CEQA Drainage Study

Golf Green Estates
Bonsall, CA

February , 2012

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1. PROJECT DESCRIPTION

The purpose of the project is to develop Golf Green Estates, a 29.5 acre residential development consisting of 94 single family homes including access roads, circulation roads, and utilities. A site map for the project is included as Figure 1. The site is located in Bonsall, California southeast of Highway 76, between Golf Club Drive and Mission Road (east and west limits) and between Old River Road and Camino Del Rey (south and north limits). The site sits on a hill between the San Luis Rey Downs Golf Course and Bonsall Elementary School. The golf course is bordered by the San Luis Rey River on the west side of the course and Moosa Canyon Creek on the east side. A vicinity map for the project is included as Figure 2.

2. DESCRIPTION OF WATERSHED

Existing Conditions

The project is situated in rolling hills within the San Luis Rey River basin. From a drainage perspective, the site lies within the San Luis Rey watershed in the Bonsall hydrologic sub-area. The site consists of three watersheds as shown in Figure 3, a North Watershed defined in the study as Basin 1, an East Watershed (Basin 2), and a West Watershed (Basin 3).

Offsite drainage begins at Bonsall Elementary School and either flows east over natural terrain, through the San Luis Rey Downs Golf Course to Moosa Canyon Creek or flows west over natural terrain, through the San Luis Rey Downs Golf Course to the San Luis Rey River. Upon reaching Moosa Canyon Creek flow continues southwest and meets with the San Luis Rey River.

A hydrology map for existing conditions is included in Appendix H.

