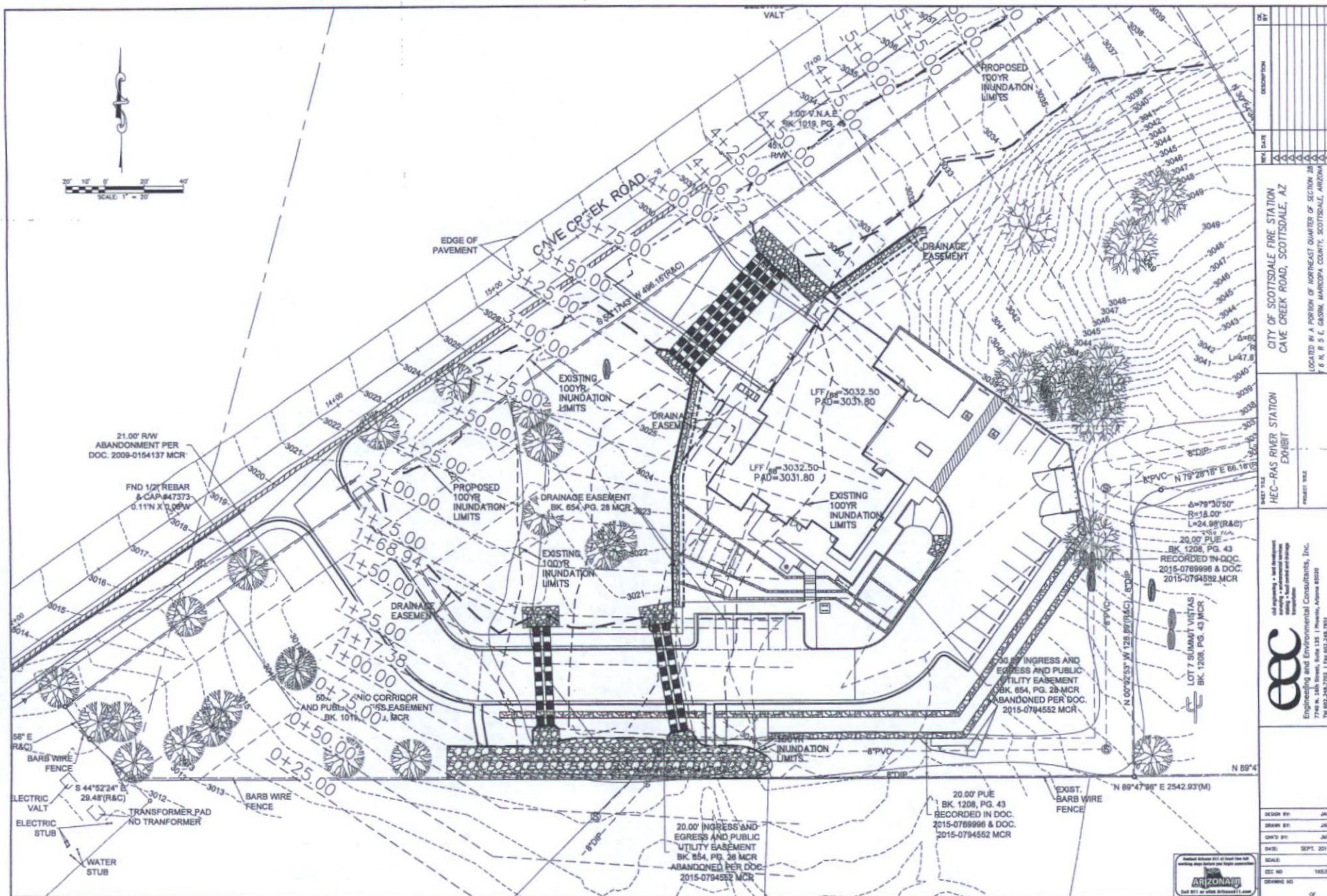


FIGURE 7

[illegible]

CITY OF SCOTTSDALE FIRE STATION
CAVE CREEK ROAD, SCOTTSDALE, AZ

LOCATED IN A PORTION OF NORTHEAST QUARTER OF SECTION 28
T 4 N. R. 6 E. CASAH. MARICOPA COUNTY, SCOTTSDALE, ARIZONA

SECRET
HEC--RAS RIVER STATION
EXHIBIT

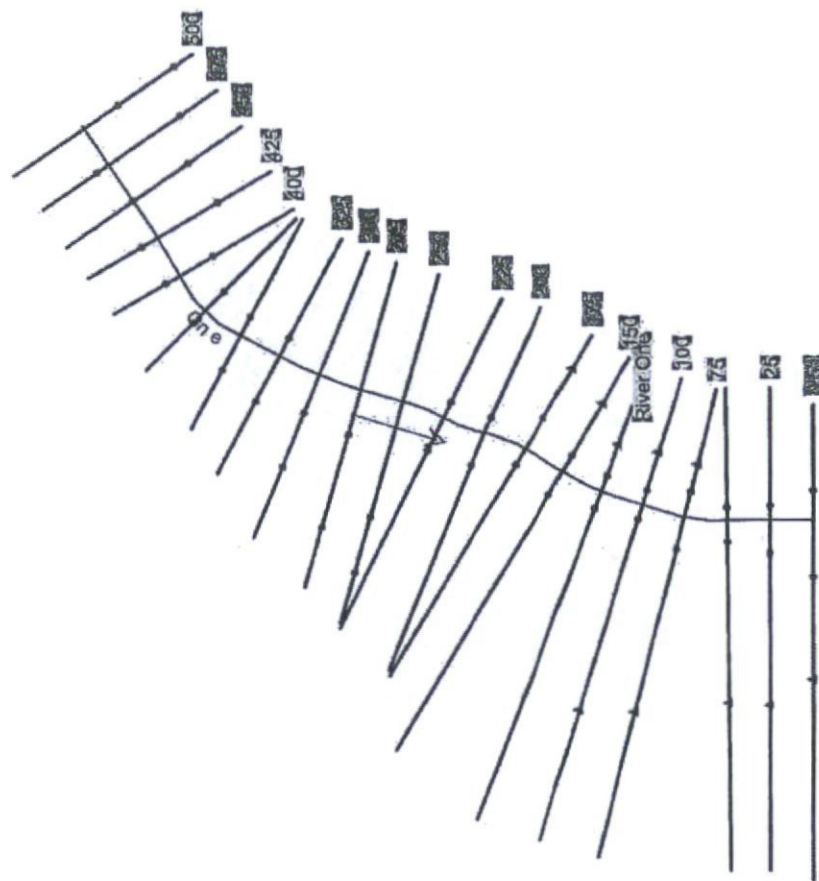
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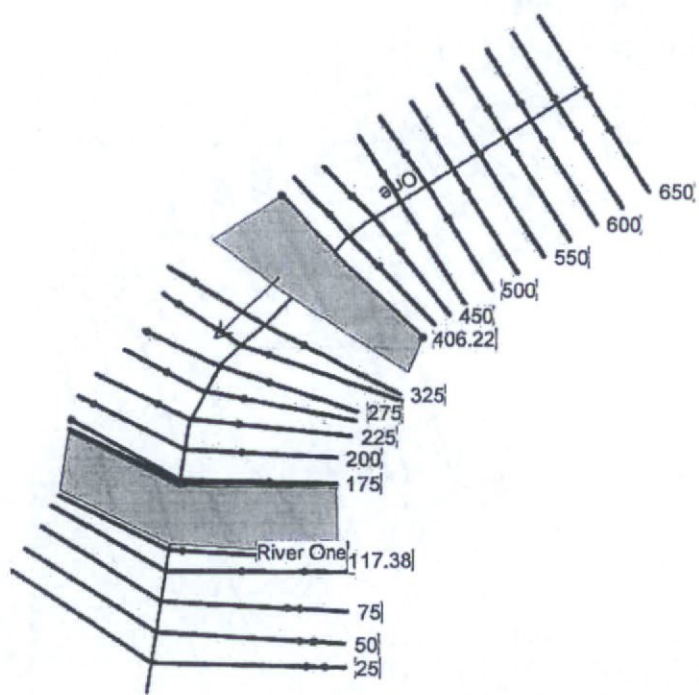
old engineering • best development
serving • architectural services
plant • food and air change
bioprocess

Engineering and Environmental Consultants, Inc.
7940 N. 26th Street, Ste 135 • Phoenix, Arizona 85028

DESIGN BY:	J
DRAWN BY:	J
CHECKED BY:	J
DATE:	SEPT. 20
SCALE:	
EEC NO:	185
DRAWING NO:	



EXISTING



PROPOSED

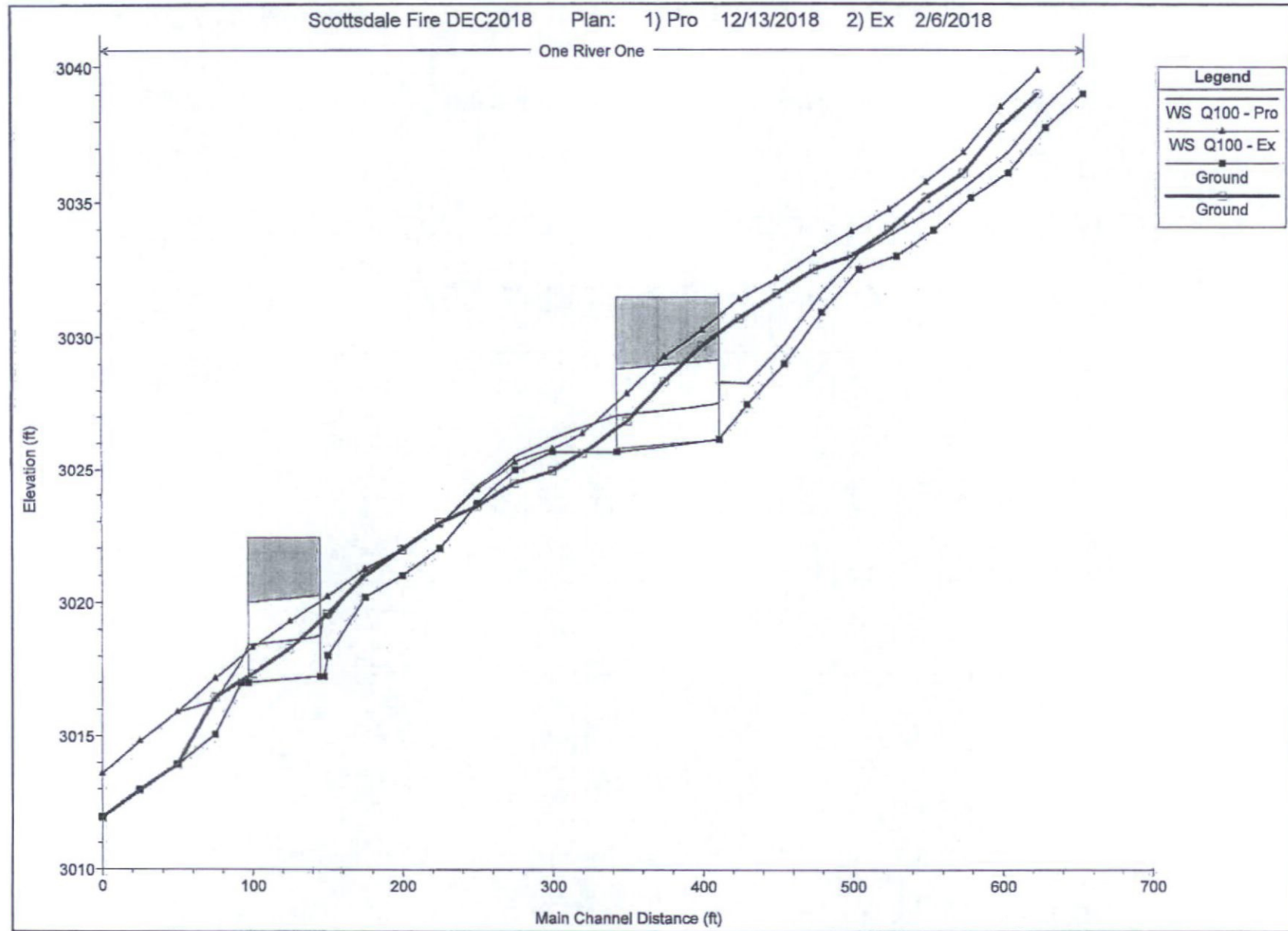
HEC-RAS River One Reach River One Profile Q100

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Chl 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
River One	650	Q100	Ex	94.00	3038.99	3039.85	3039.85	3040.10	0.018357	4.20	24.98	53.86	0.94
River One	650	Q100	Pro	94.00	3038.99	3039.85	3039.85	3040.10	0.018304	4.20	25.01	53.88	0.94
River One	625	Q100	Ex	94.00	3037.76	3038.50	3038.50	3038.72	0.017714	3.91	27.55	60.28	0.91
River One	625	Q100	Pro	94.00	3037.76	3038.50	3038.50	3038.72	0.017980	3.93	27.41	60.20	0.91
River One	600	Q100	Ex	94.00	3036.09	3036.84	3036.84	3037.09	0.018776	4.12	24.94	53.37	0.96
River One	600	Q100	Pro	94.00	3036.09	3036.84	3036.84	3037.09	0.018533	4.10	25.04	53.41	0.95
River One	575	Q100	Ex	94.00	3035.17	3035.75	3035.75	3035.99	0.020620	4.00	24.66	52.60	0.97
River One	575	Q100	Pro	94.00	3035.17	3035.75	3035.75	3035.99	0.020887	4.01	24.56	52.57	0.97
River One	550	Q100	Ex	94.00	3033.96	3034.73	3034.73	3034.98	0.017160	4.26	24.58	49.19	0.92
River One	550	Q100	Pro	94.00	3033.96	3034.73	3034.73	3034.98	0.017091	4.25	24.59	49.22	0.91
River One	525	Q100	Ex	94.00	3033.01	3033.91	3033.91	3034.15	0.023577	3.94	24.10	54.43	1.01
River One	525	Q100	Pro	94.00	3033.01	3033.91	3033.91	3034.15	0.023577	3.94	24.10	54.43	1.01
River One	500	Q100	Ex	94.00	3032.52	3033.08	3033.08	3033.28	0.024338	3.65	25.90	65.65	1.01
River One	500	Q100	Pro	94.00	3032.52	3033.11	3033.11	3033.31	0.023359	3.60	26.30	66.14	0.99
River One	475	Q100	Ex	94.00	3031.62	3032.18	3032.18	3032.39	0.024062	3.69	25.64	62.90	1.00
River One	475	Q100	Pro	94.00	3030.91	3031.64	3031.64	3031.87	0.023786	3.90	24.19	52.85	1.01
River One	450	Q100	Ex	94.00	3030.70	3031.41	3031.41	3031.52	0.023924	3.58	25.98	65.58	1.00
River One	450	Q100	Pro	94.00	3029.00	3029.76	3029.76	3029.99	0.024379	3.85	24.57	65.48	1.02
River One	425	Q100	Ex	94.00	3029.67	3030.24	3030.24	3030.44	0.023835	3.58	26.51	68.16	0.99
River One	425	Q100	Pro	94.00	3027.45	3028.26	3028.26	3028.40	0.029402	3.01	31.47	50.91	0.87
River One	400	Q100	Ex	94.00	3026.14	3026.30	3027.11	3028.33	0.006534	1.44	65.32	40.77	0.20
River One	400	Q100	Ex	94.00	3026.33	3029.25	3029.25	3029.43	0.016860	3.56	28.86	88.81	0.87
River One	375	Q100	Ex	94.00	3026.63	3027.88	3027.88	3028.09	0.014707	3.78	27.95	96.32	0.84
River One	345.11	Q100	Ex	94.00	3025.60	3026.35	3026.35	3026.57	0.024518	3.82	24.62	56.98	1.02
River One	325	Q100	Ex	94.00	3024.96	3025.76	3025.76	3025.96	0.016019	3.38	30.36	120.72	0.84
River One	325	Q100	Pro	94.00	3025.64	3026.18	3026.18	3026.37	0.026127	3.52	26.67	71.98	1.02
River One	300	Q100	Ex	94.00	3024.44	3025.28	3025.28	3025.42	0.011901	3.32	37.42	153.38	0.75
River One	300	Q100	Pro	94.00	3024.98	3025.47	3025.47	3025.63	0.025773	3.24	28.91	92.31	1.00
River One	275	Q100	Ex	94.00	3023.88	3024.19	3024.19	3024.33	0.019816	3.51	32.74	121.76	0.92
River One	275	Q100	Pro	94.00	3023.67	3024.32	3024.32	3024.49	0.025893	3.26	28.82	87.91	1.00
River One	250	Q100	Ex	94.00	3022.98	3022.88	3022.88	3023.14	0.022298		22.81	43.49	0.90
River One	250	Q100	Pro	94.00	3022.00	3022.86	3022.86	3023.14	0.022532	4.14	22.72	43.40	1.01
River One	225	Q100	Ex	94.00	3021.97	3021.97	3021.97	3022.24	0.021395	0.08	22.79	48.55	0.37
River One	225	Q100	Pro	94.00	3021.00	3021.97	3021.97	3022.24	0.021719	4.15	22.69	47.05	0.99
River One	200	Q100	Ex	94.00	3021.00	3021.26	3021.26	3021.43	0.017197	2.10	28.01	147.59	0.77
River One	200	Q100	Pro	94.00	3020.19	3021.16	3021.16	3021.31	0.032258	3.17	28.63	110.28	1.08
River One	175	Q100	Ex	94.00	3019.59	3020.22	3020.22	3020.36	0.017862	3.48	33.37	186.14	0.89
River One	175	Q100	Pro	94.00	3018.02	3019.41	3019.38	3019.64	0.018640	5.28	17.95	19.72	0.97
River One	172.41	Q100	Pro	94.00	3017.24	3018.63	3018.62	3019.73	0.002226	2.59	36.35	21.01	0.35
River One	150	Q100	Ex	94.00	3018.30	3019.30	3019.30	3019.46	0.010826	3.61	35.31	178.39	0.74
River One	125	Q100	Ex	94.00	3017.35	3018.34	3018.34	3018.49	0.015139	3.60	33.91	125.74	0.64
River One	117.38	Q100	Pro	94.00	3017.00	3017.81	3017.81	3018.20	0.022189	5.00	18.85	26.51	1.00
River One	100	Q100	Ex	94.00	3016.46	3017.17	3017.17	3017.34	0.017121	3.45	30.65	100.94	0.87
River One	100	Q100	Pro	94.00	3015.08	3016.32	3016.32	3016.33	0.004417	0.94	120.64	136.70	0.16
River One	75	Q100	Ex	94.00	3013.94	3015.80	3015.90	3016.27	0.009795	5.31	24.88	46.70	0.78
River One	75	Q100	Pro	94.00	3013.94	3015.90	3015.80	3016.27	0.009631	5.28	24.80	46.88	0.77
River One	50	Q100	Ex	94.00	3012.96	3014.80	3014.80	3015.02	0.006721	4.34	34.81	76.16	0.64
River One	50	Q100	Pro	94.00	3012.96	3014.80	3014.80	3015.02	0.008736	4.34	34.78	75.15	0.64
River One	25	Q100	Ex	94.00	3011.94	3013.58	3013.58	3013.90	0.011891	4.88	24.91	49.56	0.82
River One	25	Q100	Pro	94.00	3011.94	3013.58	3013.58	3013.90	0.011890	4.89	24.92	49.60	0.82

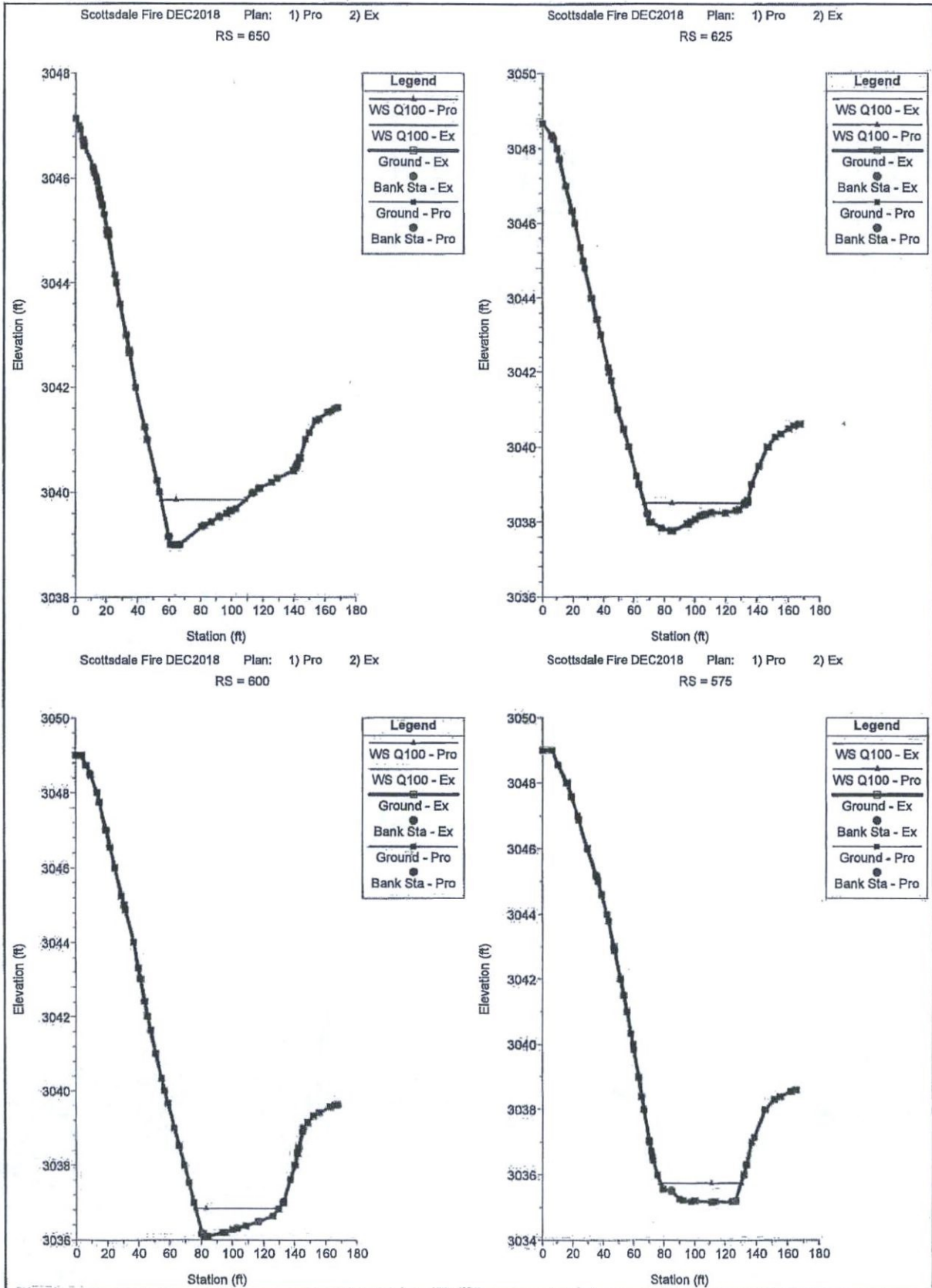
CULVERT

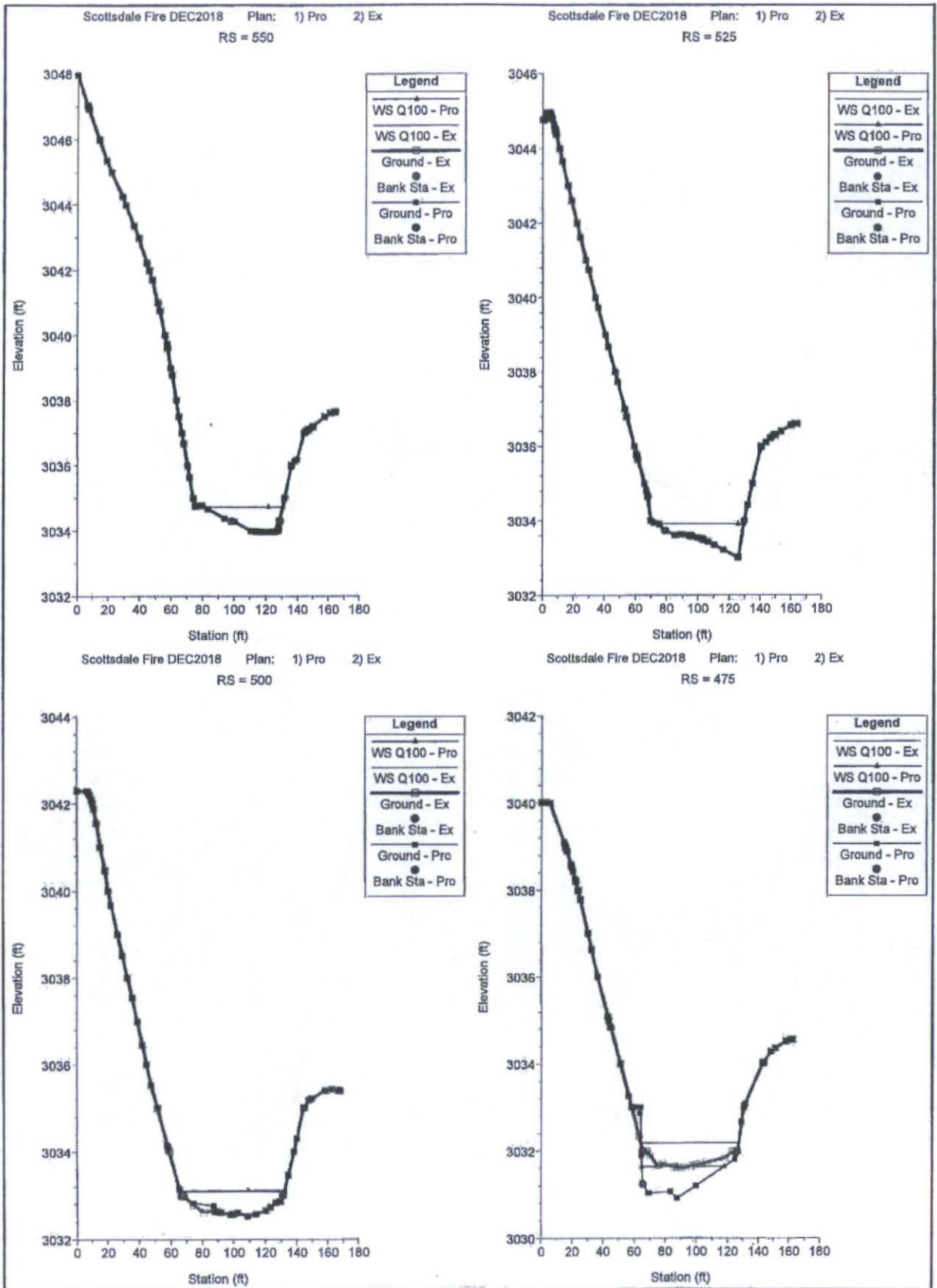
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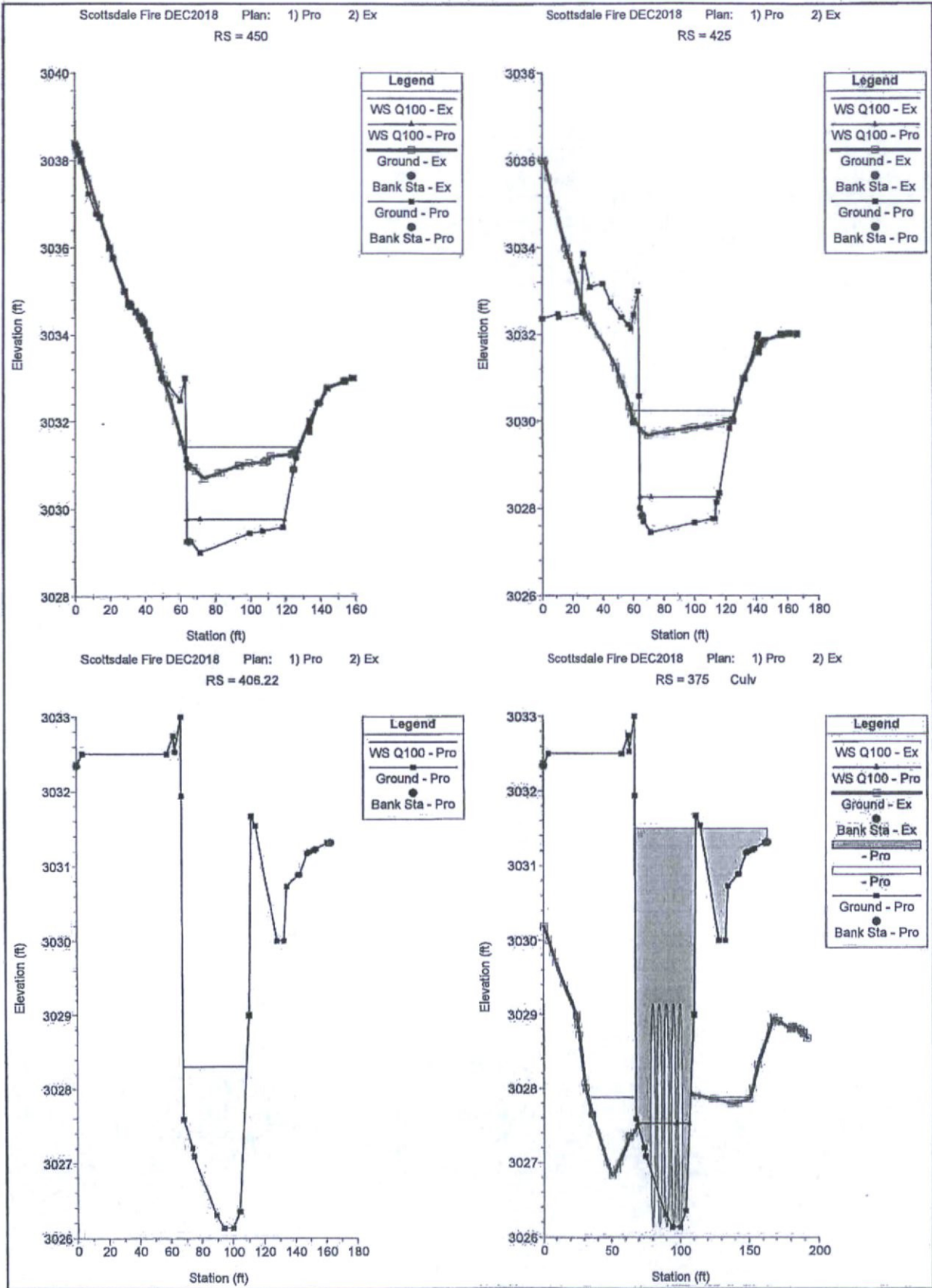
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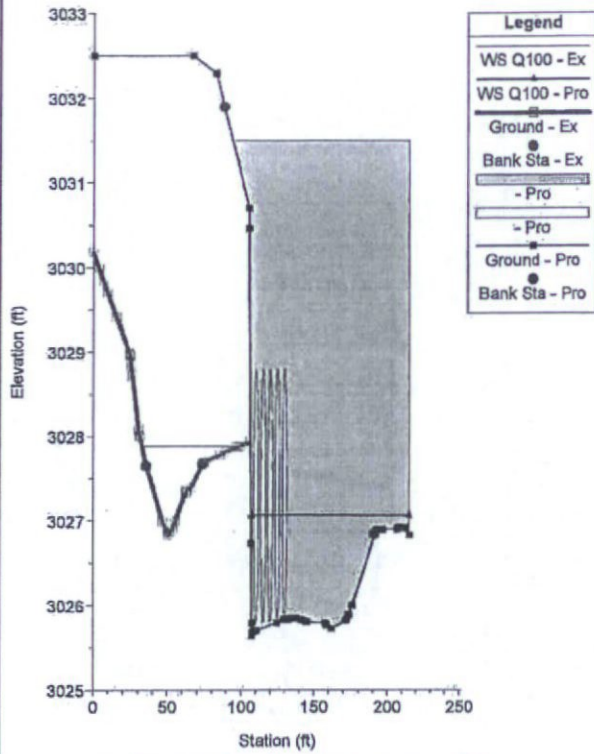
HEC-RAS PROFILE



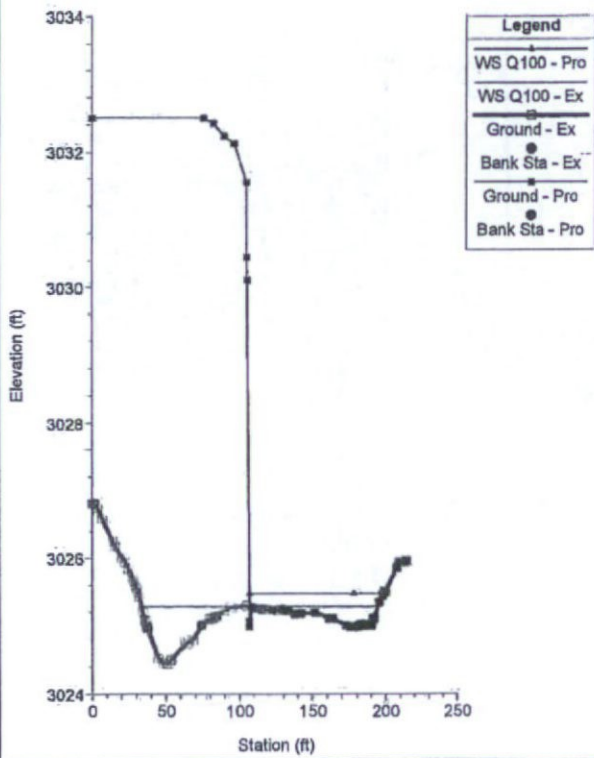




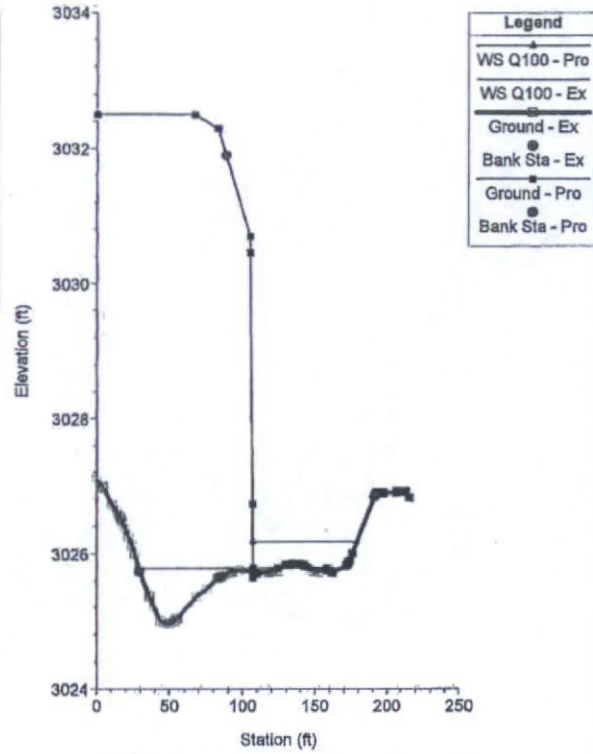
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RS = 375 Culv



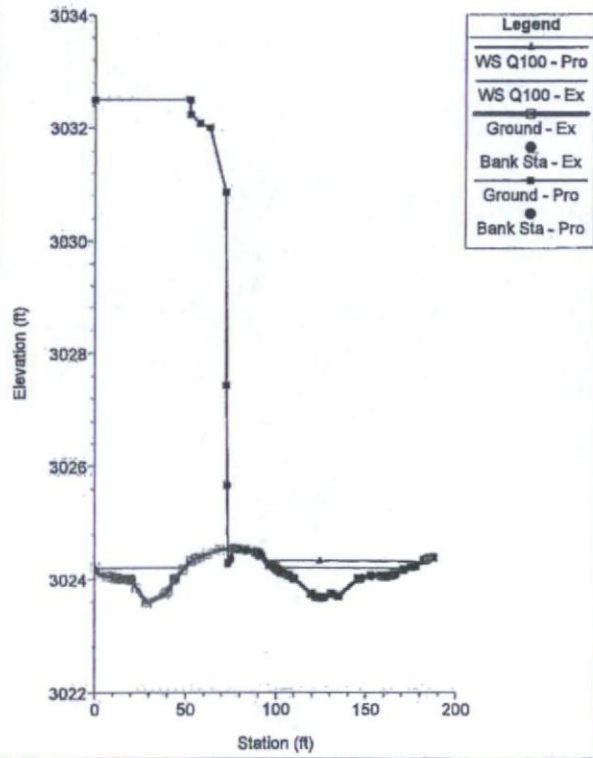
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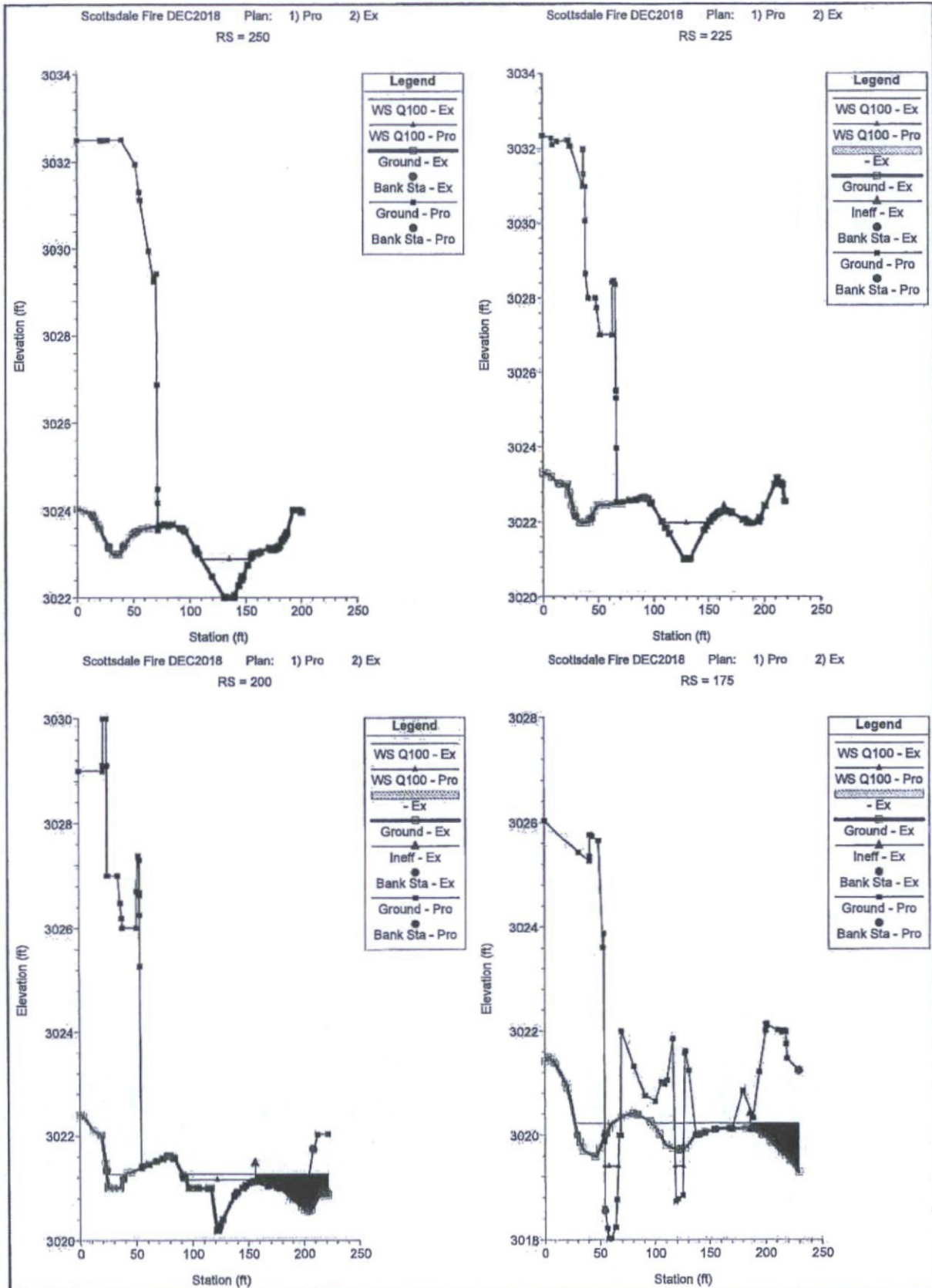


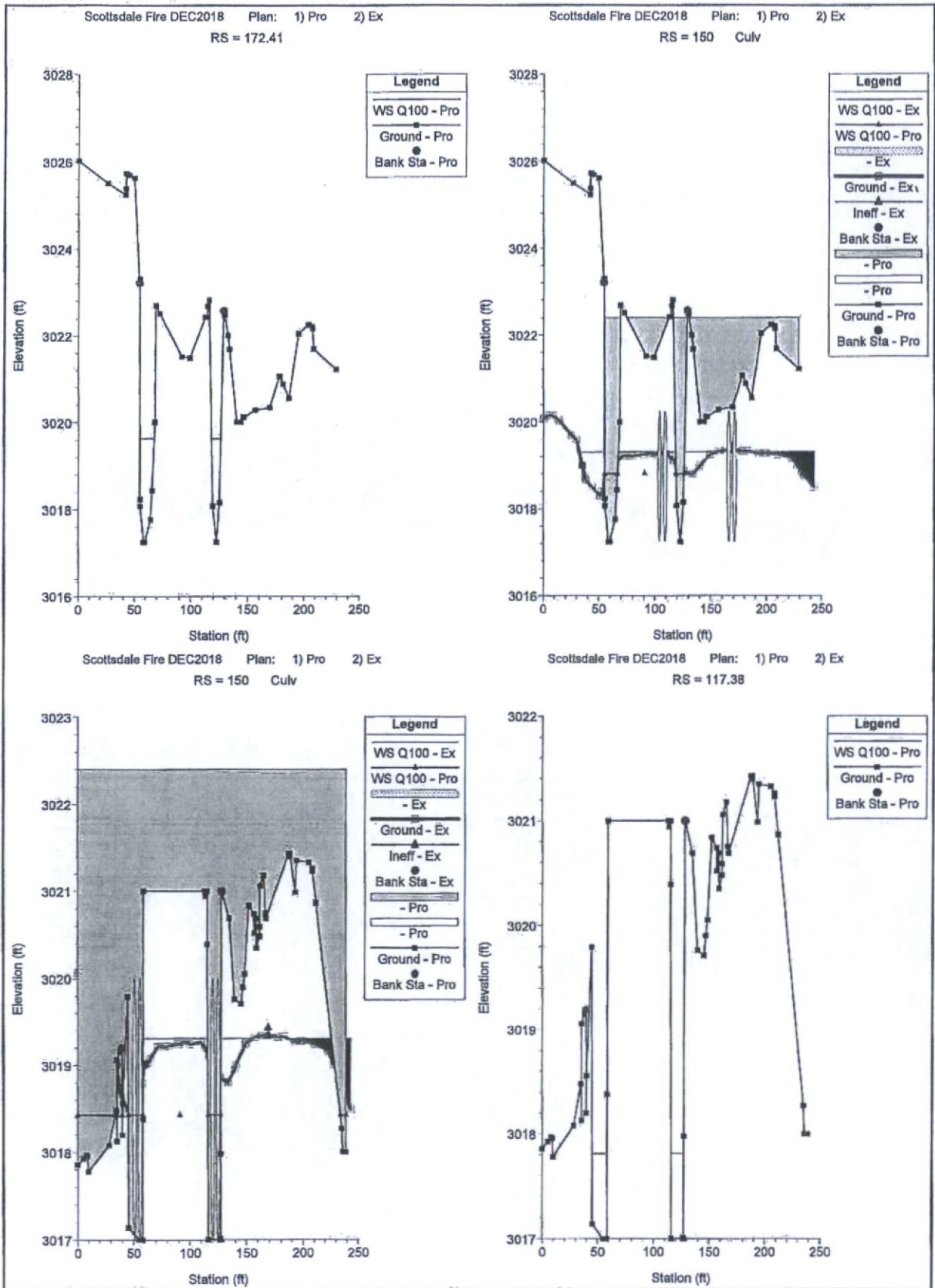
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RS = 325



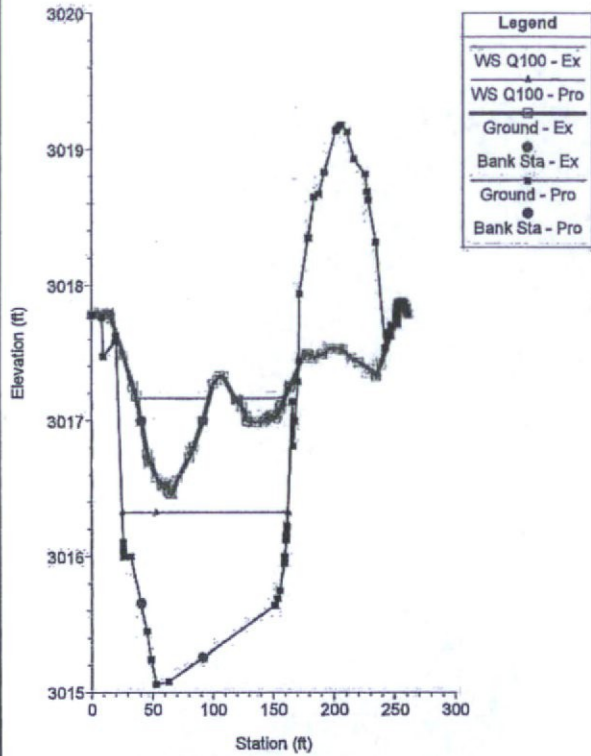
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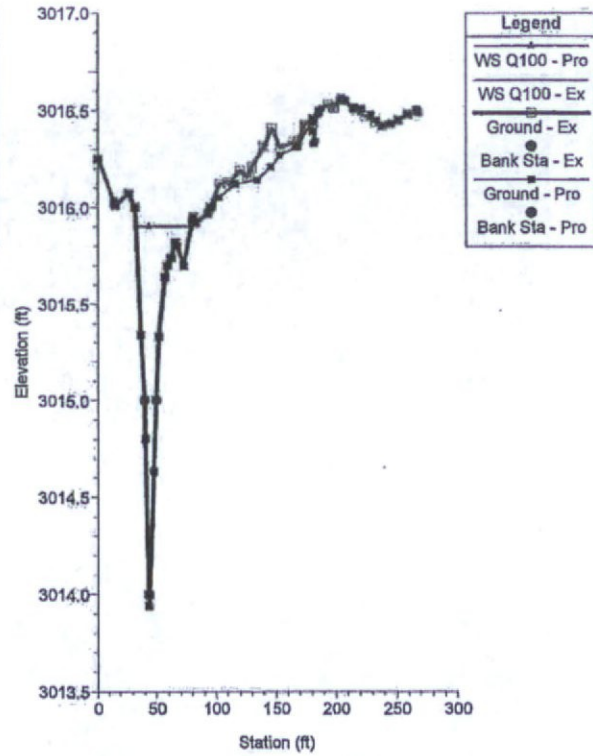




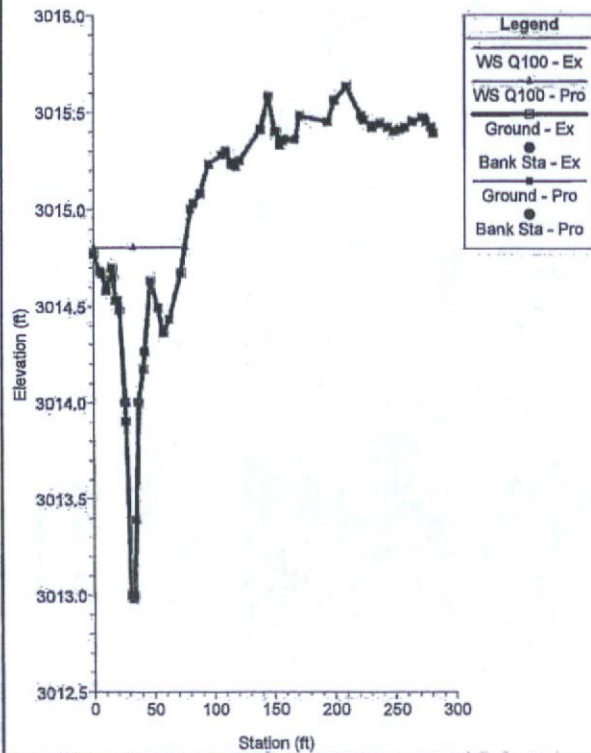
Scottsdale Fire DEC2018 Plan: 1) Pro 2) Ex
RS = 100



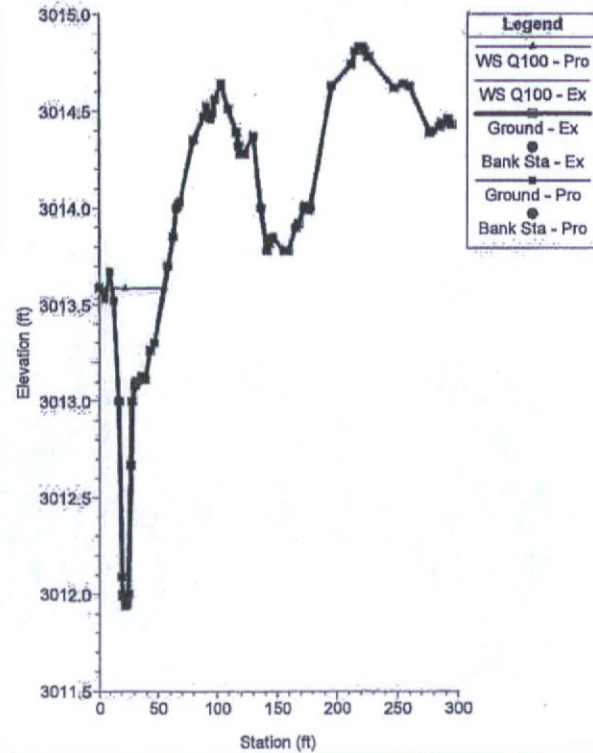
Scottsdale Fire DEC2018 Plan: 1) Pro 2) Ex
RS = 75



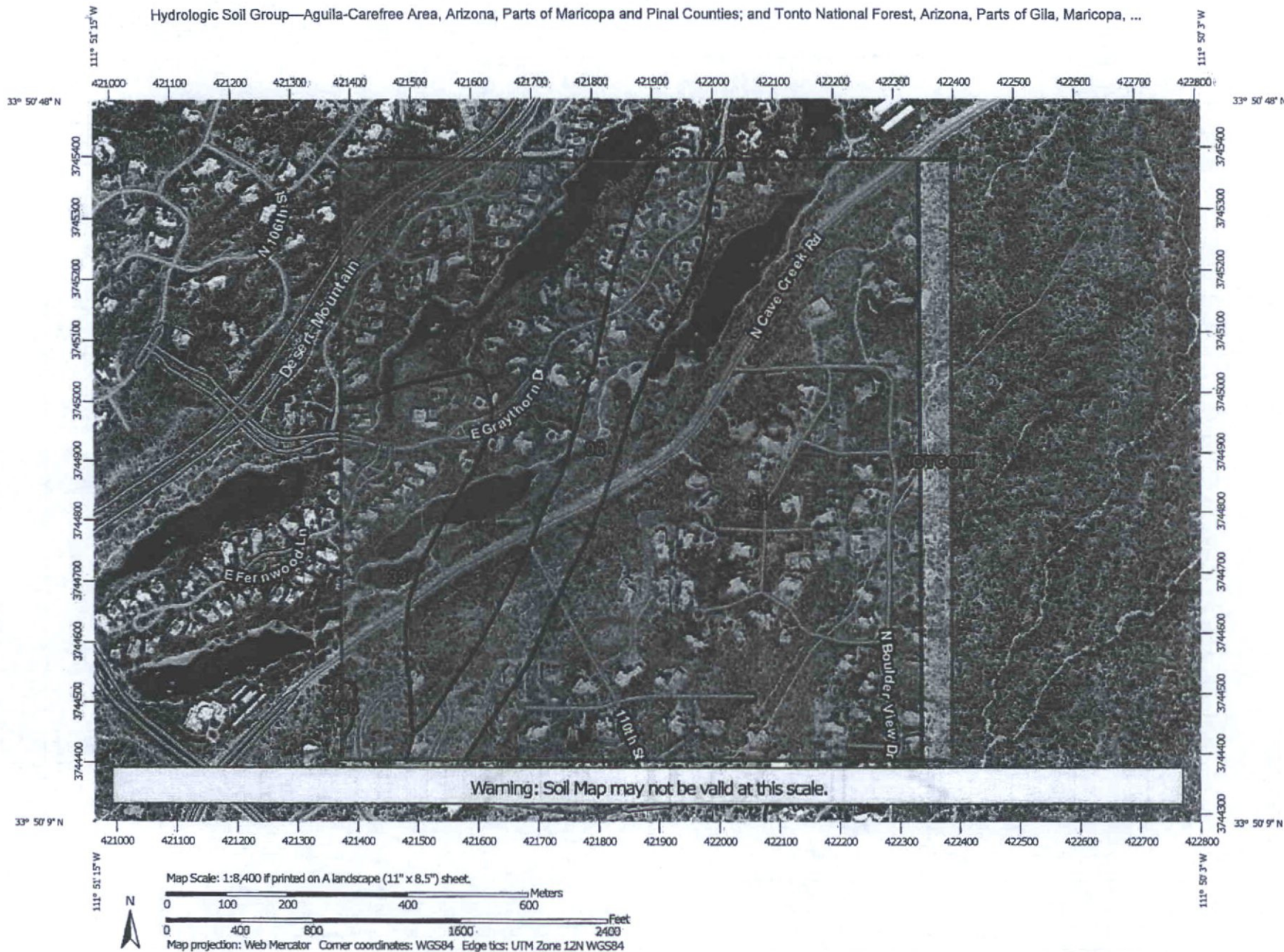
Scottsdale Fire DEC2018 Plan: 1) Pro 2) Ex
RS = 50



Scottsdale Fire DEC2018 Plan: 1) Pro 2) Ex
RS = 25



Hydrologic Soil Group—Aguila-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties; and Tonto National Forest, Arizona, Parts of Gila, Maricopa, ...



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/15/2016
Page 1 of 5

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Aguila-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties
 Survey Area Data: Version 10, Oct 1, 2015

Soil Survey Area: Tonto National Forest, Arizona, Parts of Gila, Maricopa, Pinal and Yavapai Counties
 Survey Area Data: Version 4, Oct 1, 2015

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

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 1, 2010—Nov 27, 2010

MAP LEGEND

MAP INFORMATION

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



Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Agulla-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties (AZ645)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
33	Eba very gravelly loam, 1 to 8 percent slopes	C	23.9	9.6%
61	Gran-Wickenburg complex, 1 to 10 percent slopes	D	186.6	74.9%
96	Pinaleno-Tres Hermanos complex, 1 to 10 percent slopes	C	25.5	10.2%
Subtotals for Soil Survey Area			236.0	94.8%
Totals for Area of Interest			249.0	100.0%

Hydrologic Soil Group— Summary by Map Unit — Tonto National Forest, Arizona, Parts of Gila, Maricopa, Pinal and Yavapai Counties (AZ687)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available		13.0	5.2%
Subtotals for Soil Survey Area			13.0	5.2%
Totals for Area of Interest			249.0	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```

X      X  XXXXXX  XXXX      XXXX      XX      XXXX
X      X  X      X      X  X      X      X      X
X      X  X      X      X      X      X      X
XXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X      X      X      X      X      X      X
X      X  X      X      X      X      X      X      X
X      X  XXXXXX  XXXX      X      X      X      X      XXXXX
  
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PROJECT DATA

Project Title: Scottsdale Fire
Project File : ScottsdaleFire.prj
Run Date and Time: 12/11/2017 1:55:13 PM

Project in English units

PLAN DATA

Plan Title: Existing
Plan File : x:\16535 Scottsdale Fire Station 616\400 Reports & Report
Preparation\420 Drainage\Hydraulics\HEC-RAS\ScottsdaleFire.p01

Geometry Title: Existing
Geometry File : x:\16535 Scottsdale Fire Station 616\400 Reports & Report
Preparation\420 Drainage\Hydraulics\HEC-RAS\ScottsdaleFire.g01

Flow Title : Existing
Flow File : x:\16535 Scottsdale Fire Station 616\400 Reports & Report
Preparation\420 Drainage\Hydraulics\HEC-RAS\ScottsdaleFire.f01

Plan Summary Information:

Number of:	Cross Sections =	21	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

ScottsdaleFire.rep

FLOW DATA

Flow Title: Existing
Flow File : x:\16535 Scottsdale Fire Station 616\400 Reports & Report
Preparation\420 Drainage\Hydraulics\HEC-RAS\ScottsdaleFire.f01

Flow Data (cfs)

River Q2	Reach	RS	Q100	Q10
One 25	River One	500	94	45

Boundary Conditions

River Downstream	Reach	Profile	Upstream
One Normal S = 0.04	River One	Q100	

GEOMETRY DATA

Geometry Title: Existing
Geometry File : x:\16535 Scottsdale Fire Station 616\400 Reports & Report
Preparation\420 Drainage\Hydraulics\HEC-RAS\ScottsdaleFire.g01

CROSS SECTION

RIVER: One
REACH: River One RS: 500

INPUT

Description:

Station	Elevation	Data	num=	38							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3040.933	900002	3040.437	299995	3040	12.5	3039.26	14.66	3039		
17.08	3038.98	17.59	3038.97	18	3038.98	21.97	3038.97	28.11	3039		
32.8	3039.11	32.81	3039.11	32.85	3039.11	33.25	3039.11	38.61	3039.17		
41.09	3039.21	50.38	3039.31	51.18	3039.32	57.49	3039.38	63.26	3039.53		
66.00999	3039.59	71.59	3039.66	75	3039.71	76.95	3039.74	80.05	3039.77		
91.38	3039.91	92.27	3039.95	93.22	3040	93.23	3040	93.52	3040.03		
103.06	3040.97	103.96	3041	113.66	3041.19	114.36	3041.2	114.39	3041.2		
118.57	3041.27	122.22	3041.3	122.35	3041.3						

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val		
0	.04	12.5	.035	51.18	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	12.5	51.18		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

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E.G. Elev (ft)	3039.90	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3039.67	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3039.67	Flow Area (sq ft)	0.60	21.77
3.87				
E.G. slope (ft/ft)	0.018911	Area (sq ft)	0.60	21.77
3.87				
Q Total (cfs)	94.00	Flow (cfs)	1.06	86.60
6.34				
Top width (ft)	62.84	Top Width (ft)	2.90	38.68
21.26				
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)	1.77	3.98
1.64				
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)	0.21	0.56
0.18				
Conv. Total (cfs)	683.6	Conv. (cfs)	7.7	629.7
46.1				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	2.93	38.70
21.26				
Min Ch El (ft)	3038.97	Shear (lb/sq ft)	0.24	0.66
0.21				
Alpha	1.15	Stream Power (lb/ft s)	122.35	0.00
0.00				
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	0.08	0.22
0.26				
C & E Loss (ft)	0.01	Cum SA (acres)	0.22	0.39
0.53				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
REACH: River One

RS: 475

INPUT

Description:

Station	Elevation	Data	num=	67	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3041.643	470001			30419.639999	3040.11	10.42	3040	11.54	3039.83		
17.37	3039	19.63	3038.67	21.3	3038.41	23.74	3038	25.38	3037.75			
25.53	3037.74	25.79	3037.7426	18999	3037.73	31.54	3037.57	35.3	3037.51			
37.91	3037.5	45.25	3037.63	49.71	3037.64	54.83	3037.78	56.2	3037.79			
58.19	3037.83	60.28	3037.84	62.4	3037.86	72.55	3037.83	75	3037.84			
81.25	3037.87	83.05	3037.9	84.5	3037.98	84.84	3037.98	85.1	3037.98			

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85.39999	3037.99	85.73	3037.99	85.83	3037.99	86.11	3037.99	86.24	3037.99
86.39	3037.99	86.52	3038	86.56	3038	86.64	3038	86.7	3038
86.72	3038	86.74	3038	86.75999	3038	86.92	3038.01	92.29	3039
98.42	3039.6	98.46	3039.6	98.5	3039.61	99.5	3039.69	100.16	3039.74
100.97	3039.78	101.04	3039.79	101.23	3039.8	101.43	3039.82	102.74	3039.9
102.84	3039.91	102.93	3039.92	102.99	3039.92	104.45	3040	104.69	3040
105.32	3040.01	105.73	3040.01	109.44	3040.1	115.44	3040.24	115.5	3040.24
119.74	3040.29	120.17	3040.29						

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	25.38	.035
		83.05	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	25.38	83.05		25	25		.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3038.36	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.21	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3038.15	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3038.15	Flow Area (sq ft)	0.53	24.66
0.76				
E.G. Slope (ft/ft)	0.023782	Area (sq ft)	0.53	24.66
0.76				
Q Total (cfs)	94.00	Flow (cfs)	1.04	91.65
1.30				
Top Width (ft)	64.87	Top Width (ft)	2.55	57.67
4.65				
Vel Total (ft/s)	3.62	Avg. Vel. (ft/s)	1.98	3.72
1.71				
Max Chl Dpth (ft)	0.65	Hydr. Depth (ft)	0.21	0.43
0.16				
Conv. Total (cfs)	609.5	Conv. (cfs)	6.8	594.3
8.4				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	2.58	57.68
4.66				
Min Ch El (ft)	3037.50	Shear (lb/sq ft)	0.30	0.63
0.24				
Alpha	1.03	Stream Power (lb/ft s)	120.17	0.00
0.00				
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.08	0.20
0.26				
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	0.36
0.52				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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CROSS SECTION

RIVER: One
REACH: River One

RS: 450

INPUT

Description:

Station		Elevation		Data		num= 51		Sta		Elev		Sta		Elev	
0	3042.24	5199966	3042.111	059998	3042.1	529999	3041.91	5.93	3041						
8.529999	3040.56	11.67	3040	15.7	3039.39	18.09	3039	24.18	3038.07						
24.65	3038	30.83	3037.01	30.86	3037	30.96	3036.98	30.97	3036.98						
30.98	3036.98	31.01	3036.98	37.07	3036	37.22	3036	39.66	3035.98						
40.85	3035.96	42.03	3035.95	43.14	3035.93	47.4	3035.97	49.2	3035.93						
49.6	3035.93	58.65	3035.99	58.81	3035.99	60.2	3036	71.68	3036.13						
74.05	3036.16	74.99	3036.21	75	3036.21	76.78	3036.31	86.35	3036.49						
86.5	3036.52	86.75	3036.5487	50999	3036.6	88.5	3036.71	90.1	3037						
92.68	3037.47	95.59	3038	102.39	3038.85	102.46	3038.85	102.52	3038.86						
102.71	3038.87	106.2	3039	115.3	3039.2	115.35	3039.21	120.1	3039.27						
121.21	3039.27														

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	37.07	.035	74.99	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	37.07	74.99		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3036.82	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.24	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3036.58	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3036.58	Flow Area (sq ft)	1.03	21.53
2.30				
E.G. slope (ft/ft)	0.019593	Area (sq ft)	1.03	21.53
2.30				
Q Total (cfs)	94.00	Flow (cfs)	2.33	87.74
3.93				
Top width (ft)	53.73	Top width (ft)	3.57	37.92
12.24				
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	2.25	4.07
1.71				
Max Chl Dpth (ft)	0.65	Hydr. Depth (ft)	0.29	0.57
0.19				
Conv. Total (cfs)	671.5	Conv. (cfs)	16.6	626.8
28.1				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	3.62	37.92
12.25				
Min Ch El (ft)	3035.93	Shear (lb/sq ft)	0.35	0.69
0.23				
Alpha	1.10	Stream Power (lb/ft s)	121.21	0.00
0.00				
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	0.08	0.19
0.26				
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	0.33
0.52				

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CROSS SECTION

RIVER: One
REACH: River One RS: 425

INPUT

Description:

Station Elevation Data		num= 59		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3043.45	2.32	3043.5	290001	3042.39	7.18	3042	11.68	3041.08
12.02	3041	12.39	3040.9	15.61	3040.14	16.2	3040	18.64	3039.35
19.96	3039	23.47	3038.04	23.61	3038	23.64	3037.99	27.29	3037
27.35	3036.98	30.94	3036	31.79	3035.76	32.45	3035.56	32.83	3035.43
32.99	3035.43	33.76	3035.38	34.7	3035.3	34.98	3035.24	35.37	3035.16
35.57	3035.12	36.12	3035.05	42.24	3035	43.78	3034.97	47.39	3034.99
48.43	3034.97	54.13	3034.96	54.77	3034.94	68.01	3034.9	68.09	3034.9
68.22	3034.9	68.52	3034.9	69.04	3034.89	75	3034.9	81.19	3034.9
83.28	3034.99	83.54	3034.99	83.93	3034.99	84.29	3035	84.78	3035
85.62	3035.17	86.36	3035.36	88.28	3036.90	90.01	3036.42	93.47	3037
102.37	3037.88	103.3	3038	104.14	3038.04	104.65	3038.06	116.36	3038.38
116.41	3038.38	116.51	3038.38	120.48	3038.44	120.79	3038.44		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	35.57	.035	85.62	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	35.57	85.62		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3035.66	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.24	wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3035.42	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3035.42	Flow Area (sq ft)	0.28	23.79
0.12				
E.G. slope (ft/ft)	0.023104	Area (sq ft)	0.28	23.79
0.12				
Q Total (cfs)	94.00	Flow (cfs)	0.37	93.46
0.18				
Top Width (ft)	53.45	Top Width (ft)	2.47	50.05
0.93				
Vel Total (ft/s)	3.89	Avg. Vel. (ft/s)	1.31	3.93

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1.43				
Max Chl Dpth (ft)	0.53	Hydr. Depth (ft)	0.11	0.48
0.13				
Conv. Total (cfs)	618.4	Conv. (cfs)	2.4	614.9
1.2				
Length wtd. (ft)	25.00	Wetted Per. (ft)	2.50	50.07
0.96				
Min Ch El (ft)	3034.89	Shear (lb/sq ft)	0.16	0.69
0.18				
Alpha	1.02	Stream Power (lb/ft s)	120.79	0.00
0.00				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.08	0.18
0.26				
C & E Loss (ft)	0.00	Cum SA (acres)	0.21	0.31
0.51				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

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water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 400

INPUT

Description:

Station Elevation Data		num= 69									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3040.724	900002	30407.729	9996	3039.489	839996	3039	12.5	3038.38		
14.15	3038	15.5	3037.77	16.14	3037.66	17.56	3037.38	17.85	3037.33		
18.21	3037.28	18.34	3037.25	18.47	3037.23	18.56	3037.21	19.34	3037		
22.57	3036.12	23.02	3036	26.12	3035.1	26.47	3035	31.32	3034.29		
32.23	3034.31	37.57	3034.37	42.53	3034.36	53.12	3034.11	54.75	3034.06		
55.49	3034.05	55.78	3034.05	57.6	3034	68.19	3033.88	73.94	3033.88		
74.69	3033.88	75	3033.88	80.86	3033.97	82.61	3034	82.83	3034		
82.86	3034	82.91	3034	83.03	3034.83	03999	3034	83.11	3034		
83.41	3034.05	83.59	3034.08	83.67	3034.1	83.71	3034.1	83.83	3034.12		
83.98	3034.16	84.14	3034.18	88.5	3034.94	88.55	3034.94	88.75	3034.95		
89.32	3035	94.11	3035.8	95.29	3036	97.2	3036.34	98.00	3036.48		
99.3	3036.72	100.78	3036.98	100.92	3037	101.11	3037.01	101.28	3037.01		
101.35	3037.01	102.01	3037.02	103.61	3037.02	108.88	3037.23	114.91	3037.4		
114.98	3037.41	115.02	3037.41	117.69	3037.46	118.42	3037.46				

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	53.12	.035	84.14	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
53.12	84.14	25	25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3034.81	Element	Left OB	Channel
		Page 7		

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Right OB				
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3034.58	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3034.58	Flow Area (sq ft)	6.51	19.54
0.46				
E.G. Slope (ft/ft)	0.017197	Area (sq ft)	6.51	19.54
0.46				
Q Total (cfs)	94.00	Flow (cfs)	13.36	79.89
0.75				
Top Width (ft)	57.08	Top Width (ft)	23.77	31.02
2.29				
Vel Total (ft/s)	3.55	Avg. Vel. (ft/s)	2.05	4.09
1.65				
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)	0.27	0.63
0.20				
Conv. Total (cfs)	716.8	Conv. (cfs)	101.9	609.2
5.7				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	23.80	31.04
2.32				
Min Ch El (ft)	3033.88	Shear (lb/sq ft)	0.29	0.68
0.21				
Alpha	1.18	Stream Power (lb/ft s)	118.42	0.00
0.00				
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.08	0.17
0.26				
C & E Loss (ft)	0.01	Cum SA (acres)	0.21	0.28
0.51				

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CROSS SECTION

RIVER: One
 REACH: River One RS: 375

INPUT

Description:

Station	Elevation	Data	num=	78	Station	Elevation	Data	num=	78
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3039.59	5299988	3039.493	190002	30394.779999	3038.76	410004	3038.41	
6.760002	3038.348	190002	3038.028	230003	3038.018	260002	30388.310005	3037.99	
12.65	3037	16.82	3036.3	18.42	303618.49001	3035.99	19.48	3035.77	
19.99001	3035.65	22.23	3035	23.37	3034.51	24.84	3034	27.41	3033.94
27.86	3033.93	28.08	3033.93	33.76	3033.89	34.62	3033.89	44.38	3033.68
44.68	3033.67	48.77	3033.61	49.38	3033.6	50.12	3033.59	50.97	3033.57
58.35	3033.43	59.36	3033.41	60.61	3033.38	64.4	3033.29	67.36	3033.21
74.82001	303374.85001	3033	75	303375.10001	3033	76.69	3032.99		
76.96001	3032.99	77.43	3032.99	80.33	303381.99001	3033	83.17	3033.28	
86.09	3034	90.37	3034.94	90.66	3035	90.83	3035.03	90.86	3035.03
90.9	3035.03	91.01	3035.04	94.86	3035.2697	35001	3035.38	98.43	3035.42
98.78	3035.42	99.04	3035.42	99.08	3035.42	99.13	3035.42	99.3	3035.43

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99.38	3035.43	99.45	3035.43	99.58	3035.44	107.35	3035.65	107.72	3035.67
108.27	3035.7	108.94	3035.74	110.41	3035.83	111.14	3035.87	117.94	3035.96
118.36	3035.97	118.47	3035.97	118.57	3035.97	118.77	3035.97	119.01	3035.97
119.36	3035.96	119.78	3035.95	121.33	3035.91				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	58.35	.035	83.17	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	58.35	83.17		25 25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3034.17	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.30	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3033.88	Reach Len. (ft)	25.00	25.00
25.00				
Crit w.s. (ft)	3033.88	Flow Area (sq ft)	5.29	17.87
0.72				
E.G. slope (ft/ft)	0.018351	Area (sq ft)	5.29	17.87
0.72				
Q Total (cfs)	94.00	Flow (cfs)	9.98	82.44
1.58				
Top width (ft)	50.26	Top width (ft)	23.03	24.82
2.41				
Vel Total (ft/s)	3.94	Avg. vel. (ft/s)	1.89	4.61
2.20				
Max Chl Dpth (ft)	0.88	Hydr. Depth (ft)	0.23	0.72
0.30				
Conv. Total (cfs)	693.9	Conv. (cfs)	73.7	608.6
11.6				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	23.03	24.86
2.48				
Min Ch El (ft)	3032.99	Shear (lb/sq ft)	0.26	0.82
0.33				
Alpha	1.23	Stream Power (lb/ft s)	121.33	0.00
0.00				
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.08	0.16
0.26				
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	0.27
0.51				

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CROSS SECTION

RIVER: One	
REACH: River One	RS: 350

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INPUT

Description:

Station Elevation Data		num= 53		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3039.7	2.25	3039.21	3.26001	3039.751001	3038.097	920006		3038		
12.08001	3037.1212	67001	303714.10001	3036.7217	89001	303619.75001	3035.63				
22.63	3035.1	23.16	3035.01	23.2	303524.97001	3034.66	25.09	3034.64			
25.23	3034.6228	43001	303428.49001	3033.9928	57001	3033.99	29.94	3033.88			
40.78001	3033.48	51.23	3033.0551	85001	3033.03	52.87	3033.0153	18001	3033		
63.13	3032.6964	06001	3032.6767	53001	3032.6374	50001	3032.4375	00001	3032.42		
78.3	3032.481	75001	3032.3982	87001	3032.4184	12001	3032.4392	34001	3032.37		
94.06001	3032.47	97.11	3032.6597	43001	3032.69	100.57	3033	100.62	3033		
101.37	3033.08	106.22	3033.52	108.62	3033.71	113.2	3034	113.28	3034.01		
113.59	3034.01	115.08	3034.08	119.52	3034.27	121.27	3034.27	130.12	3034.28		
130.18	3034.28	133.83	3034.24	135.1	3034.22						

Manning's n values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	63.13	.03597	43001	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	63.13	97.43		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3033.35	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.26	wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3033.09	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3033.09	Flow Area (sq ft)	2.63	21.09
0.83				
E.G. Slope (ft/ft)	0.018468	Area (sq ft)	2.63	21.09
0.83				
Q Total (cfs)	94.00	Flow (cfs)	4.59	87.98
1.43				
Top Width (ft)	51.34	Top Width (ft)	12.96	34.30
4.09				
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)	1.74	4.17
1.73				
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.20	0.61
0.20				
Conv. Total (cfs)	691.7	Conv. (cfs)	33.8	647.4
10.5				
Length wtd. (ft)	25.00	Wetted Per. (ft)	12.96	34.31
4.11				
Min Ch El (ft)	3032.37	Shear (lb/sq ft)	0.23	0.71
0.23				
Alpha	1.12	Stream Power (lb/ft s)	135.10	0.00
0.00				
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.07	0.14
0.26				
C & E Loss (ft)	0.01	Cum SA (acres)	0.18	0.25
0.51				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set

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equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
REACH: River One RS: 325

INPUT

Description:

Station Elevation Data		num= 57		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3039.321	660004	30394.639	999	3038.477	169998	303811.35	001	3037.22		
12.58	3037.17	51001	3036.03	17.67	3036	17.86	3035.96	18.3	3035.88		
21.55	3035.26	23.45	303529.42	001	3034.16	30.57	3034	31.94	3033.81		
37.97	303340.81	001	3032.61	40.91	3032.61	41.27	3032.6	43.59	3032.54		
44.51	3032.5	45.59	3032.46	56.57	3032	63.58	3031.83	65.44	3031.79		
68.85	001	3031.72	71.79	3031.68	75	3031.6775	28001	3031.6781	06001	3031.62	
86.95	3031.59	95.75	3031.55	99.51	3031.6	104.43	3031.72	111.34	3032		
112.99	3032.31	113.24	3032.32	113.49	3032.32	114.09	3032.33	114.68	3032.34		
114.93	3032.34	115.76	3032.33	116.37	3032.35	117.06	3032.38	117.36	3032.39		
126.34	3033	126.42	3033.01	126.48	3033.01	126.89	3033.01	127.2	3033.01		
131.42	3033.15	132.3	3033.15	142.63	3033.14	142.65	3033.14	142.66	3033.14		
147.39	3033.08	150.55	3033.02								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	63.58	.035	104.43	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff Contr.	Expan.
	63.58	104.43		25	25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3032.40	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3032.17	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3032.17	Flow Area (sq ft)	2.13	21.59
2.22				
E.G. Slope (ft/ft)	0.020215	Area (sq ft)	2.13	21.59
2.22				
Q Total (cfs)	94.00	Flow (cfs)	3.76	85.18
5.06				
Top Width (ft)	59.74	Top Width (ft)	11.07	40.85
7.82				
Vel Total (ft/s)	3.62	Avg. Vel. (ft/s)	1.76	3.95
2.28				
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)	0.19	0.53
0.28				
Conv. Total (cfs)	661.1	Conv. (cfs)	26.4	599.1
35.6				
Length wtd. (ft)	25.00	wetted Per. (ft)	11.08	40.85
7.84				
Min ch El (ft)	3031.55	shear (lb/sq ft)	0.24	0.67
0.36				
Alpha	1.11	Stream Power (lb/ft s)	150.55	0.00

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0.00				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.07	0.13
0.25				
C & E Loss (ft)	0.01	Cum SA (acres)	0.18	0.23
0.50				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
REACH: River One RS: 300

INPUT

Description:

Station Elevation Data		num=	64							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	3039.492	830002	30396.389999	3038.338	279999	303811.75999	3037.39			
14.37	303717.32001	3036.56	21.28	303623.25999	3035.73	28.73	3035			
31.77	3034.5936	24001	3034	42.7	3033.13	43.7	303346.57001	3032.61		
50.92	3032	53.24	3031.65	53.27	3031.65	53.35	3031.65	58.31	3031.48	
63.41	3031.14	64.33	3031.09	64.39	3031.08	72.02	3031	75	3030.96	
75.9	3030.95	76.66	3030.93	86.09	3030.8	88.74	3030.76	92.39	3030.68	
98.79	3030.6	105.48	3030.5	112.01	3030.37	113.68	3030.39	115.58	3030.42	
123.32	3030.27	123.75	3030.26	124.17	3030.26	129.92	3030.81	131.8	3031	
132.32	3031.03	132.5	3031.04	132.56	3031.05	132.7	3031.05	142.22	3031.6	
142.36	3031.6	142.48	3031.6	142.55	3031.6	143.39	3031.59	145.46	3031.66	
152.92	3031.61	153.97	3031.63	154.34	3031.63	154.73	3031.63	155.93	3031.64	
157.13	3031.63	160.3	3031.61	164.75	3031.57	164.8	3031.56	166.05	3031.53	
168.62	3031.51	168.69	3031.51	169.61	3031.49	175	3031.34			

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.04	98.79	.035
		131.8	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
98.79	131.8	25	25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3031.30	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.21	wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3031.09	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3031.09	Flow Area (sq ft)	8.07	20.34
0.07				
E.G. slope (ft/ft)	0.016179	Area (sq ft)	8.07	20.34
		Page 12		

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0.07				
Q Total (cfs)	94.00	Flow (cfs)	14.49	79.47
0.04				
Top Width (ft)	69.03	Top Width (ft)	34.45	33.01
1.57				
Vel Total (ft/s)	3.30	Avg. Vel. (ft/s)	1.80	3.91
0.59				
Max Chl Dpth (ft)	0.83	Hydr. Depth (ft)	0.23	0.62
0.04				
Conv. Total (cfs)	739.0	Conv. (cfs)	113.9	624.8
0.3				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	34.46	33.05
1.57				
Min Ch El (ft)	3030.26	Shear (lb/sq ft)	0.24	0.62
0.04				
Alpha	1.23	Stream Power (lb/ft s)	175.00	0.00
0.00				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.07	0.12
0.25				
C & E Loss (ft)	0.01	Cum SA (acres)	0.16	0.21
0.50				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 275

INPUT

Description:

Station	Elevation	Data	num=	86	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3040.211	369995		30403.779999	3039.684	440002	3039.595	539993	3039.44			
8.199997	3039.058	300003		3039.048	559998		303911.03999	3038.62	12.58	3038.4		
15.31	3038	15.97		3037.9	16.48	3037.8320	57001	3037.21	21.78	3037.03		
21.98	3037	23.88		3036.7	24.89	3036.5428	00999	3036	29.16	3035.79		
29.35001	3035.7731	35001		3035.5432	10001	3035.4433	32001	3035.2835	25999	3035.01		
35.33	3035	38.28		3034.5942	46001	303448.89999	3033.0949	50999	3033			
56.17	3032.04	56.48		3032	62.89	3031.08	63.42	303163.64999	3030.97			
69.89	3030	69.94		3029.97	69.96	3029.97	69.98	3029.97	71.93	3029.95		
72.69	3029.95	75		3029.83	76.62	3029.74	80.8	3029.71	89.69	3029.6		
95.22	3029.55	101.69		3029.47	107.91	3029.43	114.08	3029.36	123.5	3029.29		
126.05	3029.26	128.34		3029.26	128.79	3029	131.81	3029.34	140.54	3029.22		
143.73	3029.36	153.51		3029.13	156.72	3029.57	156.94	3029.56	157.41	3029.61		
157.84	3029.67	158.15		3029.73	158.58	3029.78	158.77	3029.8	158.84	3029.8		
159.11	3029.84	159.29		3029.86	159.42	3029.86	159.66	3029.86	160	3029.84		
160.37	3029.79	161.08		3029.86	161.74	3029.81	164.18	3029.74	166.36	3029.72		
170.81	3030	170.84		3030	170.9	3030	171.46	3030	173.82	3030		
173.84	3030	183.02		3029.76	184.74	3029.8	186.04	3029.82	189.12	3029.77		

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192 3029.73

Manning's n Values
Sta n Val Sta n Val Sta n Val
0 .04 101.69 .035 156.72 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
101.69 156.72 25 25 25 .1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3029.95	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3029.76	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3029.76	Flow Area (sq ft)	3.77	24.87
0.33				
E.G. Slope (ft/ft)	0.020133	Area (sq ft)	3.77	24.87
0.33				
Q Total (cfs)	94.00	Flow (cfs)	5.57	88.12
0.31				
Top width (ft)	88.27	Top width (ft)	25.47	55.03
7.78				
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)	1.48	3.54
0.94				
Max Chl Dpth (ft)	0.76	Hydr. Depth (ft)	0.15	0.45
0.04				
Conv. Total (cfs)	662.5	Conv. (cfs)	39.2	621.0
2.2				
Length wtd. (ft)	25.00	Wetted Per. (ft)	25.47	55.16
7.82				
Min Ch El (ft)	3029.00	Shear (lb/sq ft)	0.19	0.57
0.05				
Alpha	1.13	Stream Power (lb/ft s)	192.00	0.00
0.00				
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	0.07	0.11
0.25				
C & E Loss (ft)	0.00	Cum SA (acres)	0.15	0.18
0.50				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

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RIVER: One
REACH: River One

RS: 250

INPUT

Description:

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3039.62.4900055	3039.58.7899933	3039.551.210007	3039.511.740005	3039.44				
2	3039.412.710007	3039.323.770004	3039.183.910004	3039.164.960007	3039				
5.139999	3038.975.690002	3038.889.419998	3038.26	10.39	3038.09	10.89	3038		
14.78999	3037.316.49001	303720.03999	3036.3	21.53	3036	22.44	3035.83		
26.99001	3035	31.16	3034.23	32.45	3034	34.17	3033.7	38.16	3033
41.31999	3032.4542.03999	3032.35	44.94	3032	52.08	3031.19	53.55	3031.03	
53.78999	303160.74001	3030.2162.53999	3030	66.52	3029.52	70.69	3029		
73.28	3028.7574.42999	3028.72	75	3028.71	75.52	3028.7176.00999	3028.71		
79.21	3028.66	81.45	3028.71	82.57	3028.72	82.86	3028.72	83.16	3028.72
92.65	3028.61	94.97	3028.59	100.89	3028.53	107.16	3028.46	114.72	3028.37
118.64	3028.32	128.83	3028.2	131.5	3028.17	143.59	3028.03	143.94	3028.02
145.75	3028	157.76	3027.84	160.74	3027.81	162.57	3027.81	170.53	3027.79
173.42	3027.94	174.54	3028	174.55	3028	174.57	3028	176.53	3028.15
179.83	3028.29	187.44	3028.7	188.19	3028.69	189.01	3028.67	189.33	3028.66
189.36	3028.66	189.7	3028.65	191.29	3028.61	191.67	3028.61	192.03	3028.61
198	3028.48	198.65	3028.49	199.33	3028.5	201.35	3028.53	203.19	3028.54
204.94	3028.52	205	3028.52	206.14	3028.5				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	143.59	.035	176.53	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	143.59	176.53		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3028.68	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.21	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3028.48	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3028.48	Flow Area (sq ft)	8.61	19.43
1.18				
E.G. Slope (ft/ft)	0.017408	Area (sq ft)	8.61	19.43
1.18				
Q Total (cfs)	94.00	Flow (cfs)	15.64	76.55
1.81				
Top Width (ft)	77.83	Top Width (ft)	38.09	32.94
6.80				
Vel Total (ft/s)	3.22	Avg. Vel. (ft/s)	1.82	3.94
1.53				
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)	0.23	0.59
0.17				
Conv. Total (cfs)	712.4	Conv. (cfs)	118.6	580.2
13.7				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	38.09	32.95
6.81				
Min Ch El (ft)	3027.79	Shear (lb/sq ft)	0.25	0.64
0.19				
Alpha	1.28	Stream Power (lb/ft s)	206.14	0.00
0.00				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.06	0.09
0.25				

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 C & E Loss (ft) 0.02 Cum SA (acres) 0.13 0.16
 0.49

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
 REACH: River One RS: 225

INPUT

Description:

Station	Elevation	Data	num=	81	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3033.43	4.87999	3033.325	.970001	3033.277	0.059998	3033.28	1.900002	3033.11			
9.580002	3033	15.81	3032.51	22.05	3032	23.5	3031.88	25.33	3031.73			
30.28	3031.32	34.19	3031	37.33	3030.7441	8.84999	3030.3741	9.90999	3030.37			
41.95999	3030.3642	0.00999	3030.3642	8.89999	3030.2	44.14	3030.46	2.3999	3029.65			
48.40999	3029.25	49.86	3029	50.39	3028.9150	4.45999	3028.9	51.47	3028.79			
54.48999	3028.454	9.95999	3028.35	56.36	3028.258	3.37999	3028.65	5.1999	3027.46			
71.17999	3027.72	9.95999	3026.9	73.05	3026.8973	1.14999	3026.89	74.55	3026.92			
75	3026.9376	0.03999	3026.9576	1.5999	3026.9577	5.59999	3027	84.23	3027.23			
84.53	3027.2484	7.75999	3027.2486	2.1999	3027.24	95.77	3027.4896	4.3999	3027.49			
97.00999	3027.599	6.7999	3027.5	106.01	3027.49	113.12	3027.47	118.78	3027.46			
125.55	3027.43	130.98	3027.42	139.53	3027.38	144.22	3027.37	153.68	3027.34			
158.31	3027.32	159.47	3027.32	165.7	3027.36	169.33	3027.39	170.82	3027.48			
173.21	3027.62	175.95	3027.65	178.32	3027.67	179.9	3028	186.54	3028.42			
187.99	3028.42	189.48	3028.4	190.03	3028.39	190.05	3028.39	190.63	3028.38			
191.54	3028.37	192.14	3028.37	192.69	3028.39	196.73	3028.34	197.6	3028.36			
198.5	3028.38	201.03	3028.44	203.18	3028.47	204.71	3028.46	204.77	3028.46			
208.73	3028.43											

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.0465	51999	.035
		95.77	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	65.51999	95.77		25	25		.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3027.82	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.14	wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3027.68	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3027.68	Flow Area (sq ft)	0.31	14.88
20.26				
E.G. slope (ft/ft)	0.018498	Area (sq ft)	0.31	14.88
20.26				
Q Total (cfs)	94.00	Flow (cfs)	0.36	53.52
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40.12				
Top Width (ft)	115.70	Top width (ft)	2.87	30.25
82.58				
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)	1.15	3.60
1.98				
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)	0.11	0.49
0.25				
Conv. Total (cfs)	691.1	Conv. (cfs)	2.6	393.5
295.0				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	2.88	30.28
82.59				
Min Ch El (ft)	3026.89	Shear (lb/sq ft)	0.12	0.57
0.28				
Alpha	1.29	Stream Power (lb/ft s)	208.73	0.00
0.00				
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.06	0.08
0.25				
C & E Loss (ft)	0.01	Cum SA (acres)	0.12	0.14
0.47				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
REACH: River One RS: 200

INPUT

Description:

Station Elevation Data				num=	75				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3029.027.199997	3029.65	12.47	3029.4	19.25	3029	20.22	3028.95	
31.11	302831.60001	3027.98	31.62	3027.9831.64999	3027.98	31.95	3027.96		
42.53	3027.4546.71001	3027	51.28	3026.72	53.14	3026.64	54.81	3026.57	
66.55	302668.60001	3025.8968.75999	3025.89	68.88	3025.88	68.97	3025.88		
69.02	3025.8869.03999	3025.88	69.06	3025.8869.10001	3025.88	69.17	3025.88		
69.27	3025.89	77.02	3025.63	77.69	3025.62	82.13	3025.59	83.75	
95.06	3025.79	97.83	3025.85	109.97	3026	111.72	3026.04	112.65	
113.56	3026.05	115.52	3026.05	118.58	3026.02	118.9	3026.02	121.28	
132.58	3025.95	132.93	3025.95	143.96	3025.92	145.27	3025.92	146.6	
147.46	3025.93	155.6	3026	156.59	3026.02	156.84	3026.02	157.88	
159.97	3026.01	159.98	3026.01	161.27	3026.01	162.48	3026	163.51	
169	3025.89	172.46	3025.86	175.68	3025.83	182.6	3025.84	185.16	
195.77	3025.84	196.81	3025.87	197.92	3025.9	198.04	3025.9	200.16	
213.14	3026.63	214.34	3026.69	215.07	3026.7	215.73	3026.71	216.98	
217.3	3026.72	219.68	3026.69	220.05	3026.7	220.75	3026.71	223.86	

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.0468.60001	.035	97.83	.04	

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
68.60001 97.83 25 25 25 .1 .3

CROSS SECTION OUTPUT Profile #Q100

	E.G. Elev (ft)	3026.29	Element	Left OB	Channel
Right OB					
Vel Head (ft)	0.12		Wt. n-Val.	0.040	0.035
0.040					
W.S. Elev (ft)	3026.16		Reach Len. (ft)	25.00	25.00
25.00					
Crit W.S. (ft)	3026.16		Flow Area (sq ft)	0.72	13.16
24.17					
E.G. Slope (ft/ft)	0.019622		Area (sq ft)	0.72	13.16
24.17					
Q Total (cfs)	94.00		Flow (cfs)	0.97	45.98
47.05					
Top Width (ft)	140.30		Top Width (ft)	5.39	29.23
105.68					
Vel Total (ft/s)	2.47		Avg. Vel. (ft/s)	1.35	3.49
1.95					
Max Chl Dpth (ft)	0.57		Hydr. Depth (ft)	0.13	0.45
0.23					
Conv. Total (cfs)	671.1		Conv. (cfs)	6.9	328.2
335.9					
Length Wtd. (ft)	25.00		Wetted Per. (ft)	5.40	29.24
105.69					
Min Ch El (ft)	3025.59		Shear (lb/sq ft)	0.16	0.55
0.28					
Alpha	1.29		Stream Power (lb/ft s)	223.86	0.00
0.00					
Frctn Loss (ft)	0.51		Cum Volume (acre-ft)	0.06	0.08
0.23					
C & E Loss (ft)	0.01		Cum SA (acres)	0.11	0.12
0.41					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 175

INPUT

Description:

Station	Elevation	Data	num=	97	Station	Elevation	Station	Elevation	Station	Elevation
0	3024.092	0.049988	3024.281	0.07999	3025.11	3.31999	3025.12	13.37999	3025.3	
14.12999	3025.351	4.76999	3025.392	0.15999	3025.832	1.09999	3025.84	22.17	3025.84	
23.28999	3025.832	3.64999	3025.822	4.01999	3025.822	5.21999	3025.792	9.17999	3025.7	
37.42999	3025.47	40.37	3025.42	51.36	3025.13	51.7	3025.12	51.86	3025.12	

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52.00999	3025.1153	25999	3025.05	54.09	3025	54.2	3025	54.62	3024.97
54.75	3024.9757	29999	3024.79	58.06	3024.74	58.73	3024.758	73999	3024.7
64.12999	3024.45	67.09	3024.4269	96999	3024.43	71.98	3024.5	72.67	3024.52
73.31999	3024.53	75	3024.5885	76999	3024.92	86.37	3024.94	87.2	3024.96
88.14999	3025	100.94	3025.3	102.34	3025.32	103.67	3025.34	104.18	3025.35
104.53	3025.35	104.95	3025.36	105.5	3025.37	106.29	3025.37	106.79	3025.38
110.52	3025.46	113.46	3025.51	114.98	3025.51	121.34	3025.56	121.67	3025.56
129.49	3025.55	132.66	3025.56	139.46	3025.57	140.31	3025.58	141.18	3025.58
146.25	3025.6	152.53	3025.67	153.79	3025.68	154.17	3025.68	156.06	3025.67
156.87	3025.68	157.63	3025.68	157.97	3025.68	158.33	3025.68	159.04	3025.68
159.4	3025.69	160.13	3025.68	160.47	3025.69	161.19	3025.68	164.77	3025.68
168.76	3025.65	169.59	3025.64	172.89	3025.59	175.07	3025.58	177.16	3025.57
181.9	3025.6	187.83	3025.52	194.83	3025.59	195.58	3025.62	196.39	3025.65
196.82	3025.64	203.38	3026	208.36	3026.27	211.01	3026.41	212.48	3026.45
213.76	3026.49	216.01	3026.51	216.56	3026.52	218.34	3026.52	218.91	3026.53
219.99	3026.57	225.79	3026.56						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 54.62 .0485.76999 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 54.6285.76999 25 25 25 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 0 21.94 3025.82 F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3025.56	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.25	wt. n-Val.	0.040	0.040
0.040				
W.S. Elev (ft)	3025.30	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3025.30	Flow Area (sq ft)	1.36	20.91
2.78				
E.G. Slope (ft/ft)	0.021458	Area (sq ft)	9.48	20.91
2.78				
Q Total (cfs)	94.00	Flow (cfs)	1.99	87.17
4.84				
Top Width (ft)	69.80	Top Width (ft)	23.26	31.15
15.39				
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)	1.46	4.17
1.74				
Max chl Dpth (ft)	1.21	Hydr. Depth (ft)	0.14	0.67
0.18				
Conv. Total (cfs)	641.7	Conv. (cfs)	13.6	595.1
33.1				
Length wtd. (ft)	25.00	Wetted Per. (ft)	9.83	31.17
15.40				
Min ch El (ft)	3024.42	Shear (lb/sq ft)	0.19	0.90
0.24				
Alpha	1.16	Stream Power (lb/ft s)	225.79	0.00
0.00				
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.06	0.07
0.23				
C & E Loss (ft)	0.02	Cum SA (acres)	0.10	0.11
0.38				

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Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: One

REACH: River One

RS: 150

INPUT

Description:

Station Elevation Data		num= 155									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3022.931.349976		30231.829987	3023.032.809998	3023.0814.24998	3023.69					
20.13998	302425.98999	3024.3626.16998	3024.3626.39999	3024.36	26.62	3024.36					
26.81999	3024.3527.39999	3024.3228.56999	3024.3629.17999	3024.3829.83998	3024.39						
30.39999	3024.3931.18999	3024.3935.25999	3024.2840.65999	3024.2645.88998	3024.1						
50.31999	3024.0854.35999	3024.0454.40999	3024.0454.53999	3024.0454.76999	3024.04						
55.76999	3024.0457.32999	3024.0458.68999	3024.0359.35999	3024.0359.69998	3024.03						
60.62	3024.0360.63998	3024.0360.99998	3024.0361.02998	3024.03	61.37	3024.02					
61.49998	3024.0262.16998	3024.0262.50999	3024.0262.60999	3024.0262.92999	3024.01						
63.18999	3024.01	63.37	3024.0163.45999	3024.0163.49998	3024.0163.75999	3024.01					
63.92999	3024.0163.97998	3024.0164.12999	302464.19998	302464.24998	3024						
64.26999	302464.30998	302464.31999	302464.32999	302464.49998	3023.99						
64.58998	3023.98	73.37	3023.5777.03999	3023.4177.54999	3023.4	77.87	3023.4				
78.03999	3023.484.70999	3023.5584.99998	3023.5685.21999	3023.5685.37999	3023.56						
86.12999	3023.5986.95999	3023.6387.09999	3023.6390.62999	3023.8590.68999	3023.85						
90.77998	3023.8690.88998	3023.8693.43999	302495.39999	3024.0995.49998	3024.09						
100.5	3024.29	100.75	3024.29	101.14	3024.3	102.81	3024.35	103.51	3024.37		
105.6	3024.4	109.64	3024.48	115.68	3024.58	124.06	3024.64	126.2	3024.66		
126.67	3024.65	131.38	3024.66	135.56	3024.65	135.64	3024.65	136.4	3024.64		
136.82	3024.63	137.28	3024.62	139.95	3024.54	146.5	3024.55	146.9	3024.53		
147.32	3024.52	147.8	3024.51	148.25	3024.5	150.18	3024.5	150.6	3024.5		
151.17	3024.49	152.45	3024.48	153.47	3024.48	154.56	3024.46	157.24	3024.41		
157.66	3024.4	158.12	3024.4	158.58	3024.4	159.04	3024.41	160.99	3024.45		
169.52	3024.28	169.77	3024.28	170.06	3024.29	170.38	3024.29	170.64	3024.28		
171.59	3024.28	171.95	3024.26	173.9	3024.28	177.18	3024.33	180.95	3024.22		
190.24	3024.34	194.26	3024.3	198.05	3024.32	198.28	3024.32	202.34	3024.36		
206.19	3024.36	206.65	3024.35	206.77	3024.35	207.24	3024.35	207.81	3024.35		
207.87	3024.35	209	3024.36	209.92	3024.36	211.48	3024.35	212.97	3024.35		
213.33	3024.35	218.77	3024.45	219.01	3024.45	221.88	3024.49	224.39	3024.52		
225.92	3024.54	235.69	3024.73	236.17	3024.73	236.56	3024.74	238	3024.75		
239.37	3024.75	239.54	3024.75	240.63	3024.75	240.68	3024.75	243.71	3024.73		
247.56	3024.73	256.39	3024.69	257.17	3024.68	257.94	3024.68	259.8	3024.68		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.0464.58998		.03590.88998		.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
64.58998	90.88998	25	25	25	.1	.3
Ineffective Flow		num= 1				

Sta L Sta R Elev Permanent
0 29.84 3024.4 F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3024.56	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3024.38	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3024.38	Flow Area (sq ft)	8.06	19.93
6.30				
E.G. Slope (ft/ft)	0.011413	Area (sq ft)	27.77	19.93
6.30				
Q Total (cfs)	94.00	Flow (cfs)	12.47	75.08
6.46				
Top Width (ft)	152.73	Top Width (ft)	62.39	26.30
64.05				
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)	1.55	3.77
1.03				
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)	0.24	0.76
0.10				
Conv. Total (cfs)	879.9	Conv. (cfs)	116.7	702.7
60.4				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	33.10	26.32
64.07				
Min Ch El (ft)	3023.40	Shear (lb/sq ft)	0.17	0.54
0.07				
Alpha	1.56	Stream Power (lb/ft s)	259.80	0.00
0.00				
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.05	0.05
0.22				
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	0.09
0.36				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: One

REACH: River One

RS: 125

INPUT

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Description:

Station Elevation Data				num=	158				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3020.89	1799927	3020.9	.25	3020.91	769989	3020.993	029999	3021
3.119995	3021.013	809998	3021.03	5	3021.07	5.5	3021.095	859985	3021.11
6.089996	3021.126	230011	3021.146	290009	3021.159	880005	3021.310	049999	3021.32
12.04999	3021.4717	98999	3021.9418	07001	3021.95	18.78	302218.79999		3022
18.87	302218.95999		302219.00999		3022	19.13	3022	20.7	3022.12
21.32001	3022.15	31.91	3022.732	39999	3022.72	32.81	3022.73	33.19	3022.74
33.5	3022.74	33.97	3022.73	34.44	3022.72	37.13	3022.83	44.98	3022.86
45.64	3022.8646	25999	3022.87	47.95	3022.8352	21001	3022.6660	75999	3022.72
60.95	3022.6961	25999	3022.6661	57001	3022.65	61.97	3022.6162	10001	3022.61
62.14999	3022.662	24001	3022.665	00999	3022.3465	14999	3022.33	65.56	3022.28
66.00999	3022.23	66.48	3022.18	66.62	3022.17	67.13	3022.12	67.25	3022.11
67.83	3022.07	67.98	3022.0668	10001	3022.0468	17999	3022.04	68.31	3022.03
69.47	3022	69.98	3021.99	74.09	3021.97	75	3021.9778	24001	3021.99
79.83	3022	79.84	3022.03	79.86	3022.03	79.92	3022.0380	64999	3022.04
85.55	3022.52	87.98	3022.66	100.7	3022.88	102.39	3022.91	108.18	3023
116.33	3023.14	117.19	3023.14	126.06	3023.3	129.56	3023.28	132.92	3023.26
136.54	3023.22	142.39	3023	145.61	3022.86	148.92	3022.74	158.37	3023.39
169.86	3022	170.07	3022	170.3	3022	170.57	3022	172.09	3022
172.9	3022	173.17	3022	173.92	3022	175.19	3022	175.42	3022
176.03	3022	176.43	3022	176.47	3022	176.77	3022	177.19	3022
177.4	3022	177.58	3022	177.76	3022	178.17	3022	178.71	3022.03
179.57	3022.08	179.89	3022.1	180.37	3022.13	188.64	3022.62	191	3022.75
196.25	3023	199.44	3023.01	203.49	3023.01	203.53	3023.01	203.55	3023.01
207.11	3023	211.69	3022.95	216.6	3022.93	219.4	3022.95	222.72	3022.98
222.93	3022.99	223.11	3022.99	223.29	3022.99	223.66	3023	223.73	3023
223.76	3023	223.81	3023	225.23	3023.12	229.78	3023.5	234.4	3023.9
235.63	3024	236.17	3024	237.91	3024	238.68	3024	240.35	3024
246.21	3023.17	246.47	3023.15	246.62	3023.14	246.74	3023.13	247.03	3023.11
247.55	3023.09	248.41	3023.05	249.71	3023.01	249.8	3023	249.83	3023
250.07	3023	253.87	3022.99	254.03	3022.99	255.02	3022.94	259.9	3022.86
259.99	3022.86	260.29	3022.87	265.19	3022.86	266.09	3022.87	266.61	3022.87
267.14	3022.86	267.27	3022.86	275	3022.84				

Manning's n Values				num=	5				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	60.95	.035	85.55	.04	148.92	.035	191	.04
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.		
65.56	85.55	25	25	25	.1	.3			
Ineffective Flow	num=	1							
Sta L	Sta R	Elev	Permanent						
0	46.22	3022.89	F						

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3022.84	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.21	Wt. n-Val.	0.035	0.035
0.035				
W.S. Elev (ft)	3022.63	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3022.63	Flow Area (sq ft)	0.63	10.96
14.47				
E.G. slope (ft/ft)	0.021279	Area (sq ft)	28.18	10.96
14.47				
Q Total (cfs)	94.00	Flow (cfs)	1.16	45.38
47.46				
Top Width (ft)	93.17	Top Width (ft)	34.35	19.99
38.83				

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Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)	1.86	4.14
3.28				
Max Chl Dpth (ft)	1.74	Hydr. Depth (ft)	0.17	0.55
0.37				
Conv. Total (cfs)	644.4	Conv. (cfs)	8.0	311.1
325.4				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	3.81	20.05
38.87				
Min Ch El (ft)	3021.97	Shear (lb/sq ft)	0.22	0.73
0.49				
Alpha	1.06	Stream Power (lb/ft s)	275.00	0.00
0.00				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.03	0.05
0.22				
C & E Loss (ft)	0.01	Cum SA (acres)	0.05	0.08
0.33				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: One

REACH: River One

RS: 100

INPUT

Description:

Station Elevation Data		num= 152									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3020.094	910004	3020.336	579987	3020.4	20.53	3021	23.87	3021.17		
30.89999	3021.49	38.02	3021.8239	50999	3021.87	40.72	3021.9	42.05	3021.92		
42.88	3021.95	44.41	3021.9544	60001	3021.95	44.8	3021.95	48.5	3021.93		
49.42	3021.91	49.44	3021.9149	46001	3021.949	49001	3021.950	60001	3021.86		
63.12	3021.65	63.91	3021.58	64.33	3021.54	64.8	3021.48	66.38	3021.26		
66.64999	3021.26	66.66	3021.2666	67999	3021.2668	07001	3021	68.17	3020.98		
71.21001	3020.94	73.83	3020.89	75	3020.976	78999	3020.9180	89999	3021		
80.94	3021	80.95	3021	80.98	302183	96001	3021.19	87.47	3021.24		
97.84	3021.46	105.96	3021.63	111.27	3021.74	122.9	3021.97	123.18	3021.98		
124.56	3022	125.34	3022	125.85	3022	127.28	3022.01	127.3	3022.01		
129.23	3022	129.65	3021.99	131.15	3021.95	132.62	3021.91	134.72	3021.83		
140.32	3021.63	147.18	3021.35	156.21	3021	157.2	3020.98	158.26	3020.98		
158.31	3020.97	158.44	3020.97	161.48	3020.92	162.35	3020.92	165.77	3021		
166.15	3021.01	166.24	3021.01	168.76	3021.02	169.2	3021.02	169.57	3021.02		
170.05	3021.02	170.2	3021.02	170.65	3021.02	170.8	3021.02	171.19	3021.02		
171.31	3021.02	178.37	3021.4	179.47	3021.45	180.17	3021.46	181.55	3021.51		
182.19	3021.53	183.03	3021.56	183.61	3021.58	185.39	3021.63	187.37	3021.71		

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188.7	3021.75	189.05	3021.76	190.64	3021.79	191.97	3021.81	192.71	3021.82
194.29	3021.84	194.82	3021.84	195.33	3021.84	197.05	3021.85	198.84	3021.85
201.21	3021.82	202.95	3021.8	204.69	3021.78	207.29	3021.73	209.47	3021.71
211.19	3021.67	211.52	3021.67	211.9	3021.66	212.25	3021.65	217.3	3021.51
222.93	3021.35	234.71	3021.02	234.89	3021.02	235.02	3021.02	235.03	3021.02
235.15	3021.02	235.57	3021	239.71	3020.91	242.53	3020.91	245.38	3020.92
247.84	3021	253.52	3021.37	253.76	3021.37	254.08	3021.37	254.39	3021.37
254.68	3021.36	255.65	3021.37	256.59	3021.38	256.89	3021.37	257.65	3021.35
258.46	3021.33	259.35	3021.29	259.61	3021.28	260.54	3021.24	262.47	3021.02
262.8	3021.02	263.02	3021.02	263.63	3021.02	263.68	3021.02	263.91	3021.01
264.05	3021.01	264.15	3021.01	264.25	3021	264.34	3021	264.37	3021
264.44	3021	264.49	3021	264.65	3020.98	264.84	3020.96	269.27	3020.79
272.41	3020.68	272.9	3020.67	273.43	3020.65	273.75	3020.64	274.09	3020.63
274.4	3020.63	275	3020.64						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.0466	64999	.03583	96001	.04	147.18	.035	178.37	.04

Bank Sta: Left 66.6499983 Right 96001 Lengths: Left 25 Channel 25 Right 25 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	43.78	3021.96	F
197.76	275	3021.86	F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3021.73	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.035
0.036				
W.S. Elev (ft)	3021.54	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3021.54	Flow Area (sq ft)	0.36	9.70
18.08				
E.G. Slope (ft/ft)	0.019097	Area (sq ft)	23.59	9.70
44.01				
Q Total (cfs)	94.00	Flow (cfs)	0.53	38.63
54.84				
Top Width (ft)	168.05	Top Width (ft)	34.30	17.31
116.44				
Vel Total (ft/s)	3.34	Avg. Vel. (ft/s)	1.47	3.98
3.03				
Max chl Dpth (ft)	1.45	Hydr. Depth (ft)	0.15	0.56
0.31				
Conv. Total (cfs)	680.2	Conv. (cfs)	3.8	279.6
396.8				
Length wtd. (ft)	25.00	Wetted Per. (ft)	2.34	17.34
57.68				
Min Ch El (ft)	3020.89	Shear (lb/sq ft)	0.18	0.67
0.37				
Alpha	1.07	Stream Power (lb/ft s)	275.00	0.00
0.00				
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.01	0.04
0.20				
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.06
0.28				

Warning: The energy equation could not be balanced within the specified number of
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ScottsdaleFire.rep

iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: One
REACH: River One RS: 75

INPUT

Description:

Station Elevation Data		num= 110		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3019.315	3019.529999	3019.5417	01001	3020	20.5	3020.13	27.47	3020.39		
36.14999	3020.68	37.55	3020.72	38.41	3020.7439	17999	3020.75	40.62	3020.74		
41.08	3020.7641	41.78999	3020.77	42.45	3020.78	43.06	3020.78	46.78	3020.73		
47.41	3020.72	48.08	3020.7149	46001	3020.67	49.72	3020.66	50	3020.65		
50.58	3020.64	51	3020.6151	46001	3020.59	52.23	3020.56	60	3020		
60.00999	3020	60.02	302073	39999	3019.41	73.52	3019.41	74.28	3019.4		
75	3019.3775	00999	3019.3775	64999	3019.3580	78999	3019.36	82.58	3019.36		
84.96001	3019.5	90.33	3019.8291	49001	3019.94	92.09	3020	92.13	3020		
92.14	302092	24001	3020	92.37	3020	92.42	3020	92.47	3020		
92.78	302093	07001	302093	21001	3020	93.38	3020	93.44	3020		
93.46001	302093	96001	3020.03	96.83	3020.15	105.62	3020.38	111.11	3020.51		
116.92	3020.62	117.59	3020.63	118.33	3020.64	119.72	3020.65	120.44	3020.66		
121.13	3020.66	121.66	3020.65	126.69	3020.66	127.67	3020.64	128.84	3020.62		
129.73	3020.61	130.7	3020.59	131.8	3020.56	135.79	3020.45	141.54	3020.3		
148.23	3020.04	148.69	3020.03	149.29	3020	149.52	3020	153.44	3020		
154.22	3020	158.02	3020	161	3020.05	164.54	3020.07	166.37	3020.14		
174.57	3020.38	175.07	3020.38	175.6	3020.39	175.95	3020.39	181.08	3020.42		
186.18	3020.4	188.55	3020.42	189.57	3020.43	189.83	3020.43	190.12	3020.43		
190.36	3020.43	199.71	3020.34	200.54	3020.33	204.77	3020.27	215.78	3020.16		
217.01	3020.15	221.54	3020.08	221.61	3020.08	225.37	3020	232.65	3019.85		
238.72	3019.7	245.31	3019.46	251.31	3019.27	258.93	3019.06	260.64	3019		
263.47	3018.86	264.22	3018.81	273.51	3018.31	274.52	3018.25	275	3018.23		

Manning's n Values		num= 5		Sta n Val		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	60	.03593	46001	.04	141.54	.035	174.57	.04		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	6093	46001		25	25	25		.1	.3

Ineffective Flow		num= 2		Sta L Sta R Elev Permanent	
0	43.78	3020.78	F		
189.49	275	3020.45	F		

CROSS SECTION OUTPUT Profile #Q100

ScottsdaleFire.rep				
	3020.47	Element	Left OB	Channel
E.G. Elev (ft)	3020.47			
Right OB				
Vel Head (ft)	0.22	Wt. n-Val.	0.040	0.035
0.035				
W.S. Elev (ft)	3020.25	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3020.25	Flow Area (sq ft)	0.44	21.56
5.64				
E.G. Slope (ft/ft)	0.015377	Area (sq ft)	11.40	21.56
56.49				
Q Total (cfs)	94.00	Flow (cfs)	0.51	84.61
8.88				
Top Width (ft)	163.84	Top width (ft)	27.27	33.46
103.12				
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)	1.16	3.92
1.57				
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)	0.13	0.64
0.16				
Conv. Total (cfs)	758.0	Conv. (cfs)	4.1	682.3
71.6				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	3.50	33.50
34.71				
Min Ch El (ft)	3019.35	Shear (lb/sq ft)	0.12	0.62
0.16				
Alpha	1.22	Stream Power (lb/ft s)	275.00	0.00
0.00				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.00	0.03
0.17				
C & E Loss (ft)	0.06	Cum SA (acres)	0.02	0.05
0.22				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: One

REACH: River One

RS: 50

INPUT

Description:

Station Elevation Data

num= 122

Sta Elev Sta Elev Sta Elev Sta Elev

ScottsdaleFire.rep

0	3019.033	.540009	3019.146	.269989	3019.22	16.63	3019.52	22.41	3019.67
26.48	3019.78	28.83	3019.82	29.23	3019.8229	.64999	3019.82	30.72	3019.83
31.75	3019.8433	.92999	3019.76	34.84	3019.75	36.03	3019.73	37.42	3019.68
41.52	3019.58	43.8	3019.5249	.64999	3019.33	60.3	3019.08	60.98	3019
67.81	3018.22	68.03	3018.2	68.22	3018.19	75	3018.01	75.25	3018
77.75	3017.97	79.58	3017.97	79.77	3017.9780	.78999	3017.97	81.02	3017.97
81.74001	3017.98	82.03	3017.9882	.28999	3017.9982	.50999	3017.9982	.53999	3017.99
82.75999	3017.9982	.85001	3017.99	82.91	3018	83	301883	.03999	3018
83.05	3018	83.14	3018.01	83.67	3018.184	.25999	3018.12	85.31	3018.24
87.38	3018.48	87.87	3018.53	92.05	3018.6394	.74001	3018.8196	.10001	3018.86
96.94	3018.88	99.09	3018.89	104.34	3018.88	105.91	3018.89	116.11	3018.9
117.15	3018.92	124.47	3018.94	125.09	3018.94	125.46	3018.94	125.88	3018.93
137.93	3018.95	137.96	3018.95	139.29	3018.94	140.14	3018.92	141.25	3018.9
141.66	3018.88	142.27	3018.85	143.71	3018.76	145.36	3018.7	147.14	3018.63
147.33	3018.62	150.37	3018.48	150.62	3018.47	150.87	3018.46	151.04	3018.46
155.16	3018.31	157.74	3018.29	157.89	3018.29	157.99	3018.29	158.04	3018.29
158.07	3018.29	158.17	3018.29	158.42	3018.3	165.48	3018.47	166.12	3018.49
166.82	3018.52	167.3	3018.54	173.44	3018.75	173.84	3018.76	174.26	3018.77
174.64	3018.78	175.77	3018.8	176.68	3018.82	177.02	3018.83	177.37	3018.83
177.75	3018.83	178.72	3018.84	179.12	3018.84	179.54	3018.84	179.97	3018.84
181.29	3018.82	181.74	3018.81	182.72	3018.79	186.76	3018.72	198.02	3018.5
208.58	3018.29	212.85	3018.2	221.52	3018	226.93	3017.84	232.72	3017.66
243.65	3017.31	244.04	3017.3	244.39	3017.28	247.28	3017.27	250.1	3017.27
250.4	3017.29	256.74	3017	259.26	3016.95	260.2	3016.93	260.32	3016.92
272.81	3016.66	275	3016.58						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	68.22	.03584	25999	.04	143.71	.035	173.44	.04

Bank Sta: Left 67.81 Right 87.38 Lengths: Left 25 Channel 25 Right 25 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
179.39	275	3018.85	F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3018.86	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3018.85	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3018.85	Flow Area (sq ft)	1.74	15.02
114.89				
E.G. slope (ft/ft)	0.000420	Area (sq ft)	1.74	15.02
114.89				
Q Total (cfs)	94.00	Flow (cfs)	0.61	10.91
82.48				
Top width (ft)	166.29	Top width (ft)	5.52	19.57
141.20				
Vel Total (ft/s)	0.71	Avg. Vel. (ft/s)	0.35	0.73
0.72				
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)	0.32	0.77
0.81				
Conv. Total (cfs)	4585.6	Conv. (cfs)	29.8	532.0
4023.7				
Length wtd. (ft)	25.00	Wetted Per. (ft)	5.56	19.60
143.54				
Min ch El (ft)	3017.97	Shear (lb/sq ft)	0.01	0.02
0.02				

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Alpha	1.01	Stream Power (lb/ft s)	275.00	0.00
0.00				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.00	0.02
0.12				
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.03
0.15				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 25

INPUT

Description:

Station	Elevation	Data	num=	137								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	3018.042	0.089996	3018.082	6.09985	3018.13	1.70013	3018.113	6.30005	3018.13			
7.130005	3018.217	4.40002	3018.227	7.69989	3018.23	17.5	3018.5322	0.7001	3018.64			
22.27	3018.65	25.91	3018.6226	0.0999	3018.62	26.09	3018.62	26.25	3018.62			
26.28999	3018.63	26.31	3018.6226	4.6001	3018.63	27.78	3018.64	29.05	3018.64			
29.13	3018.6429	3.2001	3018.64	36.63	3018.49	38.8	3018.43	43.55	3018.32			
53.64999	3018.1	54.14	3018.09	54.59	3018.09	58.06	3018	66.19	3017.62			
66.34	3017.61	66.58	3017.666	8.5001	3017.5969	5.0999	3017.33	72.58	3017.01			
72.73	3017.0173	0.0999	3017	74.25	3017	75	301775	1.7999	3017			
76.07001	3017	77.11	301778	0.0999	3017	79.19	3017.03	79.41	3017.03			
79.88	3017.04	82.48	3017.31	85.14	3017.5285	2.8999	3017.52	87.59	3017.48			
87.82001	3017.47	88.52	3017.4589	0.0999	3017.4489	4.9001	3017.4389	7.5999	3017.43			
92.86	3017.4793	1.0001	3017.4893	3.2001	3017.4893	8.2001	3017.49	101.99	3017.61			
107.41	3017.76	107.79	3017.77	118.48	3018	119.1	3018.01	119.17	3018.01			
129.43	3018.1	135.31	3018.03	137.1	3018	137.57	3018	137.99	3018			
139.29	3018	139.47	3018	139.94	3018	140.1	3018	140.76	3017.96			
143.3	3017.83	145.24	3017.73	145.69	3017.71	153.72	3017.37	154.06	3017.35			
154.31	3017.34	154.48	3017.34	154.55	3017.34	155.32	3017.31	155.39	3017.31			
157.49	3017.33	159.95	3017.36	160.13	3017.36	160.39	3017.38	160.7	3017.39			
160.94	3017.4	161.43	3017.42	161.78	3017.43	162.44	3017.46	163.08	3017.5			
167.77	3017.87	169.83	3017.88	171.97	3017.9	172.8	3017.91	173.74	3017.92			
176.44	3017.93	178.03	3017.95	178.32	3017.96	178.51	3017.96	179.1	3017.96			
179.32	3017.96	179.95	3017.96	180.18	3017.96	180.27	3017.97	180.93	3017.97			
181.15	3017.97	181.19	3017.96	182.38	3017.83	183.12	3017.83	184.07	3017.81			
186.95	3017.8	192.78	3017.7	193.31	3017.7	193.87	3017.68	194.29	3017.67			
197.7	3017.57	205.1	3017.42	205.8	3017.4	206.5	3017.38	215.23	3017.22			
218.13	3017.15	220.1	3017.1	223.73	3017	226.12	3016.93	237.42	3016.6			
245.29	3016.38	250.03	3016.24	261.02	3016	261.8	3015.98	261.83	3015.98			
261.99	3015.98	275	3015.68									

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Manning's n Values		num=	5						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.0469	50999	.035	82.48	.04	143.3	.035	167.77	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
66.8500	193.8200	24.49	24.49	24.49	.1	.3	

Ineffective Flow	num=	1	
Sta L	Sta R	Elev	Permanent
180.61	275	3017.99	F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3018.06	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.036
0.036				
W.S. Elev (ft)	3017.88	Reach Len. (ft)	24.49	24.49
24.49				
Crit W.S. (ft)	3017.88	Flow Area (sq ft)	0.89	16.27
12.75				
E.G. Slope (ft/ft)	0.015750	Area (sq ft)	0.89	16.27
110.93				
Q Total (cfs)	94.00	Flow (cfs)	1.14	62.95
29.90				
Top Width (ft)	172.25	Top Width (ft)	6.18	26.97
139.10				
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)	1.28	3.87
2.34				
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)	0.14	0.60
0.28				
Conv. Total (cfs)	749.0	Conv. (cfs)	9.1	501.6
238.3				
Length wtd. (ft)	24.49	Wetted Per. (ft)	6.18	27.02
46.08				
Min Ch El (ft)	3017.00	Shear (lb/sq ft)	0.14	0.59
0.27				
Alpha	1.19	Stream Power (lb/ft s)	275.00	0.00
0.00				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.00	0.01
0.06				
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	0.02
0.07				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

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CROSS SECTION

RIVER: One
REACH: River One

RS: 0.51

INPUT

Description:

Station	Elevation	Data	num=	90	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3017.16	34.38	3017.11	34.52	3017.11	34.61	3017.11	34.7	3017.11			
34.8	3017.11	34.95	3017.11	36.37	3017.07	38.71	3017	48.72	3016.7			
51.36	3016.5	52.03	3016.44	53.48	3016.38	57.03	3016.2	60	3016.05			
60.02	3016.05	64.2	3016.07	64.68	3016.06	65.03	3016.05	65.04	3016.05			
65.05	3016.05	65.38	3016.05	69.39	3016.06	69.4	3016.06	71.82	3016.09			
71.84	3016.09	72.07	3016.08	72.12	3016.08	72.22	3016.08	72.46	3016.07			
72.69	3016.07	78.96	3016.25	83.23	3016.32	88.8	3016.44	89.67	3016.46			
93.87	3016.56	97.94	3016.65	99.81	3016.66	108.69	3016.88	109.42	3016.9			
110.78	3016.92	111.85	3016.94	112.94	3016.96	114.03	3016.97	115.11	3016.97			
115.44	3016.97	116.77	3016.96	118.27	3016.95	118.67	3016.95	129.51	3016.8			
130.97	3016.8	132.44	3016.8	134.44	3016.81	135	3016.81	136.39	3016.8			
136.95	3016.8	137.54	3016.79	145.48	3016.86	155.35	3016.99	155.77	3017			
156.62	3017	156.95	3017.01	157.58	3017	158.73	3017	159.33	3016.99			
169.58	3016.75	171.83	3016.72	173.86	3016.69	177.35	3016.67	186.26	3016.64			
186.81	3016.63	187.37	3016.62	187.87	3016.61	211.07	3016.17	211.43	3016.16			
213.07	3016.12	213.27	3016.12	213.44	3016.11	214.71	3016.1	217.98	3016			
219.15	3015.96	235.26	3015.46	235.53	3015.45	235.8	3015.45	246.67	3015.19			
249.55	3015.11	253.53	3015	257.67	3014.92	267.95	3014.59	271.23	3014.5			

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.04	48.72	.035
		97.94	.04

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	48.72	97.94	.1	.3

Ineffective Flow	num=	1
Sta L	Sta R	Elev
156.62	271.23	3017
		Permanent
		F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3017.01	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3016.77	Reach Len. (ft)		
Crit W.S. (ft)	3016.77	Flow Area (sq ft)	0.09	23.98
0.47				
E.G. slope (ft/ft)	0.022016	Area (sq ft)	0.09	23.98
97.45				
Q Total (cfs)	94.00	Flow (cfs)	0.05	93.49
0.46				
Top Width (ft)	160.61	Top Width (ft)	2.40	49.22
108.98				
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)	0.60	3.90
0.97				
Max chl Dpth (ft)	2.27	Hydr. Depth (ft)	0.04	0.49
0.07				
Conv. Total (cfs)	633.5	Conv. (cfs)	0.4	630.1
3.1				
Length Wtd. (ft)		Wetted Per. (ft)	2.40	49.25
		Page 30		

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6.40				
Min Ch El (ft)	3016.05	Shear (lb/sq ft)	0.05	0.67
0.10				
Alpha	1.03	Stream Power (lb/ft s)	271.23	0.00
0.00				
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.
 Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth).
 Water surface set to critical depth.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:One

Reach	River Sta.	n1	n2	n3	n4	n5
River One	500	.04	.035	.04		
River One	475	.04	.035	.04		
River One	450	.04	.035	.04		
River One	425	.04	.035	.04		
River One	400	.04	.035	.04		
River One	375	.04	.035	.04		
River One	350	.04	.035	.04		
River One	325	.04	.035	.04		
River One	300	.04	.035	.04		
River One	275	.04	.035	.04		
River One	250	.04	.035	.04		
River One	225	.04	.035	.04		
River One	200	.04	.035	.04		
River One	175	.04	.04	.04		
River One	150	.04	.035	.04		
River One	125	.04	.035	.04	.035	.04
River One	100	.04	.035	.04	.035	.04

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River One	75	.04	.035	.04	.035	.04
River One	50	.04	.035	.04	.035	.04
River One	25	.04	.035	.04	.035	.04
River One	0.51	.04	.035	.04		

SUMMARY OF REACH LENGTHS

River: One

Reach	River Sta.	Left	Channel	Right
River One	500	25	25	25
River One	475	25	25	25
River One	450	25	25	25
River One	425	25	25	25
River One	400	25	25	25
River One	375	25	25	25
River One	350	25	25	25
River One	325	25	25	25
River One	300	25	25	25
River One	275	25	25	25
River One	250	25	25	25
River One	225	25	25	25
River One	200	25	25	25
River One	175	25	25	25
River One	150	25	25	25
River One	125	25	25	25
River One	100	25	25	25
River One	75	25	25	25
River One	50	25	25	25
River One	25	24.49	24.49	24.49
River One	0.51			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: One

Reach	River Sta.	Contr.	Expan.
River One	500	.1	.3
River One	475	.1	.3
River One	450	.1	.3
River One	425	.1	.3
River One	400	.1	.3
River One	375	.1	.3
River One	350	.1	.3
River One	325	.1	.3
River One	300	.1	.3
River One	275	.1	.3
River One	250	.1	.3
River One	225	.1	.3

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River One	200	.1	.3
River One	175	.1	.3
River One	150	.1	.3
River One	125	.1	.3
River One	100	.1	.3
River One	75	.1	.3
River One	50	.1	.3
River One	25	.1	.3
River One	0.51	.1	.3

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : Ex

River: One Reach: River One RS: 500 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 475 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 450 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 425 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 400 Profile: Q100

Warning: The energy equation could not be balanced within the specified number

of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 375 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 350 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 325 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 300 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 275 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

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program defaulted to critical depth.

River: One Reach: River One RS: 250 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 225 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 200 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 175 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: One Reach: River One RS: 150 Profile: Q100

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: One Reach: River One RS: 125 Profile: Q100

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Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: One Reach: River One RS: 100 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: One Reach: River One RS: 75 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: One Reach: River One RS: 50 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

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Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: One Reach: River One RS: 25 Profile: Q100

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: One Reach: River One RS: 0.51 Profile: Q100

Warning:Divided flow computed for this cross-section.

Warning:Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

1. The first part of the document is a letter from the President of the United States to the Congress, dated January 1, 1801. It is a very important document, as it is the first time that the President has addressed the Congress since the establishment of the office.

2. The second part of the document is a report from the Secretary of the Treasury, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the Treasury has reported to the Congress since the establishment of the office.

3. The third part of the document is a report from the Secretary of the Navy, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the Navy has reported to the Congress since the establishment of the office.

4. The fourth part of the document is a report from the Secretary of the War, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the War has reported to the Congress since the establishment of the office.

5. The fifth part of the document is a report from the Secretary of the Interior, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the Interior has reported to the Congress since the establishment of the office.

6. The sixth part of the document is a report from the Secretary of the State, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the State has reported to the Congress since the establishment of the office.

7. The seventh part of the document is a report from the Secretary of the War, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the War has reported to the Congress since the establishment of the office.

8. The eighth part of the document is a report from the Secretary of the Navy, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the Navy has reported to the Congress since the establishment of the office.

9. The ninth part of the document is a report from the Secretary of the Treasury, dated January 1, 1801. It is a very important document, as it is the first time that the Secretary of the Treasury has reported to the Congress since the establishment of the office.

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HEC-RAS HEC-RAS 5.0.3 September 2016

U.S. Army Corps of Engineers

Hydrologic Engineering Center

609 Second Street

Davis, California

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X      X  XXXXXX  XXXX      XXXX      XX      XXXX
X      X  X      X  X      X  X      X  X      X
X      X  X      X      X  X  X      X  X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X      X      X  X      X  X      X      X
X      X  X      X  X      X  X      X  X      X
X      X  XXXXXX  XXXX      X  X      X  X      XXXXX
    
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PROJECT DATA

Project Title: Scottsdale Fire DEC2018

Project File : ScottsdaleFireDEC.prj

Run Date and Time: 12/13/2018 8:35:40 AM

Project in English units

PLAN DATA

Plan Title: Proposed

Plan File : y:\16535 Scottsdale Fire Station 616\200 Correspondence\210

Correspondence\Drainage Info\12-13-2018\HEC-RAS\ScottsdaleFireDEC.p02

Geometry Title: Proposed

Geometry File : y:\16535 Scottsdale Fire Station 616\200

Correspondence\210 Correspondence\Drainage

Info\12-13-2018\HEC-RAS\ScottsdaleFireDEC.g02

Flow Title : Existing

Flow File : y:\16535 Scottsdale Fire Station 616\200

Correspondence\210 Correspondence\Drainage

Info\12-13-2018\HEC-RAS\ScottsdaleFireDEC.f01

Plan Summary Information:

Number of: Cross Sections	=	24	Multiple Openings	=	0
Culverts	=	2	Inline Structures	=	0
Bridges	=	0	Lateral Structures	=	0

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Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing

Flow File : y:\16535 Scottsdale Fire Station 616\200 Correspondence\210
Correspondence\Drainage Info\12-13-2018\HEC-RAS\ScottsdaleFireDEC.f01

Flow Data (cfs)

River	Reach	RS	Q100	Q10
Q2				
One	River One	650	94	45
25				

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
One	River One	Q100	
Normal S = 0.04			

GEOMETRY DATA

ScottsdaleFireDEC.rep

Geometry Title: Proposed

Geometry File : y:\16535 Scottsdale Fire Station 616\200 Correspondence\210

Correspondence\Drainage Info\12-13-2018\HEC-RAS\ScottsdaleFireDEC.g02

CROSS SECTION

RIVER: One

REACH: River One

RS: 650

INPUT

Description:

Station Elevation Data				num=	75				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3047.142	050003	30473.029999	3046.934	860001	3046.74	5.25	3046.68	
5.550003	3046.6211	150001	3046.2111	510001	3046.1711	730001	3046.1412	200001	3046.08
13.10001	3046.0313	510001	304614.15001	3045.9315	070001	3045.79	15.77	3045.67	
16.58	3045.6117	200001	3045.517	570001	3045.47	18.72	3045.31	20.67	3045
20.71001	3045	21.02	3044.9421	200001	3044.9125	310001	3044.15	26.25	3044
28.81001	3043.6	32.61	304334.51001	3042.71	34.83	3042.6638	700001	3042	
44.52	3041.2446	150001	304152.21001	3040.2253	900001	3040	59.87	3039.15	
60.94	303961.78001	3039	63.34	3038.9965	570001	3038.9966	570001	3039	
66.87	3039	80.69	3039.34	80.87	3039.34	82.51	3039.3786	740001	3039.43
92.16	3039.5397	000001	3039.59	99.08	3039.64	100	3039.65	102.62	3039.68
113.1	3039.97	114.24	3040	117.07	3040.06	118.16	3040.08	125.57	3040.18
129.08	3040.26	139.75	3040.4	139.88	3040.4	140.01	3040.41	141.19	3040.46
141.84	3040.5	142.41	3040.54	143.48	3040.63	143.82	3040.64	144.14	3040.66
147.59	3041	147.63	3041	149.99	3041.13	154.13	3041.36	156.01	3041.39
161.97	3041.52	163.89	3041.54	163.96	3041.54	166.47	3041.59	168.24	3041.61

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	59.87	.035	92.16	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	59.87	92.16		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3040.10	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.25	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3039.85	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3039.85	Flow Area (sq ft)	1.73	20.16

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3.11				
E.G. Slope (ft/ft)	0.018304	Area (sq ft)	1.73	20.16
3.11				
Q Total (cfs)	94.00	Flow (cfs)	4.29	84.59
5.12				
Top Width (ft)	53.88	Top Width (ft)	4.93	32.29
16.66				
Vel Total (ft/s)	3.76	Avg. Vel. (ft/s)	2.48	4.20
1.64				
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)	0.35	0.62
0.19				
Conv. Total (cfs)	694.8	Conv. (cfs)	31.7	625.3
37.8				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	4.98	32.31
16.67				
Min Ch El (ft)	3038.99	Shear (lb/sq ft)	0.40	0.71
0.21				
Alpha	1.15	Stream Power (lb/ft s)	0.99	2.99
0.35				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.02	0.29
0.05				
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	0.71
0.11				

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depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 625

INPUT

Description:

Station Elevation Data

num=

62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-----	------	-----	------	-----	------	-----	------

ScottsdaleFireDEC.rep

0	3048.67	5.75	3048.375	9.70001	3048.356	309998	3048.336	9.29993	3048.29
7.149994	3048.287	5.29999	3048.25	9.87999	3048	11.48	3047.72	15.45	3047
19.25999	3046.3321	0.99999	3046	24.92	3045.35	26.89	304528.00999		3044.8
32.50999	304435.79999		3043.43	38.2	3043	43.16	3042.13	43.87	3042
45.3	3041.7849	4.6999	3041	53.12	3040.4756	4.6999	3040	61.66	3039.23
63.27	303968.68999		3038.2270	1.8999	3038	71.34	3037.9978	0.3999	3037.83
83.99	3037.76	85.09	3037.7694	6.4999	3037.9495	2.4999	3037.9597	0.7999	3038
99.99999	3038.07	103.18	3038.15	105.26	3038.19	107.21	3038.21	110.74	3038.25
119.67	3038.24	126.7	3038.3	128.69	3038.33	131.77	3038.46	131.91	3038.48
132.59	3038.49	133.2	3038.51	133.62	3038.53	133.9	3038.54	134.07	3038.56
134.23	3038.57	136.56	3039	141.42	3039.48	146.6	3040	147.12	3040
151.76	3040.27	155.27	3040.35	160.28	3040.49	163.61	3040.57	163.77	3040.57
166.35	3040.61	167.76	3040.61						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0468	68.999	.035	105.26	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
68.68999		105.26		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3038.72	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.22	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3038.50	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3038.50	Flow Area (sq ft)	0.27	20.96
6.17				
E.G. Slope (ft/ft)	0.017980	Area (sq ft)	0.27	20.96
6.17				
Q Total (cfs)	94.00	Flow (cfs)	0.37	82.32
11.31				
Top Width (ft)	66.20	Top Width (ft)	1.95	36.57
27.67				
Vel Total (ft/s)	3.43	Avg. Vel. (ft/s)	1.34	3.93
1.83				
Max Chl Dpth (ft)	0.74	Hydr. Depth (ft)	0.14	0.57
0.22				
Conv. Total (cfs)	701.0	Conv. (cfs)	2.7	613.9
84.3				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	1.97	36.59
27.68				
Min Ch El (ft)	3037.76	Shear (lb/sq ft)	0.16	0.64
0.25				

ScottsdaleFireDEC.rep

Alpha	1.18	Stream Power (lb/ft s)	0.21	2.53
0.46				
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	0.01	0.28
0.05				
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	0.69
0.10				

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depth for the water surface and continued on with the calculations.

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the need for additional cross sections.

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water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 600

INPUT

Description:

Station Elevation Data		num= 64							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30493.550003	30493.639999	3048.993.660004	3048.996.490005	3048.73				
8.949997	3048.529.559998	3048.47	13.92	3048	15.31	3047.7519.50999	3047		
22.06999	3046.54	25.08	3046	29.34	3045.25	30.92	304531.70999	3044.87	
37.25	3044	40.21	3043.3	41.43	3043	43.92	3042.4	45.88	3042
47.74	3041.63	50.82	3041	54.84	3040.33	56.67	3040	58.9	3039.66
62.94	3039	66.09	3038.52	69.39	3038	72.27	3037.53	75.34	3037
80.57	3036.18	80.69	3036.17	80.78	3036.17	80.98	3036.16	81.31	3036.15
81.87	3036.11	82.25	3036.1	82.71	3036.09	83.41	3036.09	84.44	3036.1
93.89	3036.2	95.34	3036.21	100	3036.28	103.08	3036.32	108.51	3036.38
116.53	3036.49	125.64	3036.64	129.54	3036.83	132.33	3036.99	132.72	3037
133.12	3037.04	137.31	3037.61	140.31	3038	141.89	3038.31	142.71	3038.47
145.19	3038.9	145.77	3039	148.52	3039.14	152.24	3039.32	155.99	3039.4
162.76	3039.55	162.91	3039.55	165.74	3039.6	167.53	3039.61		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	80.57	.035	116.53	.04

ScottsdaleFireDEC.rep

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
80.57	116.53	25	25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3037.09	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.24	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3036.84	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3036.84	Flow Area (sq ft)	1.40	20.69
2.95				
E.G. Slope (ft/ft)	0.019533	Area (sq ft)	1.40	20.69
2.95				
Q Total (cfs)	94.00	Flow (cfs)	3.45	84.92
5.63				
Top Width (ft)	53.41	Top Width (ft)	4.23	35.96
13.23				
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)	2.47	4.10
1.91				
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.33	0.58
0.22				
Conv. Total (cfs)	672.6	Conv. (cfs)	24.7	607.6
40.3				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	4.28	35.96
13.23				
Min Ch El (ft)	3036.09	Shear (lb/sq ft)	0.40	0.70
0.27				
Alpha	1.11	Stream Power (lb/ft s)	0.98	2.88
0.52				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.01	0.27
0.04				
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	0.67
0.09				

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depth for the water surface and continued on with the calculations.

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ScottsdaleFireDEC.rep

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
REACH: River One RS: 575

INPUT

Description:

Station Elevation Data				num=	56
Sta	Elev	Sta	Elev	Sta	Elev
0	30496.860001	304910.57999	3048.5616.17999	304818.95999	3047.59
23.14999	3047	23.97	3046.8829.75999	3046	34.98
36.40999	304538.82999	3044.6	42.55	304443.52999	3043.847.02999
47.53999	3042.8851.18999	3042	53.27	3041.5	55.37
59.48	304060.03999	3039.8463.17999	3039	65.16	3038.39
69.92999	3037.0670.16999	3037	71.41	3036.73	72.2
75.59999	3036	79.31	3035.56	84.66	3035.5189.96999
97.48999	3035.1999.52999	3035.2199.99999	3035.21	111.04	3035.17
124.41	3035.18	125.53	3035.19	126.87	3035.21
137.03	3037	138.58	3037.15	145.51	3038
155.26	3038.4	161.85	3038.56	161.93	3038.56
165.4	3038.61			162.08	3038.57
				165.01	3038.61

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	84.66	.035	126.87	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	84.66	126.87		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3035.99	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.24	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3035.75	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3035.75	Flow Area (sq ft)	1.29	22.34
0.92				
E.G. Slope (ft/ft)	0.020887	Area (sq ft)	1.29	22.34
0.92				
Q Total (cfs)	94.00	Flow (cfs)	2.25	89.70

ScottsdaleFireDEC.rep

2.05				
Top Width (ft)	52.57	Top Width (ft)	6.94	42.21
3.43				
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)	1.75	4.01
2.22				
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)	0.19	0.53
0.27				
Conv. Total (cfs)	650.4	Conv. (cfs)	15.6	620.6
14.2				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	6.95	42.22
3.47				
Min Ch El (ft)	3035.17	Shear (lb/sq ft)	0.24	0.69
0.35				
Alpha	1.06	Stream Power (lb/ft s)	0.42	2.77
0.77				
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	0.01	0.26
0.04				
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.65
0.09				

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depth for the water surface and continued on with the calculations.

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CROSS SECTION

RIVER: One

REACH: River One

RS: 550

INPUT

Description:

Station Elevation Data		num=	81						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3047.976	270004	3047.056	650009	3047	7.12001	3046.94	13.94	3046
18.75	3045.3622	01001	304528.79001	3044.26	30.88	3044	36.02	3043.37	
39.10001	3043	44.22	3042.23	45.88	3042	47.73	3041.7151	31001	3041
52.56001	3040.76	55.76	3040.01	55.77	3040.0155	81001	3040	56.97	3039.74

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57.11	3039.7	57.2	3039.68	57.51	3039.61	59.5	3039	60.41	3038.77
63.14001	3038	64.84	3037.566	71001	303767.85001	3036.68		70.41	3036
71.64001	3035.64	73.84	3035	75.48	3034.76	75.98	3034.77	77.75	3034.78
79.47	3034.77	83.52	3034.67	93.94	3034.3898	100	3034.29	100	3034.28
100.39	3034.28	110.61	3034	111.47	3033.99	111.98	3033.99	112.85	3033.98
114.47	3033.97	116.47	3033.97	118.57	3033.96	121.76	3033.96	123.47	3033.97
124.5	3033.96	124.92	3033.97	126.17	3033.98	126.42	3033.98	126.87	3033.99
127.13	3033.99	127.64	3034	128.06	3034.11	128.71	3034.31	131.64	3035
135.71	3035.98	135.77	3036	135.91	3036.02	137.88	3036.13	139.51	3036.19
144.33	3037	145.1	3037.04	146.02	3037.07	146.88	3037.1	147.13	3037.11
147.3	3037.11	147.38	3037.12	147.44	3037.12	149.4	3037.18	149.68	3037.19
150.2	3037.22	157.62	3037.5	161.35	3037.61	161.5	3037.61	163.41	3037.64
164.66	3037.66								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0498	46001	.035	128.71	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	98.46001	128.71		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3034.99	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.26	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3034.73	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3034.73	Flow Area (sq ft)	3.92	20.30
0.37				
E.G. Slope (ft/ft)	0.017091	Area (sq ft)	3.92	20.30
0.37				
Q Total (cfs)	94.00	Flow (cfs)	7.11	86.27
0.61				
Top Width (ft)	49.22	Top Width (ft)	17.20	30.25
1.77				
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)	1.81	4.25
1.67				
Max Chl Dpth (ft)	0.77	Hydr. Depth (ft)	0.23	0.67
0.21				
Conv. Total (cfs)	719.0	Conv. (cfs)	54.4	659.9
4.7				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	17.21	30.30
1.81				
Min Ch El (ft)	3033.96	Shear (lb/sq ft)	0.24	0.71
0.22				

	ScottsdaleFireDEC.rep			
Alpha	1.15	Stream Power (lb/ft s)	0.44	3.04
0.36				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.01	0.25
0.04				
C & E Loss (ft)	0.01	Cum SA (acres)	0.05	0.63
0.08				

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depth for the water surface and continued on with the calculations.

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water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 525

INPUT

Description:

Station Elevation Data		num=	94
Sta	Elev	Sta	Elev
0	3044.77.8000031	3044.76.8700104	3044.76
1.700012	3044.861.860001	3044.871.910004	3044.871.990005
2.100006	3044.892.230011	3044.92.300003	3044.92.580002
2.980011	3044.943.360001	3044.953.470001	3044.964.080002
4.710007	3044.944.880005	3044.915.300003	3044.885.340012
5.860001	3044.86.060013	3044.787.040009	3044.637.710007
8.070007	3044.488.630005	3044.38	10.75
18.67001	3042.6	22.11	3042
34.40001	3040	36.12	3039.7240.67001
48.57001	3037.7353.08001	303754.29001	3036.7959.17001
60.76001	3035.7461.43001	3035.6565.85001	303566.99001
67.91	3034.6369.79001	303471.60001	3033.95
85.08001	3033.6289.07001	3033.6390.04001	3033.63
95.58001	3033.59	96.37	3033.58
104.01	3033.48	106.42	3033.44
125.64	3033.01	125.88	3033.02
134.99	3035	140.61	3035.97
146.61	3036.22	148	3036.26
160.1	3036.56	160.23	3036.57

ScottsdaleFireDEC.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 79.02 .035 129.75 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 79.02 129.75 25 25 25 .1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3034.15	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.24	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3033.91	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3033.91	Flow Area (sq ft)	0.36	23.75
E.G. Slope (ft/ft)	0.023577	Area (sq ft)	0.36	23.75
Q Total (cfs)	94.00	Flow (cfs)	0.40	93.60
Top Width (ft)	54.43	Top Width (ft)	4.04	50.38
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)	1.13	3.94
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)	0.09	0.47
Conv. Total (cfs)	612.2	Conv. (cfs)	2.6	609.6
Length Wtd. (ft)	25.00	Wetted Per. (ft)	4.04	50.50
Min Ch El (ft)	3033.01	Shear (lb/sq ft)	0.13	0.69
Alpha	1.02	Stream Power (lb/ft s)	0.15	2.73
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.01	0.23
0.04				
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	0.60
0.08				

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depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

ScottsdaleFireDEC.rep

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 500

INPUT

Description:

Station Elevation Data num= 61									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3042.36	559998	3042.29	6.98999	3042.297	610001	3042.258	2999988	3042.2
9.289993	3042.19	399994	3042.09	10.15999	3042.10	89999	3041.88	12.67	3041.55
15.09999	3041.18	06999	3040.47	20.14999	3040	22.08	3039.67	26.31999	3039
29.17999	3038.51	32.50999	3038.35	29999	3037.55	38.72	3037	42.02	3036.45
44.67999	3036	47.52	3035.53	51.45999	3035.57	84999	3034.13	58.48	3034.05
65.39999	3033.15	66.48	3033.66	49999	3032.99	68.06999	3032.98	74.42999	3032.83
87.42	3032.76	88.42	3032.63	89.50999	3032.63	91.38	3032.61	91.87	3032.61
97.99999	3032.56	99.20999	3032.57	99.99999	3032.58	102.63	3032.6	108.91	3032.52
114.01	3032.57	120.42	3032.65	123.04	3032.73	126.37	3032.83	129.05	3032.86
130.89	3033	131.06	3033	134.21	3033.46	137.83	3034	139.91	3034.3
144.33	3035	144.37	3035.01	145.15	3035.01	147.84	3035.18	149.58	3035.21
158.01	3035.4	158.1	3035.4	162.5	3035.43	166.85	3035.41	166.99	3035.4
167.76	3035.39								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.0468	06999	.035	130.89	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	68.06999	130.89	25	25	25	.1		.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3033.31	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.20	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3033.11	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3033.11	Flow Area (sq ft)	0.24	25.99
0.06				
E.G. Slope (ft/ft)	0.023359	Area (sq ft)	0.24	25.99
0.06				

ScottsdaleFireDEC.rep				
Q Total (cfs)	94.00	Flow (cfs)	0.30	93.64
0.06				
Top Width (ft)	66.14	Top Width (ft)	2.39	62.82
0.93				
Vel Total (ft/s)	3.57	Avg. Vel. (ft/s)	1.24	3.60
0.92				
Max Chl Dpth (ft)	0.59	Hydr. Depth (ft)	0.10	0.41
0.07				
Conv. Total (cfs)	615.0	Conv. (cfs)	2.0	612.7
0.4				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	2.40	62.84
0.94				
Min Ch El (ft)	3032.52	Shear (lb/sq ft)	0.15	0.60
0.09				
Alpha	1.01	Stream Power (lb/ft s)	0.18	2.17
0.09				
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.01	0.22
0.04				
C & E Loss (ft)	0.00	Cum SA (acres)	0.04	0.57
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 475

INPUT

Description:

Station Elevation Data		num= 58							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3040.013	029999	3040.015	509995	304014.570	01	3039.09	15.38	3039
15.69	3038.97	16.5	3038.89	19	3038.59	19.55	3038.53	20.36	3038.43
21.78999	3038.25	22.27	3038.19	23.64	3038	23.78	3037.98	25.14	3037.78

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30.03999	303732.49001	3036.62	36.45	3036	43.07	3035.09	43.74	3035
44.94	3034.84	51.11	3034	56.46	3033.26	58.44	3033	60.81
63.54	3032.86	64.32	3033	64.72	3031.91	65.32	3031.27	65.773031.241
68.85	3031.04	69.79	3031.03	83.37	3031.07	87.56	3030.91	99.87 3031.19
100	3031.2	124.88	3031.81	125.46	3031.94	125.99	3032	126.01 3031.98
126.1	3031.98	126.39	3032	126.55	3032	126.62	3032	129.19 3032.66
130.7	3033	131.46	3033.07	142.74	3034	142.8	3034.02	142.84 3034.02
143.36	3034.03	143.58	3034.03	148.11	3034.28	150.94	3034.35	157.91 3034.51
158.02	3034.52	160.45	3034.55	162.25	3034.56			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	65.77	.035	126.55	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	65.77	126.55		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3031.87	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.24	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3031.64	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3031.64	Flow Area (sq ft)	0.23	23.95
E.G. Slope (ft/ft)	0.023788	Area (sq ft)	0.23	23.95
Q Total (cfs)	94.00	Flow (cfs)	0.53	93.47
Top Width (ft)	52.85	Top Width (ft)	0.79	52.05
Vel Total (ft/s)	3.89	Avg. Vel. (ft/s)	2.25	3.90
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)	0.30	0.46
Conv. Total (cfs)	609.5	Conv. (cfs)	3.4	606.0
Length Wtd. (ft)	25.00	Wetted Per. (ft)	0.95	52.07
Min Ch El (ft)	3030.91	Shear (lb/sq ft)	0.37	0.68
Alpha	1.00	Stream Power (lb/ft s)	0.82	2.67
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	0.01	0.20
0.04				

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 C & E Loss (ft) 0.00 Cum SA (acres) 0.04 0.54
 0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
 REACH: River One RS: 450

INPUT

Description:

Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3038.38	5900116	3038.331	309998	3038.252	190002	3038.153	529999	3038
7.330002	3037.2312	10001	3036.77	14.39	3036.7	19.83	3036	21.72	3035.77
28.31	303530.68001	3034.73	30.95	3034.7131	28001	3034.6931	82001	3034.66	
34.8	3034.53	36.97	3034.4437	56001	3034.4	38.16	3034.36	38.41	3034.35
39.19	3034.2839	39001	3034.2741	18001	3034.1	41.26	3034.1	42.23	3034
42.88	3033.8949	21001	303352.74001	3032.8752	89001	3032.8759	89001	3032.49	
62.71001	303363.39001	3031.13	63.77	3029.25	64.65	3029.2566	10001	3029.25	
71.35001	302999.53001	3029.44	106.92	3029.49	118.28	3029.58	124.46	3030.892	
125.72	3031.16	133.37	3032	133.42	3031.96	133.64	3031.78	133.67	3031.75
133.95	3031.84	138.63	3032.41	138.72	3032.41	139.7	3032.44	143.95	3032.77
153.37	3032.92	153.74	3032.93	154.01	3032.94	158.26	3033	158.63	3033

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	64.65	.035	124.46	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	64.65	124.46		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

ScottsdaleFireDEC.rep

E.G. Elev (ft)	3029.99	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3029.76	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3029.76	Flow Area (sq ft)	0.47	24.09
E.G. Slope (ft/ft)	0.024379	Area (sq ft)	0.47	24.09
Q Total (cfs)	94.00	Flow (cfs)	1.34	92.66
Top Width (ft)	55.46	Top Width (ft)	0.98	54.48
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)	2.82	3.85
Max Chl Dpth (ft)	0.76	Hydr. Depth (ft)	0.48	0.44
Conv. Total (cfs)	602.0	Conv. (cfs)	8.6	593.4
Length Wtd. (ft)	25.00	Wetted Per. (ft)	1.40	54.51
Min Ch El (ft)	3029.00	Shear (lb/sq ft)	0.52	0.67
Alpha	1.00	Stream Power (lb/ft s)	1.46	2.59
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	0.01	0.19
0.04				
C & E Loss (ft)	0.03	Cum SA (acres)	0.04	0.51
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than

1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.

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CROSS SECTION

RIVER: One
 REACH: River One RS: 425

INPUT

Description:

Station Elevation Data		num= 51		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
0	3032.37	10.83	3032.47	11.60	001	3032.39	26.37	001	3032.52	6.84	001
27.38	3033.85	31.71	001	3033.1	39.8	3033.17	39.85	001	3033.17	45.50	001
52.42	001	3032.39	52.49	001	3032.39	56.59	3032.23	56.63	3032.23	58.49	001
60.3	3032.45	63.35	001	3033.63	85.00	1	3030.57	64.38	3028.65	68.00	13027.827
66.64	001	3027.7	71.16	3027.45	100	3027.67	111.85	3027.76	113.31	3027.76	
114.16	3028.14	116.13	3028.35	122.73	3029.83	124.41	3030	124.63	3030.026		
132.47	3030.97	140.3	3031.92	141.06	3032	141.07	3031.99	141.57	3031.57		
141.84	3031.66	142.83	3031.75	143.17	3031.8	143.35	3031.82	143.87	3031.86		
144.16	3031.86	144.85	3031.87	145.78	3031.88	155.67	3031.99	155.79	3031.99		
156.34	3032	156.86	3032	160.96	3032.02	161.28	3032.02	166.09	3032.01		
166.21	3032										

Manning's n Values		num= 3		Sta n Val		Sta n Val	
0	.0465	68.00	1	.035	124.63	.04	

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
65.68	001	124.63	18.78	18.78	18.78	.1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3028.40	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.14	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3028.26	Reach Len. (ft)	18.78	18.78
18.78				
Crit W.S. (ft)		Flow Area (sq ft)	0.45	31.02
E.G. Slope (ft/ft)	0.009402	Area (sq ft)	0.45	31.02
Q Total (cfs)	94.00	Flow (cfs)	0.70	93.30
Top Width (ft)	50.91	Top Width (ft)	1.35	49.56
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)	1.57	3.01

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Max Chl Dpth (ft)	0.80	Hydr. Depth (ft)	0.33	0.63
Conv. Total (cfs)	969.5	Conv. (cfs)	7.3	962.2
Length Wtd. (ft)	18.78	Wetted Per. (ft)	1.57	49.66
Min Ch El (ft)	3027.45	Shear (lb/sq ft)	0.17	0.37
Alpha	1.01	Stream Power (lb/ft s)	0.26	1.10
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01	0.17
0.04				
C & E Loss (ft)	0.03	Cum SA (acres)	0.04	0.48
0.08				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: One
REACH: River One RS: 406.22

INPUT

Description:

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3032.343	740005	3032.5	58.04	3032.562	35001	3032.74	63.15	3032.53
66.98	303367.21	001	3031.94	67.94	3027.59	73.88	3027.21	74.8	3027.09
89.04	3026.319	4.17	3026.14	100	3026.14	104.2	3026.36	110.16	3028.99
110.24	3029	110.35	3029	111.76	3031.67	114.65	3031.54	128.29	3030
132.84	3030	134.7	3030.73	141.88	3030.88	143	3030.89	147.86	3031.17
147.9	3031.17	149.42	3031.19	152.27	3031.21	153.71	3031.23	161.29	3031.31
161.32	3031.31	161.98	3031.3	163.02	3031.31				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	163.02	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	163.02	111.11	111.11	.1	.3

CROSS SECTION OUTPUT Profile #Q100

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E.G. Elev (ft)	3028.33	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.03	Wt. n-Val.		0.035
W.S. Elev (ft)	3028.30	Reach Len. (ft)	111.11	111.11
111.11				
Crit W.S. (ft)	3027.11	Flow Area (sq ft)		65.32
E.G. Slope (ft/ft)	0.000634	Area (sq ft)		65.32
Q Total (cfs)	94.00	Flow (cfs)		94.00
Top Width (ft)	40.77	Top Width (ft)		40.77
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)		1.44
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		1.60
Conv. Total (cfs)	3732.7	Conv. (cfs)		3732.7
Length Wtd. (ft)	111.11	Wetted Per. (ft)		41.83
Min Ch El (ft)	3026.14	Shear (lb/sq ft)		0.06
Alpha	1.00	Stream Power (lb/ft s)		0.09
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	0.15
0.04				
C & E Loss (ft)		Cum SA (acres)	0.04	0.46
0.08				

CULVERT

RIVER: One
 REACH: River One RS: 375

INPUT

Description:
 Distance from Upstream XS = .05
 Deck/Roadway Width = 68
 Weir Coefficient = 2.6
 Upstream Deck/Roadway Coordinates
 num= 2

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Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
0 3031.5 3024	250 3031.5 3024

Upstream Bridge Cross Section Data

Station Elevation Data		num=	33
Sta	Elev	Sta	Elev
0	3032.343.740005	3032.5	58.04 3032.562.35001
66.98	303367.21001	3031.94	67.94 3027.59 73.88 3027.21
89.04	3026.3194.17001	3026.14	100 3026.14 104.2 3026.36
110.24	3029 110.35	3029	111.76 3031.67 114.65 3031.54
132.84	3030 134.7	3030.73	141.88 3030.88 143 3030.89
147.9	3031.17 149.42	3031.19	152.27 3031.21 153.71 3031.23
161.32	3031.31 161.98	3031.3	163.02 3031.31

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.04	0	.035 163.02
			.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	163.02	.1	.3

Downstream Deck/Roadway Coordinates

num=	2
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
0 3031.5 3024	250 3031.5 3024

Downstream Bridge Cross Section Data

Station Elevation Data		num=	47
Sta	Elev	Sta	Elev
0	3032.5	66.75	3032.5
88.13	3031.901	104.94	3030.7
107.4	3025.79	107.43	3025.79
124.43	3025.79	129.22	3025.83
137.98	3025.85	139.73	3025.84
157.62	3025.79	158.51	3025.76
173.74	3025.89	173.88	3025.89
192.14	3026.88	192.41	3026.89
196.9	3026.9	206.55	3026.9
212.86	3026.91	215.42	3026.83

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.04	88.1	.035 191.24
			.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
88.1	191.24	.1	.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical

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Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Circular 3
 FHWA Chart # 1 - Concrete Pipe Culvert
 FHWA Scale # 1 - Square edge entrance with headwall
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef
 .05 68 .012 .012 0 .5

1

Number of Barrels = 5
 Upstream Elevation = 3026.14
 Centerline Stations
 Sta. Sta. Sta. Sta. Sta.
 80 85 90 95 100
 Downstream Elevation = 3025.8
 Centerline Stations
 Sta. Sta. Sta. Sta. Sta.
 110 115 120 125 130

CULVERT OUTPUT Profile #Q100 Culv Group: Culvert #1

Q Culv Group (cfs)	94.00	Culv Full Len (ft)	
# Barrels	5	Culv Vel US (ft/s)	5.87
Q Barrel (cfs)	18.80	Culv Vel DS (ft/s)	6.66
E.G. US. (ft)	3028.33	Culv Inv El Up (ft)	3026.14
W.S. US. (ft)	3028.30	Culv Inv El Dn (ft)	3025.80
E.G. DS (ft)	3026.37	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	3026.18	Culv Exit Loss (ft)	1.38
Delta EG (ft)	1.96	Culv Entr Loss (ft)	0.27
Delta WS (ft)	2.12	Q Weir (cfs)	
E.G. IC (ft)	3028.13	Weir Sta Lft (ft)	
E.G. OC (ft)	3028.33	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	3027.53	Weir Max Depth (ft)	
Culv WS Outlet (ft)	3027.06	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.26	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.39	Min El Weir Flow (ft)	3031.51

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Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.

Note: The flow in the culvert is entirely supercritical.

CROSS SECTION

RIVER: One

REACH: River One

RS: 325

INPUT

Description:

Station Elevation Data		num=		47					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3032.5	66.75	3032.5	82.13	3032.3	82.41	3032.3	82.64	3032.29
88.13	3031.90	104.94	3030.7	104.99	3030.46	106.9	3026.73	107.34	3025.64
107.4	3025.79	107.43	3025.79	107.83	3025.69	108.88	3025.69	110.24	3025.7
124.43	3025.79	129.22	3025.83	132.69	3025.83	133.69	3025.84	134.64	3025.85
137.98	3025.85	139.73	3025.84	141.68	3025.83	142.75	3025.82	145.14	3025.8
157.62	3025.79	158.51	3025.76	161.98	3025.72	171.61	3025.82	172.63	3025.85
173.74	3025.89	173.88	3025.89	175.92	3026	191.24	3026.84	191.82	3026.87
192.14	3026.88	192.41	3026.89	192.9	3026.89	193.02	3026.9	196.77	3026.89
196.9	3026.9	206.55	3026.9	207.21	3026.91	207.74	3026.92	212.54	3026.92
212.86	3026.91	215.42	3026.83						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	88.1	.035	191.24	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	88.1	191.24		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3026.37	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.19	Wt. n-Val.		0.035
W.S. Elev (ft)	3026.18	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3026.18	Flow Area (sq ft)		26.67
E.G. Slope (ft/ft)	0.026127	Area (sq ft)		26.67
Q Total (cfs)	94.00	Flow (cfs)		94.00

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Top Width (ft)	71.98	Top Width (ft)		71.98
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.52
Max Chl Dpth (ft)	0.53	Hydr. Depth (ft)		0.37
Conv. Total (cfs)	581.5	Conv. (cfs)		581.5
Length Wtd. (ft)	25.00	Wetted Per. (ft)		72.47
Min Ch El (ft)	3025.64	Shear (lb/sq ft)		0.60
Alpha	1.00	Stream Power (lb/ft s)		2.12
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.01	0.15
0.04				
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	0.31
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 300

INPUT

Description:

Station Elevation Data		num=		52							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3032.575	100.01	3032.5	81.94	3032.42	89.21	3032.23	95.83	3032.12		
104.5	3031.54	104.71	3030.44	104.8	3030.1	106.79	3024.98	106.81	3025.02		
106.83	3025.07	109.15	3025.28	109.29	3025.25	114.29	3025.241	114.83	3025.24		
122.56	3025.22	128.4	3025.24	128.81	3025.24	132.29	3025.22	133.16	3025.22		
137.8	3025.17	141.33	3025.17	142.21	3025.18	142.41	3025.18	151.56	3025.19		
161.51	3025.11	163.65	3025.11	163.77	3025.1	173.08	3025	176.13	3024.98		
179.55	3024.98	180.38	3024.99	181.38	3025	182.37	3025.01	182.65	3025.01		
184.52	3025.02	185.17	3025.02	187.18	3025	190.15	3025	191.11	3025.09		

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191.55	3025.1	191.69	3025.1	191.86	3025.11	195.7	3025.34	198.09	3025.44
199.4	3025.49	199.75	3025.5	207.63	3025.85	209.33	3025.93	213.59	3025.93
214.27	3025.96	214.86	3025.96						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	114.29	.035	199.4	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	114.29	199.4		25 25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3025.63	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.16	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3025.47	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3025.47	Flow Area (sq ft)	1.91	27.70
E.G. Slope (ft/ft)	0.025773	Area (sq ft)	1.91	27.70
Q Total (cfs)	94.00	Flow (cfs)	4.35	89.65
Top Width (ft)	92.31	Top Width (ft)	7.69	84.62
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	2.28	3.24
Max Chl Dpth (ft)	0.49	Hydr. Depth (ft)	0.25	0.33
Conv. Total (cfs)	585.5	Conv. (cfs)	27.1	558.5
Length Wtd. (ft)	25.00	Wetted Per. (ft)	8.10	84.63
Min Ch El (ft)	3024.98	Shear (lb/sq ft)	0.38	0.53
Alpha	1.02	Stream Power (lb/ft s)	0.86	1.70
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.01	0.13
0.04				
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.27
0.08				

Warning: The energy equation could not be balanced within the specified number of

iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
 REACH: River One RS: 275

INPUT

Description:

Station Elevation Data		num= 58	
Sta	Elev	Sta	Elev
0	3032.552.07999	3032.5	52.42 3032.24
71.73999	3030.8672.32999	3027.4472.75999	3025.66 73.31 3024.2773.31999 3024.29
74.67999	3024.3676.21999	3024.5379.25999	3024.53 83.34 3024.5188.56999 3024.48
89.16999	3024.47 90.37	3024.45 91.05	3024.4391.78999 3024.41 96.31 3024.25
98.95999	3024.2399.67999	3024.2 100.45	3024.17 101.32 3024.15 102 3024.14
102.75	3024.12 103.49	3024.11 103.62	3024.11 105.92 3024.08 107.81 3024.05
109.91	3024 109.98	3024 119.91	3023.73 122 3023.69 123.86 3023.67
124.73	3023.67 126.59	3023.68 130.68	3023.73 134.54 3023.7 145.63 3024
146.61	3024.01 146.93	3024.01 152.87	3024.06 159.19 3024.06 159.87 3024.05
160.7	3024.05 162.35	3024.06 163.7	3024.07 164.82 3024.07 165.98 3024.1
166.38	3024.1 171.07	3024.17 175.18	3024.22 177.68 3024.24 182.15 3024.33
183.3	3024.35 184.27	3024.37 187.4	3024.39

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.0476.21999	.035	184.27 .04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76.21999	184.27		25 25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3024.49	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.17	Wt. n-Val.	0.040	0.035

ScottsdaleFireDEC.rep				
W.S. Elev (ft)	3024.32	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3024.32	Flow Area (sq ft)	0.01	28.81
E.G. Slope (ft/ft)	0.025893	Area (sq ft)	0.01	28.81
Q Total (cfs)	94.00	Flow (cfs)	0.00	94.00
Top Width (ft)	87.91	Top Width (ft)	0.61	87.30
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)	0.36	3.26
Max Chl Dpth (ft)	0.65	Hydr. Depth (ft)	0.02	0.33
Conv. Total (cfs)	584.2	Conv. (cfs)	0.0	584.1
Length Wtd. (ft)	25.00	Wetted Per. (ft)	0.65	87.32
Min Ch El (ft)	3023.67	Shear (lb/sq ft)	0.02	0.53
Alpha	1.00	Stream Power (lb/ft s)	0.01	1.74
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	0.01	0.12
0.04				
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	0.22
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 250

ScottsdaleFireDEC.rep

INPUT

Description:

Station Elevation Data				num=	71				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3032.5	20.89	3032.5	22.28	3032.48	23.39	3032.49	26.93	3032.5
39.20	3032.5	52.06	3031.94	55.62	3031.3	56.22	3031.12	63.73	3029.95
68.39	3029.25	68.59	3029.32	70.37	3029.43	70.79	3026.88	71.23	3024.48
71.28	3024.17	71.39	3023.54	73.73	3023.65	77.17	3023.67	80.93	3023.65
84.35	3023.68	91.05	3023.59	93.16	3023.57	95.60	3023.52	104.57	3023.13
104.77	3023.12	105.13	3023.11	105.29	3023.1	105.44	3023.09	105.93	3023.07
107.53	3023	119.21	3022.48	130.16	3022.02	130.82	3022	138.89	3022
139.53	3022.05	143.45	3022.27	145.71	3022.4	146.59	3022.46	146.9	3022.48
151.47	3022.74	154.61	3022.93	155.11	3022.96	155.93	3023	158.17	3023.01
160.97	3023.01	163.18	3023.05	170.9	3023.13	171.88	3023.1	171.92	3023.11
172.85	3023.09	173.85	3023.09	174.62	3023.1	175.64	3023.1	176.67	3023.11
177.04	3023.12	178.09	3023.13	178.43	3023.14	178.84	3023.16	179.92	3023.18
181.79	3023.29	182.86	3023.32	183.86	3023.36	184.78	3023.39	185.6	3023.43
186.31	3023.46	186.86	3023.49	192.54	3024	198.17	3024	199.6	3023.96
200.26	3023.95								

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	93.16	.035	160.97	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	93.16	160.97		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3023.14	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.27	Wt. n-Val.		0.035
W.S. Elev (ft)	3022.88	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3022.88	Flow Area (sq ft)		22.72
E.G. Slope (ft/ft)	0.022552	Area (sq ft)		22.72
Q Total (cfs)	94.00	Flow (cfs)		94.00
Top Width (ft)	43.40	Top Width (ft)		43.40
Vel Total (ft/s)	4.14	Avg. Vel. (ft/s)		4.14
Max Chl Dpth (ft)	0.88	Hydr. Depth (ft)		0.52

ScottsdaleFireDEC.rep				
Conv. Total (cfs)	625.9	Conv. (cfs)	625.9	
Length Wtd. (ft)	25.00	Wetted Per. (ft)	43.45	
Min Ch El (ft)	3022.00	Shear (lb/sq ft)	0.74	
Alpha	1.00	Stream Power (lb/ft s)	3.05	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	0.01	0.10
0.04				
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.18
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 225

INPUT

Description:

Station Elevation Data num= 96									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3032.35	7.76001	3032.289	040009	3032.1	12.86	3032.1913	51001	3032.19
23.19	3032.2324	90001	3032.08	36.56	3031	36.58	3031.98	36.64	3032
37.22	3032	37.3	3031.33	37.34	303138.68001		303138.74001		3030.07
38.88	3028.65	41.59	302847.87001		3028	48.97	3027.74	52.08	3027
63.29001	3027	63.31	3028.4264	49001	3028.4665	90001	3028.37	66.41	3025.52
66.42	3025.49	66.45	3025.31	66.67	3023.9666	90001	3022.53	71.94	3022.53
77.96001	3022.57	84.05	3022.58	88.34	3022.62	89.47	3022.63	89.91	3022.63
91.15	3022.6592	81001	3022.63	94.69	3022.6	94.98	3022.6	97.12	3022.51
97.34	3022.51	97.61	3022.5	97.87	3022.49	107.72	3022	110.97	3021.84
114.26	3021.68	127.55	3021	130.92	3021	131.23	3021.01	131.55	3021
131.73	3021	132.7	3021.01	133.27	3021.01	146.21	3021.77	148.39	3021.89
150.91	3022	151.17	3022.01	153.54	3022.09	154.67	3022.12	154.72	3022.13
156.71	3022.18	158.34	3022.22	159.1	3022.23	160.58	3022.25	162.14	3022.27
163.69	3022.28	166.75	3022.28	169.24	3022.26	169.32	3022.26	171.03	3022.24

ScottsdaleFireDEC.rep

171.16	3022.23	171.34	3022.23	181.29	3022.06	181.37	3022.06	181.84	3022.05
182.19	3022.05	182.61	3022.06	185.08	3022	185.9	3021.97	188.03	3021.96
189.7	3021.96	195.13	3022	195.4	3022.03	196.35	3022.1	200.76	3022.42
209.27	3023	211.47	3023.16	211.56	3023.16	213.62	3023.03	213.79	3023.03
214.35	3023.02	214.46	3023.02	215.65	3023	215.74	3023	215.89	3022.97
218.16	3022.54								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0492	81001	.035	162.14	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	92.81001	162.14		25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3022.24	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.27	Wt. n-Val.		0.035
0.040				
W.S. Elev (ft)	3021.97	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3021.97	Flow Area (sq ft)		22.65
0.03				
E.G. Slope (ft/ft)	0.021719	Area (sq ft)		22.65
0.03				
Q Total (cfs)	94.00	Flow (cfs)		93.99
0.01				
Top Width (ft)	47.05	Top Width (ft)		41.89
5.16				
Vel Total (ft/s)	4.14	Avg. Vel. (ft/s)		4.15
0.19				
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)		0.54
0.01				
Conv. Total (cfs)	637.8	Conv. (cfs)		637.8
0.0				
Length Wtd. (ft)	25.00	Wetted Per. (ft)		41.94
5.16				
Min Ch El (ft)	3021.00	Shear (lb/sq ft)		0.73
0.01				
Alpha	1.00	Stream Power (lb/ft s)		3.04
0.00				
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.01	0.09
0.04				
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	0.16
0.08				

ScottsdaleFireDEC.rep

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 200

INPUT

Description:

Station Elevation Data

num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3029	21.53	3029	21.56	3029.1	21.83	3030	24.75	3030
24.84	3029.125	04001	302734.23001	302736.46001	3026.48	37.63	3026.19		
38.3	3026	51.03	302651.04001	3026.71	52.66	3027.38	52.72	3027.36	
53.65001	3027.353	76001	3026.68	53.77	3026.63	53.83	3026.2553	99001	3025.27
54.62001	3021.3955	74001	3021.4361	07001	3021.45	67.78	3021.51	73.5	3021.56
77.72	3021.61	79.28	3021.61	80.84	3021.682	57001	3021.5783	32001	3021.57
83.91	3021.56	91.42	3021.24	91.77	3021.23	92.14	3021.21	92.5	3021.2
92.84	3021.19	96.62	3021	104.76	3021	113.24	3020.99	116.22	3020.99
121.73	3020.19	121.92	3020.19	122.22	3020.2	122.84	3020.23	123.86	3020.27
124.6	3020.31	126.73	3020.4	137.15	3020.84	138.86	3020.9	140.26	3020.93
140.3	3020.93	144.74	3021	145	3021	147.38	3021.05	147.52	3021.05
150.74	3021.1	153.72	3021.12	153.98	3021.12	154.25	3021.13	167.29	3021.04
167.59	3021.04	174.85	3021.03	174.93	3021.03	175.85	3021.02	176.87	3021.01
177.51	3021	177.95	3020.99	189.06	3020.81	196.01	3020.71	200.24	3020.69
208.13	3021.74	208.87	3021.72	212.11	3022.02	221.66	3022.03		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	77.72	.035	208.13	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	77.72	208.13	25	25	25		.1	.3

CROSS SECTION OUTPUT Profile #Q100

ScottsdaleFireDEC.rep				
E.G. Elev (ft)	3021.31	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.16	Wt. n-Val.		0.035
W.S. Elev (ft)	3021.16	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3021.16	Flow Area (sq ft)		29.63
E.G. Slope (ft/ft)	0.032258	Area (sq ft)		29.63
Q Total (cfs)	94.00	Flow (cfs)		94.00
Top Width (ft)	110.26	Top Width (ft)		110.26
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)		3.17
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)		0.27
Conv. Total (cfs)	523.4	Conv. (cfs)		523.4
Length Wtd. (ft)	25.00	Wetted Per. (ft)		110.37
Min Ch El (ft)	3020.19	Shear (lb/sq ft)		0.54
Alpha	1.00	Stream Power (lb/ft s)		1.72
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	0.01	0.07
0.04				
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	0.11
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

ScottsdaleFireDEC.rep

RIVER: One
REACH: River One

RS: 175

INPUT

Description:

Station Elevation Data num= 62									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3026.03	30.92	3025.43	41.01	3025.27	41.11	3025.35	41.59	3025.76
41.88	3025.76	43.47	3025.73	49.01	3025.65	52.92	3023.6	53.8	3023.87
54.29	3019.88	54.45	3018.59	54.69	3018.55	56.85	3018.22	57.98	3018.02
60.39	3018.03	64.25	3018.24	65.43	3018.77	67.31	3020.68	71.01	3020
69.17	3022	80.56	3021.32	90.76	3020.75	100.06	3020.65	105.88	3021.02
108.47	3020.98	110.75	3021.05	116.09	3021.85	118.45	3018.74	120.72	3018.78
125.19	3018.85	127.24	3021.58	127.79	3021.61	130.84	3021.24	137.39	3020
138.77	3020	138.91	3020.01	139.88	3020.01	139.96	3020.02	144.7	3020.04
145.96	3020.06	154.27	3020.1	154.46	3020.1	154.72	3020.11	154.93	3020.11
168.07	3020.13	168.36	3020.13	170.12	3020.12	179.96	3020.85	187.67	3020.41
188.92	3020.33	194.52	3021.22	200.1	3022.01	200.47	3022.14	201.14	3022.11
210.9	3022.02	214.61	3021.98	215.85	3022.01	217.8	3021.99	218.38	3021.75
219.1	3021.47	229.3	3021.24						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	54.69	.035	229.3	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.69	229.3		2.56	2.56		.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3019.84	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.43	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3019.41	Reach Len. (ft)	2.56	2.56
2.56				
Crit W.S. (ft)	3019.38	Flow Area (sq ft)	0.24	17.71
E.G. Slope (ft/ft)	0.018640	Area (sq ft)	0.24	17.71
Q Total (cfs)	94.00	Flow (cfs)	0.46	93.54
Top Width (ft)	19.72	Top Width (ft)	0.34	19.38
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	1.89	5.28
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)	0.71	0.91

ScottsdaleFireDEC.rep

Conv. Total (cfs)	688.5	Conv. (cfs)	3.4	685.2
Length Wtd. (ft)	2.56	Wetted Per. (ft)	1.07	20.35
Min Ch El (ft)	3018.02	Shear (lb/sq ft)	0.26	1.01
Alpha	1.01	Stream Power (lb/ft s)	0.50	5.35
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.06
0.04				
C & E Loss (ft)	0.10	Cum SA (acres)	0.03	0.08
0.08				

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than

1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: One

REACH: River One

RS: 172.41

INPUT

Description:

Station Elevation Data				num=	52				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3026.02	26.00	3025.5	41.72	3025.24	41.87	3025.38	42.3	3025.73
42.73	3025.73	45.15	3025.69	49.72	3025.62	54.33	3023.21	54.63	3023.3
55.25	3018.23	55.27	3018.07	58.33	3017.24	58.73	3017.24	59.56	3017.24
64.41	3017.76	65.92	3018.43	68.33	3020.68	69.00	3020.69	69.10	3022.69
72.40	3022.51	72.19	3021.52	98.92	3021.49	112.62	3022.42	113.96	3022.42
114.89	3022.67	115.79	3022.81	119.39	3018.07	122.89	3017.24	125.43	3018.15
128.76	3022.57	128.88	3022.57	129.82	3022.48	132.51	3022	133.88	3021.68
140.35	3020	143.67	3020	145.67	3020.12	146.22	3020.11	156.68	3020.28
169.2	3020.34	177.93	3021.06	180.81	3020.88	186.08	3020.55	195	3022.04
203.95	3022.25	204.31	3022.24	204.44	3022.24	207.31	3022.2	207.4	3022.16
208.51	3021.69	229.02	3021.22						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	54.33	.035	128.88	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
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54.33 128.88 ScottsdaleFireDEC.rep 55.03 55.3 55.03 .1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3019.73	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.10	Wt. n-Val.		0.035
W.S. Elev (ft)	3019.63	Reach Len. (ft)	55.03	55.30
55.03				
Crit W.S. (ft)	3018.62	Flow Area (sq ft)		36.35
E.G. Slope (ft/ft)	0.002226	Area (sq ft)		36.35
Q Total (cfs)	94.00	Flow (cfs)		94.00
Top Width (ft)	21.01	Top Width (ft)		21.01
Vel Total (ft/s)	2.59	Avg. Vel. (ft/s)		2.59
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)		1.73
Conv. Total (cfs)	1992.2	Conv. (cfs)		1992.2
Length Wtd. (ft)	55.30	Wetted Per. (ft)		24.78
Min Ch El (ft)	3017.24	Shear (lb/sq ft)		0.20
Alpha	1.00	Stream Power (lb/ft s)		0.53
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	0.06
0.04				
C & E Loss (ft)		Cum SA (acres)	0.03	0.07
0.08				

CULVERT

RIVER: One
 REACH: River One RS: 150

INPUT

Description:

Distance from Upstream XS = 2.5
 Deck/Roadway Width = 48

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Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	3022.4	3016	250	3022.4	3016

Upstream Bridge Cross Section Data

Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3026.02	26001	3025.5	41.72	3025.24	41.87	3025.38	42.3	3025.73
42.73	3025.73	45.15	3025.69	49.72	3025.62	54.33	3023.21	54.63	3023.3
55.25	3018.23	55.27	3018.07	58.33	3017.24	58.73	3017.24	59.56	3017.24
64.41	3017.76	65.92	3018.43	68.33	3020.68	68.49	3020.69	69.10	3022.69
72.40	3022.51	71.79	3021.52	98.92	3021.49	112.62	3022.42	113.96	3022.42
114.89	3022.67	115.79	3022.81	119.39	3018.07	122.89	3017.24	125.43	3018.15
128.76	3022.57	128.88	3022.57	129.82	3022.48	132.51	3022	133.88	3021.68
140.35	3020	143.67	3020	145.67	3020.12	146.22	3020.11	156.68	3020.28
169.2	3020.34	177.93	3021.06	180.81	3020.88	186.08	3020.55	195	3022.04
203.95	3022.25	204.31	3022.24	204.44	3022.24	207.31	3022.2	207.4	3022.16
208.51	3021.69	229.02	3021.22						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	54.33	.035	128.88	.04

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	54.33	128.88	.1	.3

Downstream Deck/Roadway Coordinates

num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	3022.4	3016	250	3022.4	3016

Downstream Bridge Cross Section Data

Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3017.86	5.27	3017.93	7.83	3017.97	8	3017.97	8.83	3017.96
8.96	3017.96	9.68	3017.78	28.24	3018.08	28.27	3018.08	35.02	3018.48
35.38	3018.13	35.39	3019.06	38.21	3019.15	39.68	3019.19	39.68	3018.2
40.03	3018.56	44.64	3019.79	45.39	3017.14	54.74	3017	58.11	3017
58.40	3018.38	58.94	3021	113	3021	113.72	3020.94	114.74	3021
115.08	3021	115.24	3020.39	116.13	3017	126.49	3017	126.65	3017.01
127	3017	127.21	3017.98	127.87	3021	134.39	3020.69	139.14	3019.76
144.97	3019.71	146.76	3019.9	148.24	3020.05	151.8	3020.84	156.16	3020.74
156.42	3020.52	157.92	3020.69	158.36	3020.35	161.16	3020.48	161.27	3020.59
161.74	3021.06	164.65	3021.18	166.07	3020.75	166.47	3020.69	166.71	3020.69
186.61	3021.43	186.72	3021.43	187.49	3021.41	187.75	3021.4	187.88	3021.43
192.68	3020.99	193.76	3021.35	204.64	3021.33	207.86	3021.26	207.91	3021.25

ScottsdaleFireDEC.rep

207.93 3021.25 208.16 3021.23 211.45 3020.87 211.52 3020.86 235 3018.27
235.8 3018 238.77 3018

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .0439.68001 .035 127.87 .04

Bank Sta: Left Right Coeff Contr. Expan.
39.68001 127.87 .1 .3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
Culvert #1 Circular 3
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
Exit Loss Coef
1 2.5 48 .012 .012 0 .5

Number of Barrels = 4
Upstream Elevation = 3017.24

Centerline Stations
Sta. Sta. Sta. Sta.
104 109 166 171

Downstream Elevation = 3017
Centerline Stations
Sta. Sta. Sta. Sta.
51 56 120 125

CULVERT OUTPUT Profile #Q100 Culv Group: Culvert #1

Q Culv Group (cfs)	94.00	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	6.32
Q Barrel (cfs)	23.50	Culv Vel DS (ft/s)	7.09
E.G. US. (ft)	3019.73	Culv Inv El Up (ft)	3017.24
W.S. US. (ft)	3019.63	Culv Inv El Dn (ft)	3017.00
E.G. DS (ft)	3018.20	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	3017.81	Culv Exit Loss (ft)	1.01

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Delta EG (ft)	1.53	Culv Entr Loss (ft)	0.31
Delta WS (ft)	1.81	Q Weir (cfs)	
E.G. IC (ft)	3019.52	Weir Sta Lft (ft)	
E.G. OC (ft)	3019.73	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	3018.80	Weir Max Depth (ft)	
Culv WS Outlet (ft)	3018.43	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.43	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.56	Min El Weir Flow (ft)	3022.41

Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.

Note: The flow in the culvert is entirely supercritical.

CROSS SECTION

RIVER: One

REACH: River One

RS: 117.38

INPUT

Description:

Station Elevation Data		num= 67									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3017.865	279999	3017.937	830002	3017.97	8	3017.978	830002	3017.96		
8.960007	3017.969	680008	3017.7828	24001	3018.08	28.27	3018.08	35.02	3018.48		
35.38	3018.13	35.39	3019.0638	21001	3019.1539	68001	3019.1939	68001	3018.2		
40.03	3018.56	44.64	3019.79	45.39	3017.1454	74001	3017	58.11	3017		
58.40001	3018.38	58.94	3021	113	3021	113.72	3020.94	114.74	3021		
115.08	3021	115.24	3020.39	116.13	3017	126.49	3017	126.65	3017.01		
127	3017	127.21	3017.98	127.87	3021	134.39	3020.69	139.14	3019.76		
144.97	3019.71	146.76	3019.9	148.24	3020.05	151.8	3020.84	156.16	3020.74		
156.42	3020.52	157.92	3020.69	158.36	3020.35	161.16	3020.48	161.27	3020.59		
161.74	3021.06	164.65	3021.18	166.07	3020.75	166.47	3020.69	166.71	3020.69		
186.61	3021.43	186.72	3021.43	187.49	3021.41	187.75	3021.4	187.88	3021.43		
192.68	3020.99	193.76	3021.35	204.64	3021.33	207.86	3021.26	207.91	3021.25		
207.93	3021.25	208.16	3021.23	211.45	3020.87	211.52	3020.86	235	3018.27		
235.8	3018	238.77	3018								

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0439	68001	.035	127.87	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	39.68001	127.87		17.38	17.38	.1	.3

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CROSS SECTION OUTPUT Profile #Q100

		Element	Left OB	Channel
E.G. Elev (ft)	3018.20			
Right OB				
Vel Head (ft)	0.39	Wt. n-Val.	0.040	0.035
W.S. Elev (ft)	3017.81	Reach Len. (ft)	17.38	17.38
17.38				
Crit W.S. (ft)	3017.81	Flow Area (sq ft)	0.04	18.81
E.G. Slope (ft/ft)	0.022189	Area (sq ft)	0.04	18.81
Q Total (cfs)	94.00	Flow (cfs)	0.01	93.99
Top Width (ft)	26.51	Top Width (ft)	2.17	24.34
Vel Total (ft/s)	4.99	Avg. Vel. (ft/s)	0.36	5.00
Max Chl Dpth (ft)	0.81	Hydr. Depth (ft)	0.02	0.77
Conv. Total (cfs)	631.0	Conv. (cfs)	0.1	631.0
Length Wtd. (ft)	17.38	Wetted Per. (ft)	2.17	26.79
Min Ch El (ft)	3017.00	Shear (lb/sq ft)	0.02	0.97
Alpha	1.00	Stream Power (lb/ft s)	0.01	4.86
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01	0.05
0.04				
C & E Loss (ft)	0.11	Cum SA (acres)	0.03	0.05
0.08				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than

1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

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water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 100

INPUT

Description:

Station Elevation Data num= 61									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3017.788	429993	3017.769	369995	3017.47	18.75	3017.58	19.69	3017.63
26.03999	3016.1	26.36	3016.05	26.47	301632.29999		301640.42999	3015.654	
45.22	3015.454	89999	3015.24	52.97	3015.0663	37999	3015.0891	34999	3015.258
151.41	3015.64	153.98	3015.69	155.78	3015.75	159.32	3015.95	159.74	3016
160.82	3016.12	161.06	3016.16	161.2	3016.22	161.35	3016.2	165.8	3017.14
166.25	3016.81	167.74	3017	170.77	3017.29	171.41	3017.44	172.03	3017.94
179	3018.35	183.72	3018.65	187.73	3018.67	192.36	3018.83	201.82	3019.14
202.68	3019.15	204.56	3019.17	206.16	3019.18	210.98	3019.13	216.62	3018.93
226.05	3018.82	227.62	3018.69	228.28	3018.63	234.72	3018.32	242.66	3017.54
244.02	3017.61	245.04	3017.66	246.31	3017.63	247.57	3017.7	251.69	3017.72
252.06	3017.77	252.38	3017.8	252.86	3017.84	253.13	3017.85	253.59	3017.86
254.27	3017.87	256.07	3017.88	257.05	3017.87	258.23	3017.86	259.51	3017.83
260.87	3017.79								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.0440	42999	.0359	1.34999	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	40.42999	91.34999		25	25	25		.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3016.33	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3016.32	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)		Flow Area (sq ft)	6.09	57.25
57.30				
E.G. Slope (ft/ft)	0.000417	Area (sq ft)	6.09	57.25
57.30				

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Q Total (cfs)	94.00	Flow (cfs)	2.49	53.67
37.83				
Top Width (ft)	136.79	Top Width (ft)	15.30	50.92
70.57				
Vel Total (ft/s)	0.78	Avg. Vel. (ft/s)	0.41	0.94
0.66				
Max Chl Dpth (ft)	1.26	Hydr. Depth (ft)	0.40	1.12
0.81				
Conv. Total (cfs)	4601.3	Conv. (cfs)	122.1	2627.3
1851.8				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	15.35	50.93
70.62				
Min Ch El (ft)	3015.06	Shear (lb/sq ft)	0.01	0.03
0.02				
Alpha	1.12	Stream Power (lb/ft s)	0.00	0.03
0.01				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01	0.04
0.03				
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	0.03
0.07				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than

1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: One

REACH: River One

RS: 75

INPUT

Description:

Station Elevation Data		num=		61						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	3016.25	14.59	3016.03	15.02	3016.02	16.28	999	3016.01	26.63	3016.07
31.78	999	3016	36.62	3015.34	39.73	3015	40.37	3014.8	42.86	3014
43.48	3013.94	44.08	3014	47.5	3014.63	49.72	3015	51.95	999	3015.33
56.81	999	3015.64	58.95	999	3015.76	1.84	999	3015.74	65.22	3015.82
66.67	999	3015.8	72.73	999	3015.78	0.25	999	3015.93	80.92	999
82.92	999	3015.92	93.16	3015.97	94.61	3016	95.36	3016	97.42	999
97.42	999	3016.01	102.89	3016.05	116.11	3016.12	134.61	3016.14	145.93	3016.21
153.31	3016.27	153.34	3016.27	167.65	3016.31	180.52	3016.44	180.52	3016.39	180.53
3016.46	181.48	3016.33	181.8	3016.33	183	3016.34	184.63	3016.48	185.62	3016.5
186.17	3016.49	187.95	3016.51	203.06	3016.55	204.7	3016.56	206.39	3016.55	207.69
3016.55	214.65	3016.51	216.35	3016.52	221.31	3016.51	228.66	3016.48	233.34	3016.45
237.83	3016.42									

ScottsdaleFireDEC.rep

245.08 3016.43 251.06 3016.45 258.54 3016.48 259.2 3016.48 266.28 3016.5
267.81 3016.49

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 39.73 .035 49.72 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
39.73 49.72 25 25 25 .1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3016.27	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.36	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3015.90	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3015.90	Flow Area (sq ft)	3.44	14.59
6.87				
E.G. Slope (ft/ft)	0.009631	Area (sq ft)	3.44	14.59
6.87				
Q Total (cfs)	94.00	Flow (cfs)	7.60	76.97
9.43				
Top Width (ft)	46.88	Top Width (ft)	7.23	9.99
29.66				
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	2.21	5.28
1.37				
Max Chl Dpth (ft)	1.96	Hydr. Depth (ft)	0.48	1.46
0.23				
Conv. Total (cfs)	957.8	Conv. (cfs)	77.5	784.3
96.1				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	7.29	10.24
29.70				
Min Ch El (ft)	3013.94	Shear (lb/sq ft)	0.28	0.86
0.14				
Alpha	1.64	Stream Power (lb/ft s)	0.63	4.52
0.19				
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.00	0.02
0.01				
C & E Loss (ft)	0.04	Cum SA (acres)	0.02	0.01
0.04				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

ScottsdaleFireDEC.rep

depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One

REACH: River One

RS: 50

INPUT

Description:

Station Elevation Data				num=	61
Sta	Elev	Sta	Elev	Sta	Elev
0	3014.77	4.75	3014.687.200012	3014.67	10.41 3014.5815.05002 3014.7
15.87003	3014.6517.43002	3014.5319.54001	3014.5320.98001	3014.4825.55002	3014
26.23001	3013.930.62001	301332.45001	3012.9833.58002	301334.50002	3013.39
36.42001	301440.67001	3014.1741.56001	3014.2646.63002	3014.6353.00002	3014.49
57.38002	3014.3662.51001	3014.4371.97002	3014.6779.89001	301582.33002	3015.03
87.81001	3015.0895.00002	3015.23	106.4	3015.28	109.41 3015.3 114.27 3015.23
115.08	3015.24	117.46	3015.22	120.73	3015.25 138.03 3015.41 144.65 3015.58
150.54	3015.4	151.49	3015.4	154.63	3015.33 156.22 3015.35 158.41 3015.36
167	3015.36	170.75	3015.48	193.61	3015.45 199.04 3015.56 208.88 3015.63
221.09	3015.48	223.14	3015.46	229.92	3015.42 230.16 3015.42 230.4 3015.43
236.78	3015.44	243.05	3015.42	248.05	3015.4 253.1 3015.41 257.19 3015.42
263.33	3015.45	271.38	3015.47	273.29	3015.47 274.57 3015.45 279.05 3015.42
280.64	3015.39				

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.0425.55002	.03536.42001	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	25.5500236.42001		25	25	25	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3015.02	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.22	Wt. n-Val.	0.040	0.035
0.040				

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W.S. Elev (ft)	3014.80	Reach Len. (ft)	25.00	25.00
25.00				
Crit W.S. (ft)	3014.80	Flow Area (sq ft)	6.01	15.49
13.27				
E.G. Slope (ft/ft)	0.006736	Area (sq ft)	6.01	15.49
13.27				
Q Total (cfs)	94.00	Flow (cfs)	6.98	67.21
19.81				
Top Width (ft)	75.15	Top Width (ft)	25.55	10.87
38.73				
Vel Total (ft/s)	2.70	Avg. Vel. (ft/s)	1.16	4.34
1.49				
Max Chl Dpth (ft)	1.82	Hydr. Depth (ft)	0.24	1.42
0.34				
Conv. Total (cfs)	1145.3	Conv. (cfs)	85.0	818.9
241.4				
Length Wtd. (ft)	25.00	Wetted Per. (ft)	25.62	11.14
38.76				
Min Ch El (ft)	3012.98	Shear (lb/sq ft)	0.10	0.58
0.14				
Alpha	1.92	Stream Power (lb/ft s)	0.11	2.54
0.21				
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.00	0.01
0.01				
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.01
0.02				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth for the water surface and continued on with the calculations.

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: One
REACH: River One

RS: 25

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INPUT

Description:

Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3013.59	4.76001	3013.53	9.51001	3013.67	13.13	3013.52	17.63	3013
20.36002	3012.0920	7.3001	301220.81003	3011.9920	9.6002	3011.9922	2.92001	3011.94	
23.82001	3011.9525	1.4001	301227.21002	3012.6728	4.5001	301330.64001	3013.08		
31.63	3013.132	0.6003	3013.136	0.4001	3013.1339	4.7002	3013.1143	2.3001	3013.26
47.27002	3013.358	2.1002	3013.762	1.4001	3013.8565	0.0002	301466.85002	3014.02	
68.03001	3014.0379	9.1002	3014.3588	3.9001	3014.4791	0.09001	3014.5293	8.2001	3014.46
95.62001	3014.4997	7.9001	3014.56	103.12	3014.64	109.26	3014.51	115.84	3014.39
117.78	3014.32	119.19	3014.28	122.37	3014.28	130.31	3014.37	136.31	3014
141.32	3013.78	143.12	3013.82	144.6	3013.84	145.92	3013.85	155.29	3013.78
159.41	3013.78	165.75	3013.9	167.97	3013.92	172.24	3014	173.45	3014.01
174.2	3014	176.82	3013.99	177.44	3014	195.39	3014.63	211.76	3014.74
215.16	3014.81	218.04	3014.83	220.87	3014.83	222.9	3014.81	225.53	3014.78
246.32	3014.62	246.82	3014.62	254.01	3014.64	259.2	3014.63	276.01	3014.39
278.64	3014.4	284.51	3014.42	286.23	3014.44	287.31	3014.44	290.98	3014.46
292.05	3014.45	294.14	3014.43						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	17.63	.03532	0.6003	.04

Bank Sta: Left Right Coeff Contr. Expan.

17.63	32.06003	.1	.3
-------	----------	----	----

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	3013.90	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.31	Wt. n-Val.	0.040	0.035
0.040				
W.S. Elev (ft)	3013.58	Reach Len. (ft)		
Crit W.S. (ft)	3013.58	Flow Area (sq ft)	1.68	15.95
7.29				
E.G. Slope (ft/ft)	0.011880	Area (sq ft)	1.68	15.95
7.29				
Q Total (cfs)	94.00	Flow (cfs)	2.47	77.79
13.74				
Top Width (ft)	49.60	Top Width (ft)	12.19	14.43
22.98				
Vel Total (ft/s)	3.77	Avg. Vel. (ft/s)	1.48	4.88
1.88				
Max Chl Dpth (ft)	1.64	Hydr. Depth (ft)	0.14	1.11

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0.32				
Conv. Total (cfs)	862.4	Conv. (cfs)	22.7	713.7
126.0				
Length Wtd. (ft)		Wetted Per. (ft)	12.22	14.74
22.99				
Min Ch El (ft)	3011.94	Shear (lb/sq ft)	0.10	0.80
0.24				
Alpha	1.42	Stream Power (lb/ft s)	0.15	3.91
0.44				
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River:One

Reach	River Sta.	n1	n2	n3
River One	650	.04	.035	.04
River One	625	.04	.035	.04
River One	600	.04	.035	.04
River One	575	.04	.035	.04
River One	550	.04	.035	.04
River One	525	.04	.035	.04
River One	500	.04	.035	.04
River One	475	.04	.035	.04
River One	450	.04	.035	.04
River One	425	.04	.035	.04
River One	406.22	.04	.035	.04
River One	375	Culvert		
River One	325	.04	.035	.04
River One	300	.04	.035	.04
River One	275	.04	.035	.04
River One	250	.04	.035	.04
River One	225	.04	.035	.04
River One	200	.04	.035	.04
River One	175	.04	.035	.04

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River One	172.41	.04	.035	.04
River One	150	Culvert		
River One	117.38	.04	.035	.04
River One	100	.04	.035	.04
River One	75	.04	.035	.04
River One	50	.04	.035	.04
River One	25	.04	.035	.04

SUMMARY OF REACH LENGTHS

River: One

Reach	River Sta.	Left	Channel	Right
River One	650	25	25	25
River One	625	25	25	25
River One	600	25	25	25
River One	575	25	25	25
River One	550	25	25	25
River One	525	25	25	25
River One	500	25	25	25
River One	475	25	25	25
River One	450	25	25	25
River One	425	18.78	18.78	18.78
River One	406.22	111.11	111.11	111.11
River One	375	Culvert		
River One	325	25	25	25
River One	300	25	25	25
River One	275	25	25	25
River One	250	25	25	25
River One	225	25	25	25
River One	200	25	25	25
River One	175	2.56	2.56	2.56
River One	172.41	55.03	55.3	55.03
River One	150	Culvert		
River One	117.38	17.38	17.38	17.38
River One	100	25	25	25
River One	75	25	25	25
River One	50	25	25	25
River One	25			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

ScottsdaleFireDEC.rep

River: One

Reach	River Sta.	Contr.	Expan.
River One	650	.1	.3
River One	625	.1	.3
River One	600	.1	.3
River One	575	.1	.3
River One	550	.1	.3
River One	525	.1	.3
River One	500	.1	.3
River One	475	.1	.3
River One	450	.1	.3
River One	425	.1	.3
River One	406.22	.1	.3
River One	375	Culvert	
River One	325	.1	.3
River One	300	.1	.3
River One	275	.1	.3
River One	250	.1	.3
River One	225	.1	.3
River One	200	.1	.3
River One	175	.1	.3
River One	172.41	.1	.3
River One	150	Culvert	
River One	117.38	.1	.3
River One	100	.1	.3
River One	75	.1	.3
River One	50	.1	.3
River One	25	.1	.3

STAGE ONE	38			
STAGE TWO	20			
STAGE THREE	11			
STAGE FOUR	1000			
STAGE FIVE	171 32			
STAGE SIX	400	LO/AGLL		
STAGE SEVEN	733 42			
STAGE EIGHT	112			
STAGE NINE	100			
STAGE TEN	100			
STAGE ELEVEN	120			
STAGE TWELVE	130			
STAGE THIRTEEN	150			
STAGE FOURTEEN	170			
STAGE FIFTEEN	190			
STAGE SIXTEEN	210			
STAGE SEVENTEEN	230			
STAGE EIGHTEEN	250			
STAGE NINETEEN	270			
STAGE TWENTY	290			
STAGE TWENTY ONE	310			
STAGE TWENTY TWO	330			
STAGE TWENTY THREE	350			
STAGE TWENTY FOUR	370			
STAGE TWENTY FIVE	390			
STAGE TWENTY SIX	410			
STAGE TWENTY SEVEN	430			
STAGE TWENTY EIGHT	450			
STAGE TWENTY NINE	470			
STAGE THIRTY	490			

STAGE ONE STAGE TWO STAGE THREE STAGE FOUR

STAGE FIVE

STAGE SIX

- a. Increasing the percent impervious on the L card to reflect the amount of impervious surfaces that will exist under fully developed conditions
- b. Recalculate the time of concentration (**T_c**) based on the proposed drainage system, after full development. Normally there should be a reduction in **T_c** after development
- c. The existing condition model must be sub-divided, as necessary, to create concentration points which will match the sub-watershed areas above each proposed storage facility under fully developed conditions
- d. Each separate storage facility proposed must be modeled as it will physically exist under fully developed conditions with appropriate routing and combining operations through each basin and through the entire watershed. The modeling of storage capacity provided, as one hypothetical reservoir at the outlet with all the upstream storage arbitrarily combined at this one location, is not acceptable
- e. As a minimum, the 2, 10 and 100-year frequency events shall be analyzed
- f. Comparison of discharge values for existing and post development conditions must be made at concentration points just downstream from each proposed storage facility; other critical locations such as road crossings; and at points where flows exit the proposed development.

4-1.807

CALCULATION OF RUNOFF VOLUMES

The only accepted method for determining the required stormwater storage volume is the standard formula described below. HEC-1 modeling can be used for storage basin design and analysis, or if a pre-versus post volume difference is needed. City ordinance requires on-site storage of runoff from the 100-year, 2-hour frequency event.

A. Standard Formula for Runoff Volumes

$$V_r = (P/12) AC$$

V_r = Required storage volume in acre-feet.

P = Precipitation amount = The depth of the 100-year 2-hour rainfall, from figure in Appendix 4-1D at the site.

A = Area in acres; the developed portion of the entire site in acres, to the centerline of adjacent streets, on which any man made change is planned, including, but not limited to: construction, excavation, filling, grading, paving, or mining.

C = Runoff coefficient; Rational Method values from Figure 4.1-4. 0.86

B. HEC-1 Computer Modeling

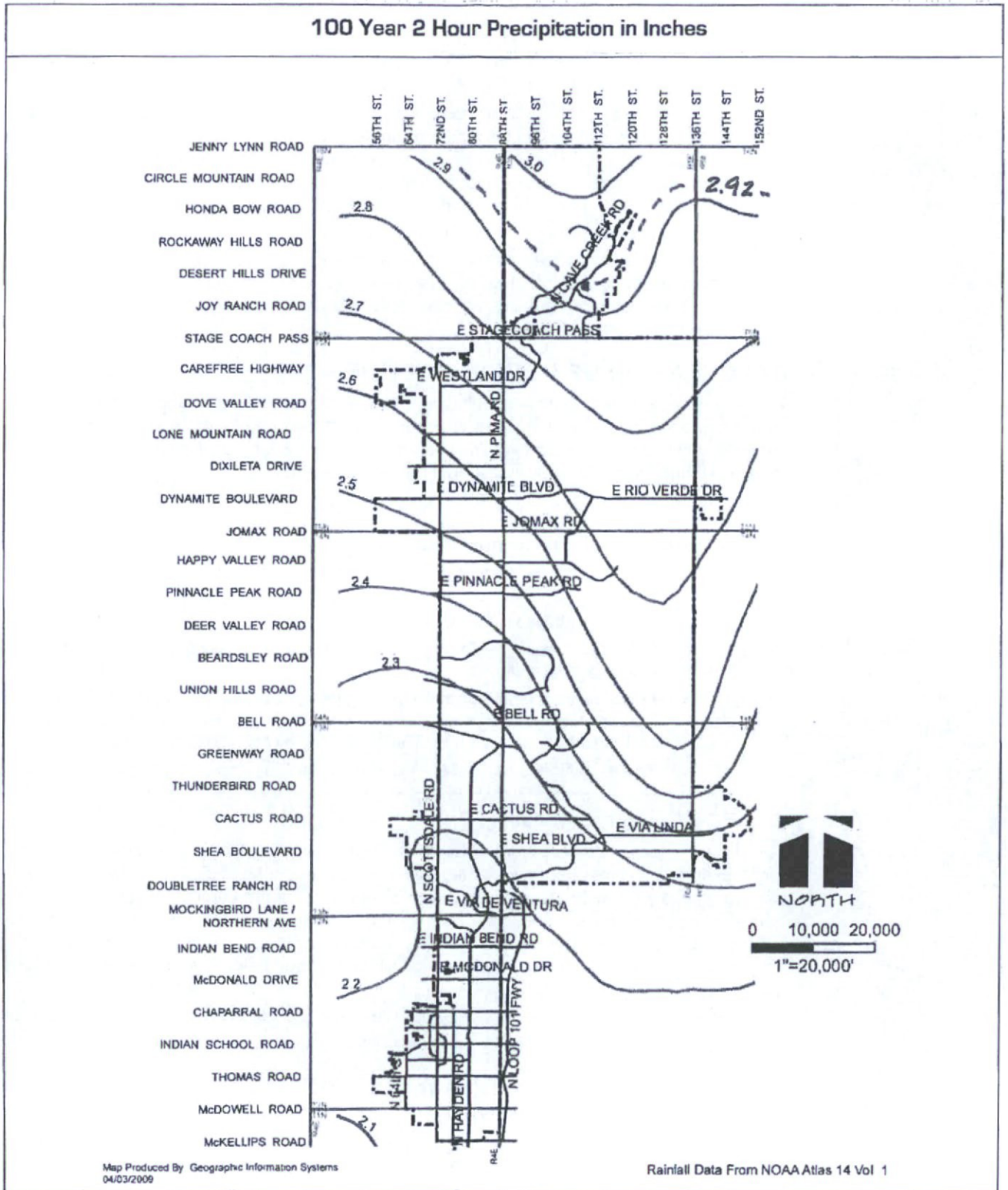
The HEC-1 model or similar computer program is not to be used to determine the ordinance required 100-year, 2-hour stormwater storage runoff volumes. The HEC-1 program may be used for the purpose of analyzing storage basin routing or for pre versus post analysis (a six-hour storm; procedures described in Section 4-1.806 paragraphs D and E must be used). Use modified Puls level pool routing option in HEC-1 for hydrograph routing through storage basins and lakes. For permanent lakes assume no available storage below the normal water surface elevation.

CAUTION: Do not use the built-in orifice equation in the HEC-1 model because errors can result. It is necessary to build a stage discharge table and input to the model.

4-1.808

METHODS FOR ESTIMATING WATER SURFACE ELEVATIONS AND INUNDATION LIMITS

The engineer may use any standard method for the determination of water surface elevations. Only the U.S. Army Corps of Engineers' HEC-2, Water Surface Profiles program and the HEC-RAS, River Analysis System are supported by the City. Prior approval by city staff is required for the use of other methods.



2. Time of Concentration

Time of concentration "Tc" is the total time of travel from the most hydraulically remote part of the watershed to the concentration point of interest. The calculation of "Tc" must follow FCDMC Hydrology Manual procedures.

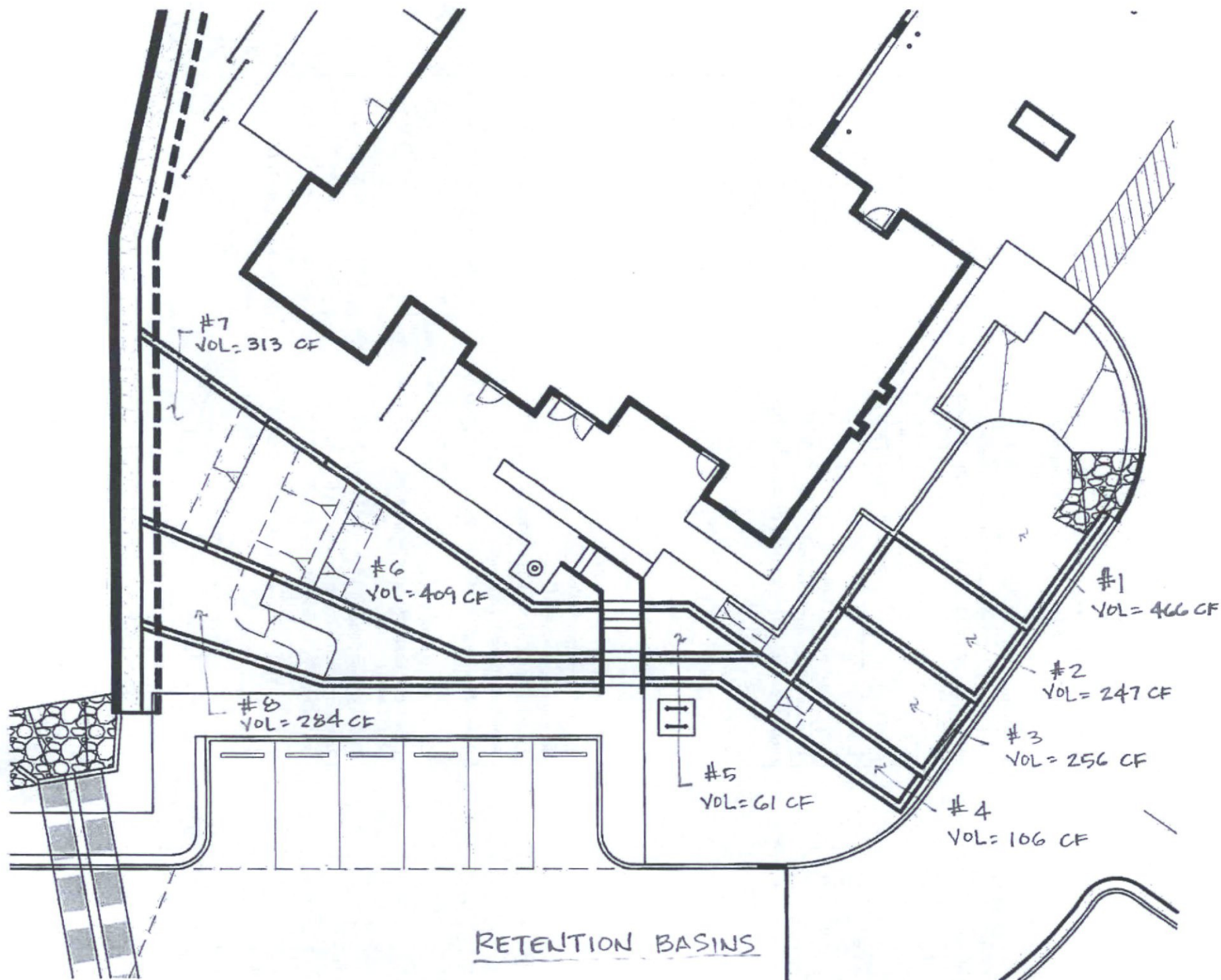
***Note:** Do not add a standard set amount of time to the estimated "Tc" for lot runoff delay (such as 5 or 10 minutes). Natural land slopes are too variable in Scottsdale to add a set amount of time for lot runoff.

3. Runoff Coefficients

Use Figure 4.1-4 or equivalent to obtain the runoff coefficients or "C" values. Composite "C" values for the appropriate zoning category or weighted average values calculated for the specific site are both acceptable approaches.

RUNOFF COEFFICIENTS - "C" VALUE			
Land Use	Storm Frequency		
Composite Area-wide Values	2-25 Year	50 Year	100 Year
Commercial & Industrial Areas	0.80	0.83	0.86
Residential Areas-Single Family (average lot size)			
R1-1-1901	0.33	0.50	0.53
R1-130	0.35	0.51	0.59
R1-70	0.37	0.52	0.60
R1-43	0.38	0.55	0.61
R1-35 (35,000 square feet/lot)	0.40	0.56	0.62
R1-18 (18,000 square feet/lot)	0.43	0.58	0.64
R1-10 (10,000 square feet/lot)	0.47	0.62	0.67
R1-7 (7,000 square feet/lot)	0.51	0.64	0.94
Townhouses (R-2, R-4)	0.63	0.74	0.94
Apartments & Condominiums (R-3, R-5)	0.76	0.83	0.94
Specific Surface Type Values			
Paved streets, parking lots (concrete or asphalt), roofs, drive-ways, etc.	0.90	0.93	0.95
Lawns, golf courses, & parks (grassed areas)	0.20	0.25	0.30
Undisturbed natural desert or desert landscaping (no impervious weed barrier)	0.37	0.42	0.45
Desert landscaping (with impervious weed barrier)	0.63	0.73	0.83
Mountain terrain – slopes greater than 10%	0.60	0.70	0.80
Agricultural areas (flood-irrigated fields)	0.16	0.18	0.20

FIGURE 4.1-4 RUNOFF COEFFICIENTS FOR USE WITH RATIONAL METHOD



RETENTION BASINS

RETENTION CALCULATIONS - FIRST FLUSH RETENTION REQUIREMENT

EEC # 16535; SCOTTSDALE FIRE STATION # 616

Drainage Area	Area "A"	Runoff Coef. "C"	Required Volume "V"	Basin #	Elevation Bottom	Top	Depth	Area Bottom	Area Top	Provided Volume	Drywell Quantities	Percolation Rate	Percolation Time (hrs)
Retention Basin Storage													
FIRST FLUSH RETENTION REQUIREMENTS													
DISTURBED AREA + 10%	43,257	1	1,802	BASIN 1			1.00	466	466	466			
				BASIN 2			1.00	247	247	247			
				BASIN 3			1.00	256	256	256			
				BASIN 4			1.00	106	106	106			
TOTAL			1,802	BASIN 5			1.00	61	61	61			
				BASIN 6			1.00	409	409	409			
				BASIN 7			1.00	313	313	313			
				BASIN 8			1.00	284	284	284			
First Flush	43,257	1	1,802	TOTAL				2,142	0				

Formulas:

1. $V_R = D/12AC$

where D=0.50 inches (First Flush Rainfall Depth) and A=area in SF

2. Basin Vol = $0.5(A_{TOP} + A_{BOT}) \times \text{Depth}$

3. C = 1.0 (First Flush)

RETENTION AS-BUILTS

DETENTION BASIN	RETENTION VOLUME REQUIRED (cf)	RETENTION VOLUME PROVIDED (cf)	AS-BUILT VOLUME(cf)
BASIN 1		466	
BASIN 2		247	
BASIN 3		256	
BASIN 4		106	
BASIN 5		61	
BASIN 6		409	
BASIN 7		313	
BASIN 8		284	
TOTAL	1,802	2,142	

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: 16535

Page 1

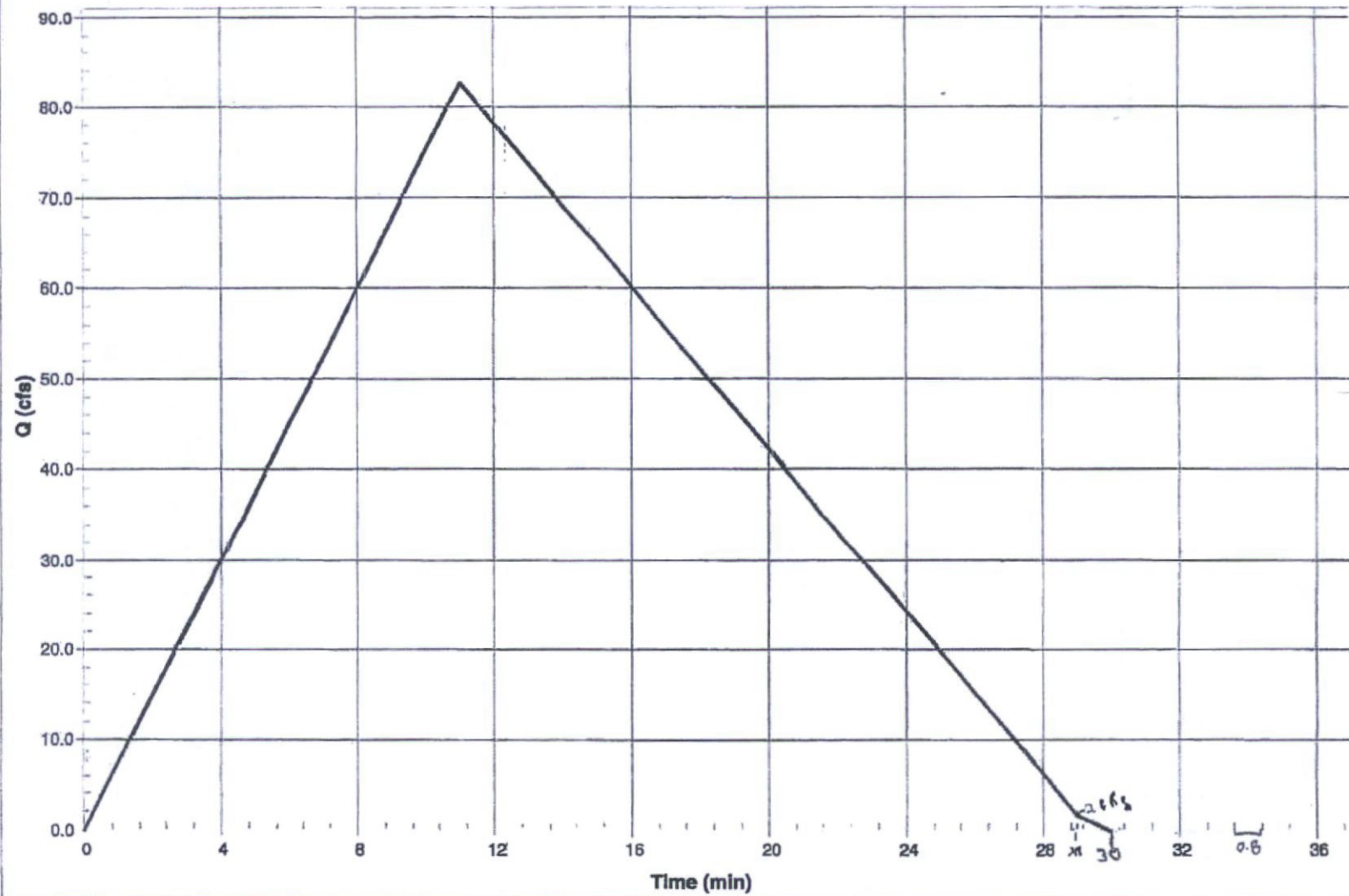
12/15/2016

ID	Sub Basin Data						Sub Basin Hydrology Summary						
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
A	22.5	3,290	3,200.00	3,040.00	256.8	0.061	Q (cfs)	21.8	31.5	39.2	54.8	69.4	82.7
							C	0.40	0.40	0.40	0.44	0.48	0.50
							CA (ac)	8.99	8.99	8.99	9.89	10.79	11.24
							Volume (ac-ft)	0.6454	0.8109	0.9299	1.1790	1.4165	1.5968
							Tc (min)	16	14	13	12	11	11
							I (in/hr)	2.43	3.50	4.36	5.54	6.43	7.36
							B	1.0	309	3,049.00	3,016.00	563.9	0.080
C	0.40	0.40	0.40	0.44	0.48	0.50							
CA (ac)	0.41	0.41	0.41	0.45	0.49	0.52							
Volume (ac-ft)	0.0147	0.0202	0.0239	0.0322	0.0395	0.0469							
Tc (min)	5	5	5	5	5	5							
I (in/hr)	3.98	5.36	6.40	7.76	8.81	9.85							
C	2.3	503	3,040.00	3,016.00	251.9	0.075							
							C	0.40	0.40	0.40	0.44	0.48	0.50
							CA (ac)	0.92	0.92	0.92	1.01	1.10	1.15
							Volume (ac-ft)	0.0380	0.0460	0.0542	0.0717	0.0892	0.1039
							Tc (min)	6	5	5	5	5	5
							I (in/hr)	3.79	5.33	6.40	7.76	8.81	9.85
							D	0.5	318	3,027.00	3,011.00	265.7	0.084
C	0.40	0.40	0.40	0.44	0.48	0.50							
CA (ac)	0.22	0.22	0.22	0.24	0.26	0.27							
Volume (ac-ft)	0.0083	0.0110	0.0129	0.0175	0.0211	0.0248							
Tc (min)	5	5	5	5	5	5							
I (in/hr)	3.98	5.36	6.40	7.76	8.81	9.85							

* Non default value

(stSubBasRat.pt)

Flood Control District of Maricopa County
Rational Method Hydrograph
Sub Basin ID: A RP: 100 Year Peak Q: 82.7 cfs at 11 minutes



— Hydrograph

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS

Page 1

Project Reference: 16535

12/18/2018

ID	Sub Basin Data						Sub Basin Hydrology Summary						
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
E 1.8 cfs	0.2	164	3,032.50	3,026.00	209.3	0.089	Q (cfs)	0.3	0.4	0.5	0.7	0.9	1.1
							C	0.40	0.40	0.40	0.44	0.48	0.50
							CA (ac)	0.08	0.08	0.08	0.09	0.10	0.11
							Volume (ac-ft)	0.0028	0.0037	0.0046	0.0064	0.0083	0.0101
							Tc (min)	5	5	5	5	5	5
							I (in/hr)	3.98	5.36	6.41	7.78	8.82	9.88
							F	0.1	100	3,032.40	3,026.50	311.5	0.092
							C	0.40	0.40	0.40	0.44	0.48	0.50
							CA (ac)	0.06	0.06	0.06	0.06	0.07	0.07
							Volume (ac-ft)	0.0018	0.0028	0.0037	0.0046	0.0055	0.0064
							Tc (min)	5	5	5	5	5	5
							I (in/hr)	3.98	5.36	6.41	7.78	8.82	9.88
G 3.3 cfs	0.2	164	3,032.50	3,026.00	209.3	0.044	Q (cfs)	0.8	1.1	1.3	1.6	1.8	2.0
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.20	0.20	0.20	0.20	0.20	0.20
							Volume (ac-ft)	0.0074	0.0101	0.0120	0.0147	0.0165	0.0184
							Tc (min)	5	5	5	5	5	5
							I (in/hr)	3.98	5.36	6.41	7.78	8.82	9.88
							H	0.1	100	3,032.40	3,026.50	311.5	0.045
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.13	0.13	0.13	0.13	0.13	0.13
							Volume (ac-ft)	0.0046	0.0064	0.0074	0.0092	0.0101	0.0120
							Tc (min)	5	5	5	5	5	5
							I (in/hr)	3.98	5.36	6.41	7.78	8.82	9.88
PRE (Site)	3.3	500	3,040.00	3,016.00	253.4	0.073	Q (cfs)	5.1	7.1	8.5	11.4	14.0	16.4
							C	0.40	0.40	0.40	0.44	0.48	0.50

* Non default value

(stSubBasRat.rpt)

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: 16535

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12/18/2018

ID	Sub Basin Data						Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year

Major Basin ID: 01

POST 3.3 500 3,040.00 3,016.00 253.4 0.062

(Site)

CA (ac)	1.33	1.33	1.33	1.46	1.59	1.66
Volume (ac-ft)	0.0535	0.0653	0.0782	0.1048	0.1287	0.1508
Tc (min)	6	5	5	5	5	5
i (in/hr)	3.83	5.36	6.41	7.78	8.82	9.88
Q (cfs)	7.4	10.1	12.1	15.2	18.2	20.9
C	0.57	0.57	0.57	0.59	0.62	0.64
CA (ac)	1.89	1.89	1.89	1.96	2.06	2.12
Volume (ac-ft)	0.0708	0.0929	0.1113	0.1398	0.1673	0.1922
Tc (min)	5	5	5	5	5	5
i (in/hr)	3.94	5.36	6.41	7.78	8.82	9.88

Basin Volume provided in:

WS-G is 0.0203 acft
WS-H is 0.0289 acft

Vol 100yr for:

WS-G is 0.0184 acft
WS-H is 0.0120 acft

Proposed Q_{100} :

WS-G is 0 cfs
WS-H is 0 cfs

Post site w/ Retention:

$$20.9 \text{ cfs} - 2 \text{ cfs} - 1.3 \text{ cfs} = 17.6 \text{ cfs}$$

Pre site:

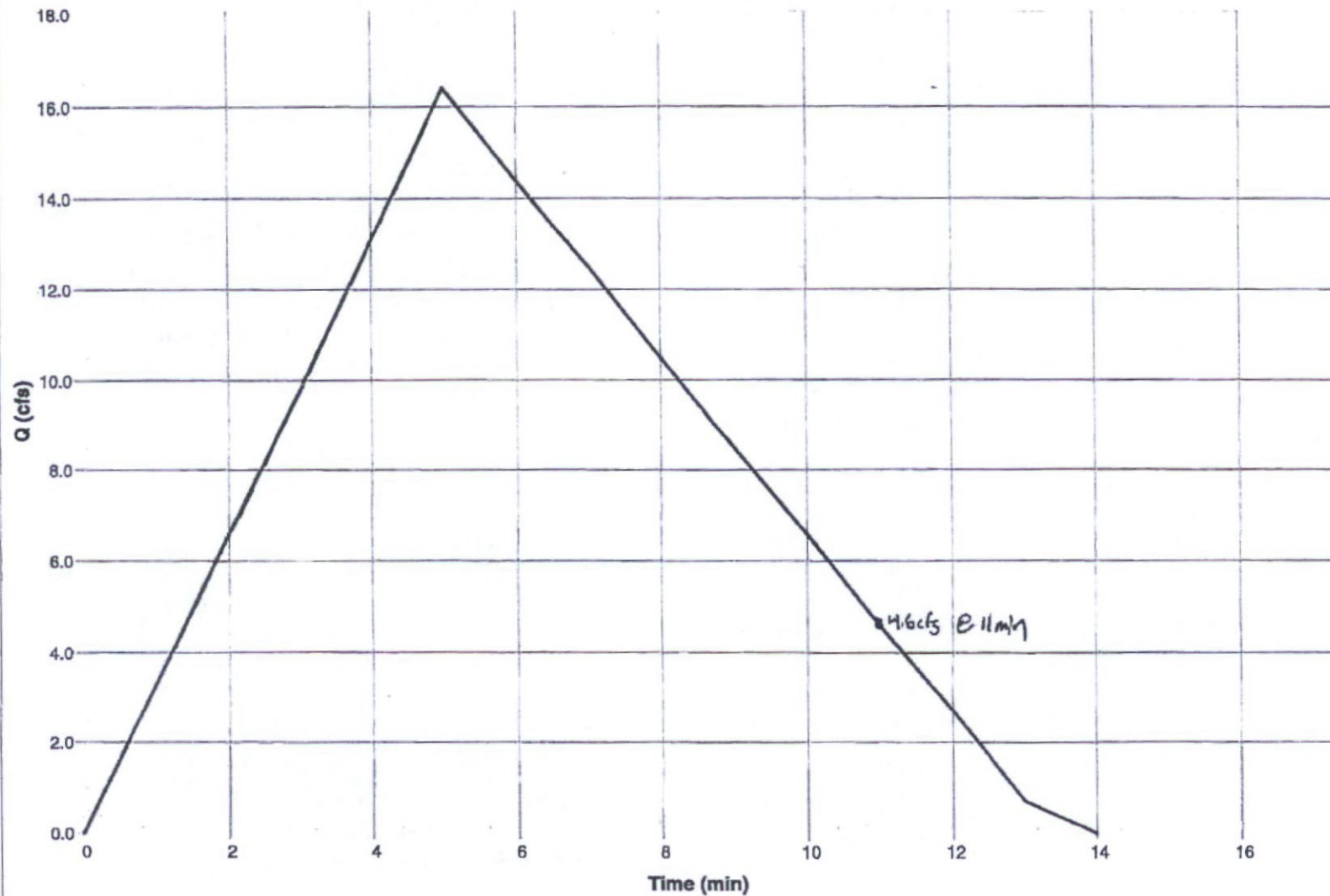
$$16.4 \text{ cfs}$$

Offsite + onsite @ T = 11 min and Neglecting Retention

$$Pre = 82.7 \text{ cfs} + 4.6 \text{ cfs} = 87.3 \text{ cfs}$$

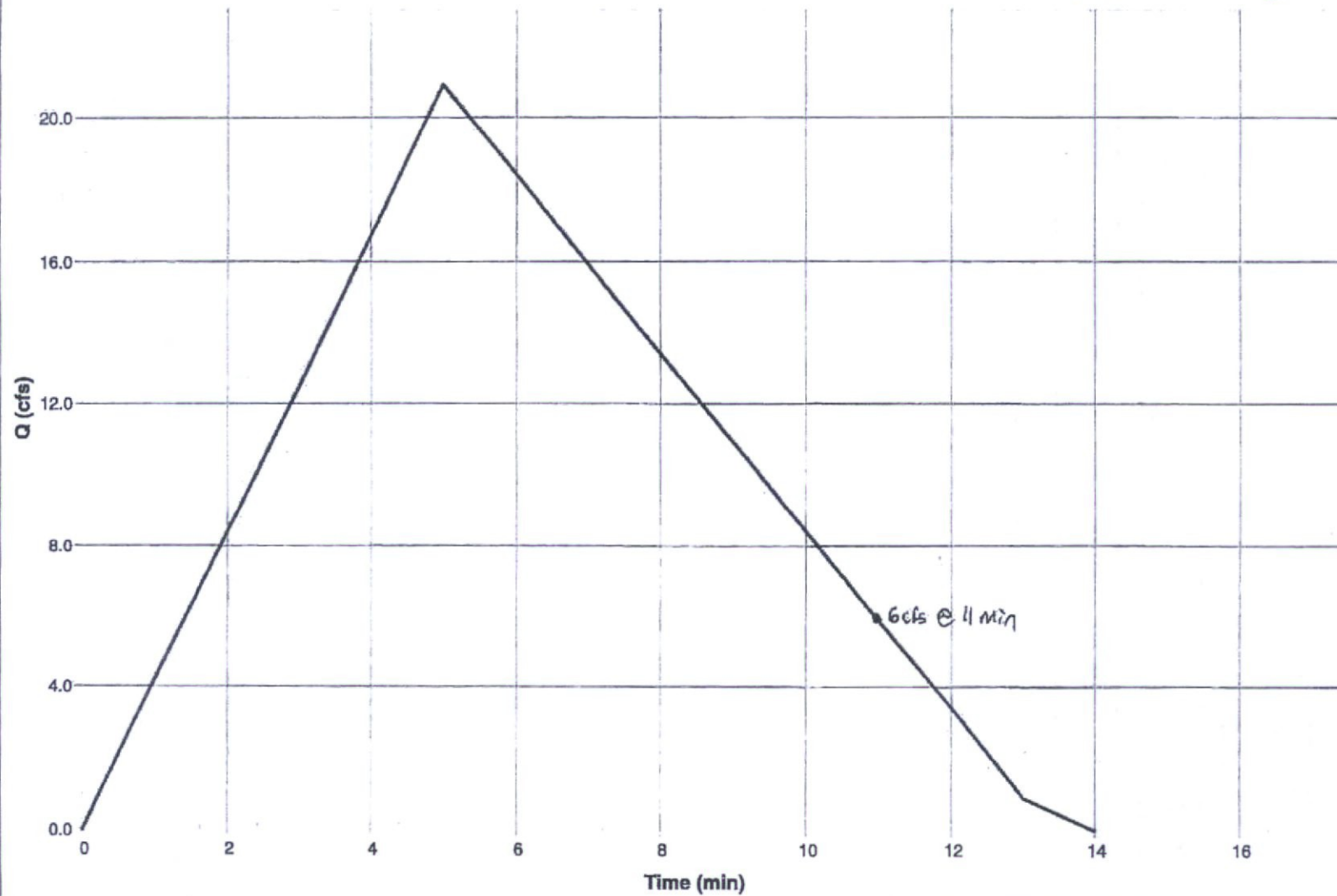
$$Post = 82.7 \text{ cfs} + 6 \text{ cfs} = 88.7 \text{ cfs}$$

Flood Control District of Maricopa County
Rational Method Hydrograph
Sub Basin ID: PRE RP: 100 Year Peak Q: 16.4 cfs at 5.0 minutes



— Hydrograph

Flood Control District of Maricopa County
Rational Method Hydrograph
Sub Basin ID: POST RP: 100 Year Peak Q: 20.9 cfs at 5.0 minutes (Neglects Retention)



— Hydrograph

Culvert Analysis Report

Culvert 1 Pro

(North)

Analysis Component				
Storm Event		Design	Discharge	83.00 cfs
Peak Discharge Method: User-Specified				
Design Discharge		83.00 cfs	Check Discharge	0.00 cfs
Tailwater Conditions: Constant Tailwater				
Tailwater Elevation		N/A ft		
Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	4-36 inch Circular	83.00 cfs	3,028.46 ft	6.46 ft/s
Weir	Not Considered	N/A	N/A	N/A

Culvert Analysis Report Culvert 1 Pro

Component: Culvert-1

Culvert Summary			
Computed Headwater Elevation	3,028.46 ft	Discharge	83.00 cfs
Inlet Control HW Elev.	3,028.25 ft	Tailwater Elevation	N/A ft
Outlet Control HW Elev.	3,028.46 ft	Control Type	Entrance Control
Headwater Depth/Height	0.77		
Grades			
Upstream Invert	3,026.14 ft	Downstream Invert	3,025.80 ft
Length	68.00 ft	Constructed Slope	0.005000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.39 ft
Slope Type	Steep	Normal Depth	1.39 ft
Flow Regime	Supercritical	Critical Depth	1.46 ft
Velocity Downstream	6.46 ft/s	Critical Slope	0.004215 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	3,028.46 ft	Upstream Velocity Head	0.57 ft
Ke	0.50	Entrance Loss	0.29 ft
Inlet Control Properties			
Inlet Control HW Elev.	3,028.25 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	28.3 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Analysis Report

Culvert 2 Pro

(South)

Analysis Component				
Storm Event	Design	Discharge	83.00 cfs	
Peak Discharge Method: User-Specified				
Design Discharge	83.00 cfs	Check Discharge	0.00 cfs	
Tailwater Conditions: Constant Tailwater				
Tailwater Elevation	N/A ft			
Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	4-36 inch Circular	83.00 cfs	3,019.56 ft	6.46 ft/s
Weir	Not Considered	N/A	N/A	N/A

Culvert Analysis Report

Culvert 2 Pro

Component: Culvert-1

Culvert Summary			
Computed Headwater Elevation	3,019.56 ft	Discharge	83.00 cfs
Inlet Control HW Elev.	3,019.35 ft	Tailwater Elevation	N/A ft
Outlet Control HW Elev.	3,019.56 ft	Control Type	Entrance Control
Headwater Depth/Height	0.77		
Grades			
Upstream Invert	3,017.24 ft	Downstream Invert	3,017.00 ft
Length	48.00 ft	Constructed Slope	0.005000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.39 ft
Slope Type	Steep	Normal Depth	1.39 ft
Flow Regime	Supercritical	Critical Depth	1.46 ft
Velocity Downstream	6.46 ft/s	Critical Slope	0.004215 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	3,019.56 ft	Upstream Velocity Head	0.57 ft
K _e	0.50	Entrance Loss	0.29 ft
Inlet Control Properties			
Inlet Control HW Elev.	3,019.35 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	28.3 ft ²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

FIGURE 8



CITY OF SCOTTSDALE

PUBLIC IMPROVEMENTS



COUNCIL
W.J. "JIM" LANE, MAYOR
SUZANNE KLAPP
VIRGINIA KORTE
KATHY LITTLEFIELD
LINDA MILHAVEN
GUY PHILLIPS
DAVID N. SMITH
CITY MANAGER
JIM THOMPSON
CITY ATTORNEY
BRUCE WASHBURN
CITY CLERK
CAROLYN JAGGER

"AS-BUILT" CERTIFICATION

I HEREBY CERTIFY THAT THE "AS-BUILT" IMPROVEMENTS AS SHOWN HEREON ARE LOCATED AS NOTED, AND THE LOCATIONS ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED LAND SURVEYOR _____ DATE _____

CITY OF SCOTTSDALE

REVIEWED AND RECOMMENDED APPROVAL BY:

PAVING	STRUCTURES
GRADING & DRAINAGE	BUILDING
WATER & SEWER	PLUMBING
TRAFFIC	MECHANICAL
PLANNING IMPROVEMENTS	ELECTRICAL
PLANNING FACILITIES	FIRE IMPROVEMENTS
LANDSCAPE	FIRE FACILITIES
NATIVE PLANT	

ENGINEERING COORDINATION MANAGER (OR DESIGNER) _____ DATE _____

BUILDING OFFICIAL (OR DESIGNER) _____ DATE _____

ENGINEER
EEC, INC.
7740 N. 16TH STREET, SUITE 135
PHOENIX, AZ 85020
PHONE: 602-248-7702
FAX: 602-248-7851

CITY OF SCOTTSDALE

FIRE STATION # 616

PROJECT NO. BC03

BID NO.

10905 E. LOVING TREE LANE; SCOTTSDALE, AZ 85262
APN 219-60-912A/SECTION 28, T6N, R5E

Utility	Company	Name of Company Representative	Telephone Number	Date Signed
Electric	APS	Elizabeth Weaver	(602)711-7299	
Telephone	Century Link	Edwin Aloia	(602)630-5853	
Historical Data	Southwest Bell	Walt Pearson	(480)725-2855	
Cable TV	Cox Comm.	Tom Chapman	(602)248-5844	
Water	City of Scottsdale			
Sewer	City of Scottsdale			

Engineer's Certification:
I, Jim Griffin as the Engineer of Record for this development, hereby certify that all utility companies listed above have been provided final improvement plans for review, and that all conflicts identified by the utilities have been resolved. In addition, "No Conflict" letters have been obtained from each utility company and are included in this submittal.

Signature _____ Date _____

Certificate of Approval to Construct: Maricopa County Environmental Services Department
Water and Waste Management Division

WCS-16

Public Water System ID Number 0427- (and/or) Waste Water System ID Number 0437-
Project Description:

Project Location:
Project Owner:

Permitted to AEC Title 18, Chapter 1, Article 2; or AEC Title 18, Chapter 1, Article 3; or Maricopa County Environmental Health Code Chapter 1 or 2. This certificate of approval is granted to construct the above described facilities as represented in the attached plan to which certain conditions are applicable to a Maricopa County Environmental Services Department's representative plan for the following purposes:
(1) It is required for Certificate of Approval of Construction, together with an Engineer's Certificate of Completion, and related engineering and other plans, and be submitted to this Department prior to approval of construction and start.
(2) It is required to construct in and to major modifications done to the plan within the knowledge and consent of the Department.
If construction has not started within one year of the approval date, this certificate will be void. In extension of time may be available upon written request.

Received By: _____ Date Approved: _____

CC: NCESD FILE: AECG
Engineer: AEC Corp. Construction



100% DD
DEC. 2018

SHEET INDEX

Sht. No.	Dwg. No.	Description
1	G1	COVER SHEET
2	G2	GENERAL NOTES/PROJECT INFORMATION
3	G3	GRADING AND DRAINAGE PLAN
4	G4	OFFSITE PAVING PLAN
5	G5	WATER & SEWER PLAN
6	G6	SWPPP PLAN
7	G7	SWPPP DETAILS
8	G8	STRIPING & SIGNAGE PLAN
9	G9	HORIZONTAL CONTROL MAP
10	G10	HORIZONTAL CONTROL TABLE
11	G11	EARTHWORK GRADING
12	G12	DETAIL SHEET

BENCH MARKS (COS NAVD '88)

- No. Description**
- THE NORTH 1/4 CORNER OF SECTION 28, TOWNSHIP 6 NORTH, RANGE 5 EAST, BLM MONUMENT ON POST. ELEVATION = 3074.299
 - LOVING TREE LANE CULDESAC RADIUS POINT FOUND BRASS CAP FLUSH ELEVATION = 3035.77

SCOTTSDALE FIRE STATION # 616
PROJECT NO. BC03 BID NO.



DR/STAFF APPROVAL NO.

PLAN REVIEW NO. 5826-18

GENERAL CONSTRUCTION NOTES FOR CAPITAL PROJECTS

- ALL IMPROVEMENT CONSTRUCTION SHALL COMPLY WITH THE LATEST MARICOPA COUNTY ASSOCIATION OF GOVERNMENTS STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE SUPPLEMENTAL STANDARD SPECIFICATIONS AND DETAILS AND CITY OF SCOTTSDALE'S DESIGN STANDARD & POLICES MANUAL (DSMPM). IF THERE IS A CONFLICT, THE LATTER SHALL APPLY. ALL FACILITIES CONSTRUCTION SHALL COMPLY WITH THE LATEST BUILDING CODES AS AMENDED AND ADOPTED BY THE CITY OF SCOTTSDALE.
- THE ENGINEERING DESIGNS ON THESE PLANS ARE APPROVED BY THE CITY IN SCOPE AND NOT IN DETAIL. IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
- BASED ON THE INFORMATION SUBMITTED ON THE PLANS AND ASSOCIATED DOCUMENTS, THE CITY HAS REVIEWED AND FOUND THEM TO BE IN ACCORDANCE WITH THE CITY'S MUNICIPAL CODE AND ARE ACCEPTABLE FOR PERMIT ISSUANCE. THIS ACCEPTANCE BY THE CITY DOES NOT AUTHORIZE VIOLATIONS OF ANY APPLICABLE CODE, ORDINANCE OR STANDARD AS ADOPTED BY THE MUNICIPAL CODE.
- APPROVAL OF THE PLANS BY THE CITY IS VALID FOR SIX MONTHS. IF A PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS OF REVIEW, THE PLANS SHALL BE RESUBMITTED TO THE CITY FOR REAPPROVAL.
- ANY DEVIATION FROM THE APPROVED PLANS SHALL BE REVIEWED AND APPROVED BY THE CITY PRIOR TO THAT CHANGE BEING INCORPORATED INTO THE PROJECT.
- A CITY-CAPITAL PROJECTS INSPECTOR WILL INSPECT ALL WORK WITHIN THE CITY RIGHTS-OF-WAY, EASEMENTS AND FACILITIES.
- ANY SPECIAL INSPECTION REQUIRED SHALL BE IN ADDITION TO ANY ROUTINE INSPECTION BY THE CITY.
- CITY DISCREPANCY AND BUILDING PERMITS ARE REQUIRED FOR WORK IN PUBLIC RIGHTS-OF-WAY, EASEMENTS AND FACILITIES. PERMITS WILL BE ISSUED BY THE CITY THROUGH THE CITY'S ONE STOP SHOP. COPIES OF ALL PERMITS SHALL BE RETAINED ON-SITE AND SHALL BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE WORK STOPPAGE UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FOR SALVAGING PROTECTED NATIVE PLANTS PRIOR TO THE START OF CONSTRUCTION.
- WHEREVER EXCAVATION IS DONE CONTACT THE BLUE STAKE CENTER AT (602) 283-1100 TWO WORKING DAYS BEFORE EXCAVATION IS TO BEGIN. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT.
- ALL EXCAVATION AND GRADING WHICH IS NOT IN PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS DRAFTED FOR PUBLIC PURPOSES MUST CONFORM TO SECTION 1803 AND APPENDIX J OF THE LATEST INTERNATIONAL CODE BOOKS, AS ADOPTED AND AMENDED BY THE CITY OF SCOTTSDALE. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY.
- THRUST RESTRAINT, WHERE REQUIRED, ON ALL CITY WATER LINES SHALL BE PROVIDED USING MECHANICAL JOINT RESTRAINTS OR CITY-APPROVED EQUAL.
- ANY ASPHALT MIX DESIGN USED ON CITY PROJECTS SHALL HAVE BEEN APPROVED FOR THAT USE PER SECTION 5-10 THE CITY'S DSMPM AND APPEAR ON THE "APPROVED LIST OF ASPHALT MIXES" AS DISTRIBUTED BY THE CITY-VALLEY ASPHALT COMMITTEE (EVAC).
- THE CONTRACTOR SHALL BE RESPONSIBLE TO REMOVE AND REPLACE, AT NO ADDITIONAL COST TO THE CITY, ANY AND ALL PAVEMENT, SIDEWALK, CURB AND GUTTER, DRAINAGE STRUCTURES, ETC. OUTSIDE THE PAY LIMIT THAT ARE DAMAGED DUE TO THEIR ACTIVITIES ON THE PROJECT. THIS INCLUDES, BUT IS NOT LIMITED TO, THE REMOVAL AND REPLACEMENT OF NEWLY GRADED ROADWAY INFRASTRUCTURE, THE REMOVAL AND REPLACEMENT OF EXISTING GRADED ROADWAY INFRASTRUCTURE WHERE THE CRACKS HAVE BEEN ENLARGED DUE TO THE CONTRACTOR'S OPERATIONS, THE REMOVAL AND REPLACEMENT OF DISTURBED ROADWAY INFRASTRUCTURE, ALL SANICUTS USED FOR THE REMOVAL OF THESE ITEMS SHALL BE PERPENDICULAR AND PARALLEL TO THE CENTERLINE CONTROLLING THAT ITEM, OR AT THE DIRECTION OF THE CITY'S CAPITAL PROJECTS INSPECTOR.
- ALL CAPITAL IMPROVEMENT PROJECTS SHALL MEET THE PROCEDURES AND STANDARDS FOR THE USE OF TEMPORARY/SECURITY FENCING AROUND THE PERIMETER OF CONSTRUCTION SITES, AS SET FORTH IN THE CITY'S 2006H ORDINANCE, ARTICLE VI, SECTION 7.700.

LEGEND

---	C&G WALL (4 OR 8 INCH BLOCKS)
---	EXISTING CONTOUR
---	PROPOSED CONTOUR
---	ROAD CENTERLINE
---	BOUNDARY
---	EXISTING WATERLINE
---	PROPOSED WATERLINE
---	BRASS CAP IN HANDHOLE
---	BRASS CAP FLUSH
---	SET RBR/CAP RLS345558 OR AS NOTED
---	MEASURED
---	SECTION
---	GRADE BREAK
---	LINEAR FOOTAGE
---	TOP OF WALL
---	FINISHED GRADE ELEVATION
---	PAVEMENT ELEVATION
---	CONCRETE ELEVATION
---	DUP DUCTILE IRON PIPE
---	LOWEST FLOOR ELEVATION
---	FF FINISHED FLOOR ELEVATION
---	ROP REINFORCED CONCRETE PIPE
---	INV INVERT ELEVATION
---	FG FINISH GRADE
---	C CONCRETE
---	NG NATURAL GROUND
---	P PAVEMENT
---	TC TOP OF CURB
---	DOT BOTTOM
---	TOP
---	SOH
---	WATER METER
---	WATER VALVE
---	FRY HYDRANT
---	BR CONTROL VALVE
---	TRC

GENERAL NOTES FOR SIGNING & PAVEMENT MARKING

- ALL PAVEMENT MARKINGS, SIGNS, AND WORK ZONE TRAFFIC CONTROL TYPE AND LAYOUT MUST CONFORM TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, HTTP://NHTSD.FHWA.DOT.GOV/INDEX.HTM.
- WORK ZONE TRAFFIC CONTROL NEEDS TO CONFORM TO THE CITY OF PHOENIX "TRAFFIC BARRICADE MANUAL" AND/OR AS DIRECTED BY THE CITY PUBLIC WORKS INSPECTOR OR TRAFFIC ENGINEERING DIVISION.
- SIGNS ARE TO BE INSTALLED ON TELESPAR PREPARED SQUARE STEEL TUBING POSTS PER COS STANDARD DETAIL NO. 2131, WWW.SCOTTSDALEAZ.GOV/DESIGN/COSMA05SUPP.
- DIMENSIONS TO SIGNS NEED TO INCLUDE THE SIGN POST, OR IN THE CASE OF MULTIPLE POSTS, THE PLAN VIEW CENTER OF THE SIGN.
- "NO PARKING" SIGNS SHALL ONLY BE USED WHEN THE FOLLOWING SITE CONDITIONS EXIST.
 - WHEN ANY RIGHT HAND LANE (CURB LANE) IS 10 FEET OR WIDER, OR IF A PAVED SHOULDER AREA IS PRESENT.
 - WHERE ON-STREET PARKING COULD BE EXPECTED TO OCCUR, SUCH AS COMMERCIAL AREAS WHERE BUSINESSES HAVE DIRECT FRONTAGE ON THE STREET, WHEN THE ABOVE CRITERIA EXISTS "NO PARKING" SIGNS (28-3A 12"X18") WITH AN ARROW (SINGLE DIRECTION OR BI-DIRECTIONAL) BELOW THE "P" SYMBOL, ON THE SIGN TO DESIGNATE THE DIRECTION OF THE RESTRICTION SHALL BE INSTALLED APPROXIMATELY EVERY 300-400 FEET ALONG THE LENGTH OF THE PROJECT. NO PARKING SIGNS SHALL BE INSTALLED APPROXIMATELY 5 FEET FROM THE BACK OF CURB AT A 45 DEGREE ANGLE TO THE CURB. STREET LIGHT POLES SHOULD BE USED FOR SIGN MOUNTING WHEN A LIGHT POLE IS WITHIN 50 FEET OF THE PROPOSED SIGN LOCATION.
- ALL LONGITUDINAL STRIPING (EDGE LINE, LANE LINE, AND CENTERLINE) SHALL BE "DUST" (80 MIL) EXTRUDED THERMOPLASTIC, UNLESS OTHERWISE NOTED ON THE PLANS.
 - ALL TRANSVERSE STRIPING (STOP LINES, CROSSWALK LINES) SHALL BE A MINIMUM OF "DUST" (80 MIL) EXTRUDED THERMOPLASTIC, UNLESS NOTED OTHERWISE ON THE PLANS.
- ALL PLAN VIEW STRIPING DIMENSIONS ARE MEASURED TO THE CENTER OF THE LINE OR CENTER OF THE DOUBLE LINE.
- ALL PAVEMENT SYMBOLS, ARROWS AND LEGENDS SHALL BE TYPE 1 PERMANENT, HIGH PERFORMANCE PRE-FORMED PAVEMENT TAPE. (TAPE MUST PERFORM AS 3M 280-ES SERIES OR EQUIVALENT.)
- RAISED PAVEMENT MARKERS (RPMs) SHALL BE USED ON ALL STRIPED STREETS. RPMs SHALL BE INSTALLED PER COS STANDARD DETAIL NO. 2132, WWW.SCOTTSDALEAZ.GOV/DESIGN/COSMA05SUPP, AND ADOPT STANDARD DRAWING M-19, WITH A CITY APPROVED BITUMINOUS ADHESIVE.
- BLUE TIE (2-WAY REFLECTIVE) RPMs SHALL BE USED TO INDICATE THE LOCATION OF ALL FIRE HYDRANTS AND REMOTE FIRE DEPARTMENT CONNECTIONS, PER COS STANDARD DETAIL NO. 2383, WWW.SCOTTSDALEAZ.GOV/DESIGN/COSMA05SUPP.
- ALL EXISTING PAVEMENT MARKINGS THAT CONFLICT WITH PROPOSED MARKINGS SHALL BE REMOVED BY SANDBLASTING, HYDROBLASTING, OR GRINDING PRIOR TO THE INSTALLATION OF NEW PAVEMENT MARKINGS. REMOVALS SHALL BE TO THE SATISFACTION OF THE CITY INSPECTOR.
- ASTM TYPE IV SHEETING (MINIMUM) SHALL BE USED FOR ALL MARKING AND REGULATORY AND STREET NAME SIGNS. ALL ADVANCE STREET NAME AND METRO SIGNS SHALL BE PROPOSED TYPE IV SHEETING. SCHOOL MARKING SIGNS AND ACCOMPANYING PLACARDS MUST BE ASTM PROPOSED TYPE IV FLOURESCENT YELLOW GREEN SHEETING.
- THE CONTRACTOR IS RESPONSIBLE FOR LAYOUT OF ALL PAVEMENT MARKINGS USING CONTROL POINTS SPACED NO MORE THAN 50 FEET APART. PAVEMENT MARKING LAYOUT SHALL BE APPROVED BY TRAFFIC ENGINEERING PRIOR TO THE APPLICATION OF THE FINAL PRODUCT. ALL PAVEMENT MARKING DRAWINGS ARE SCHEMATIC ONLY. THE CONTRACTOR SHALL FOLLOW ALL DIMENSIONS, DETAILS, AND STANDARDS WHEN INSTALLING PAVEMENT STRIPING, MARKING AND MARKERS.

NOTE

IN ACCORDANCE WITH ACR16-4-118, ALL MATERIALS OR PRODUCTS INSTALLED AFTER JAN. 1, 1983 MUST COME INTO CONTACT WITH DRINKING WATER OR WITH WATER TREATMENT CHEMICALS SHALL CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE/NSF INTERNATIONAL STANDARD 61 AND 61.

GENERAL NOTES:

CITY OF SCOTTSDALE FIRE STATION #616
10905 E. LOVING TREE LANE; SCOTTSDALE, ARIZONA 85262
A PORTION OF THE NORTHEAST QUARTER OF SECTION 28, TOWNSHIP 6 NORTH, RANGE 5 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, SCOTTSDALE, ARIZONA.



VICINITY MAP
NHS

PRIVATE UTILITY NOTES

- FOR ALL WORK PERFORMED IN THE RIGHT-OF-WAY AND PUBLIC EASEMENTS, MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION INCLUDING LATEST REVISIONS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL JURISDICTION) ARE INCORPORATED INTO THESE PLANS. THE CONTRACTOR SHALL CHECK WITH THE LOCAL JURISDICTION FOR THE LATEST APPROVED EDITION AND ANY LOCAL AMENDMENTS.
- ALL WORK PERFORMED ON-SITE SHALL BE IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE. CONTRACTOR SHALL CHECK WITH THE LOCAL JURISDICTION FOR THE LATEST APPROVED EDITION AND ANY LOCAL AMENDMENTS.
- ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THESE PLANS SHALL BE IN ACCORDANCE WITH THE LATEST MAG STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF FOR THE LOCAL JURISDICTION UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BEGINS THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY USED DURING CONSTRUCTION UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THESE PLANS OR ELSEWHERE. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THESE PLANS.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THESE PLANS.
- EXCAVATION AND DIRT MOVEMENT PERMIT MAY BE REQUIRED BY THE MARICOPA COUNTY HEALTH DEPARTMENT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THIS PERMIT, IF NECESSARY, AND COMPLY WITH THE REQUIREMENTS.
- THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND OMISSION. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BEGINS THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS.
- A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL CALL FOR BLUE STAKE (283-1100) PRIOR TO ANY EXCAVATION.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COORDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.
- ALL PAVING, GRADING, EXCAVATION, TRENCHING, PIPE BEDDING, AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOils (GEOTECHNICAL) REPORT FOR THIS PROJECT IN ADDITION TO THE REFERENCED REQUIRED SPECIFICATIONS AND DETAILS.
- THE CONTRACTOR IS TO VERIFY THE LOCATION AND THE ELEVATIONS OF ALL EXISTING UTILITIES AT POINTS OF TIE-IN PRIOR TO COMMENCING ANY WORK. CONSTRUCTION SHOULD ANY LOCATION OR ELEVATION DIFFER FROM THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AGENT.
- CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND SITE LAYOUT WITH ARCHITECTURE'S FINAL SITE PLAN, PLUMBING PLAN, AND FINAL BUILDING DIMENSIONS BEFORE STARTING WORK. REPORT DISCREPANCIES TO OWNER'S AGENT.

LEGAL DESCRIPTION

A PORTION OF NORTHEAST QUARTER OF SECTION 28, TOWNSHIP 6 NORTH, RANGE 5 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, SCOTTSDALE, ARIZONA.
EXCEPT ALL OIL, GAS AND OTHER MINERAL DEPOSITS AS RESERVED IN THE PATENT.

ENGINEER

EEC, INC.
7740 N. 16TH STREET, STE. 135
PHOENIX, ARIZONA 85020
TEL: (602) 248-7702
CONTACT: JANE GRIFFIN
EMAIL: jgriffin@eecorp.com

ARCHITECT

MELCHERBEN GROUP ARCHITECTS/PLANNERS
2740 S. HARDY ROAD
TEMPE, AZ 85283
PHONE: (480) 859-3332
CONTACT: KIMOTI BRECKENRIDGE
EMAIL: kbreckenridge@melchereben.com

OWNER

CITY OF SCOTTSDALE
7447 E. INDIAN SCHOOL RD, SUITE 205
SCOTTSDALE, AZ 85251
CONTACT: ANNA LEVYA
PHONE: 480-312-7769
EMAIL: alevya@scottsdaleaz.gov

SITE INFORMATION

SITE ADDRESS: 10905 E. LOVING TREE LANE, SCOTTSDALE, AZ
APN#: 219-06-912A
ZONING: R1-43
GROSS AREA PER SURVEY: 14,885 SF OR 3.32 AC
LANDFORM: LOWER DESERT
DS#

BENCH MARK

THE NORTH 1/4 CORNER OF SECTION 28, TOWNSHIP 6 NORTH, RANGE 5 EAST, BLM MONUMENT ON POST
ELEVATION = 3074.299 NAVD 83 DATUM

BASIS OF BEARING

THE SOUTH LINE OF LOT 2, AS RECORDED IN BOOK 654 OF MAPS, PAGE 28 IN THE OFFICE OF THE COUNTY RECORDER, MARICOPA COUNTY, ARIZONA.

BEARING = N 88°47'30" E

BENCHMARK CERTIFICATION

I HEREBY CERTIFY THAT ALL ELEVATIONS REPRESENTED ON THIS PLAN ARE BASED ON THE ELEVATION DATUM FOR THE CITY OF SCOTTSDALE BENCHMARK PROVIDED ABOVE.

SURVEY NOTE

THESE PLANS ARE BASED ON BOUNDARY AND TOPOGRAPHIC INFORMATION PREPARED BY MILLER AND SONS SURVEYING, INC. THE ENGINEER, ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC. ASSUMES NO RESPONSIBILITY FOR ANY INACCURACIES IN THESE PLANS ARISING FROM ERRORS WHICH MAY BE WITHIN THE BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON.

THE EXISTING UTILITIES SHOWN HEREON ARE BASED ON FIELD SURVEYS AND UTILITY MAPS AVAILABLE. SOME UTILITIES MAY NOT BE SHOWN. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES (LOCATIONS, SIZES, ELEVATIONS) AFFECTED BY CONSTRUCTION FOR POSSIBLE CONFLICTS. CALL BLUESTAKE PRIOR TO ANY DIGGING.

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER	PANEL #	SUFFIX	DATE OF FIRM (Index Date)	FIRM ZONE	BASE FLOOD ELEVATION (In AD 20m, Use Depth)
040012	1310	L	11-04-2015	X	N/A
	10-16-2013				



DESIGN BY:	JAG
DRAWN BY:	JAG
CHECK BY:	JAG
DATE:	NOVEMBER 2018
SCALE:	
SEC NO:	18530
DRAWING NO:	

PLAN REVIEW NO. 5826-18



Engineering and Environmental Consultants, Inc.
7740 N. 16th Street, Suite 125 | Phoenix, Arizona 85020
Tel 602.348.7702 | Fax 602.348.7851

PROJECT TITLE

LOCATED IN SECTION 28
T 6 N, R 5 E, G&SRM, MARICOPA COUNTY, ARIZONA

[illegible]

FIGURE 9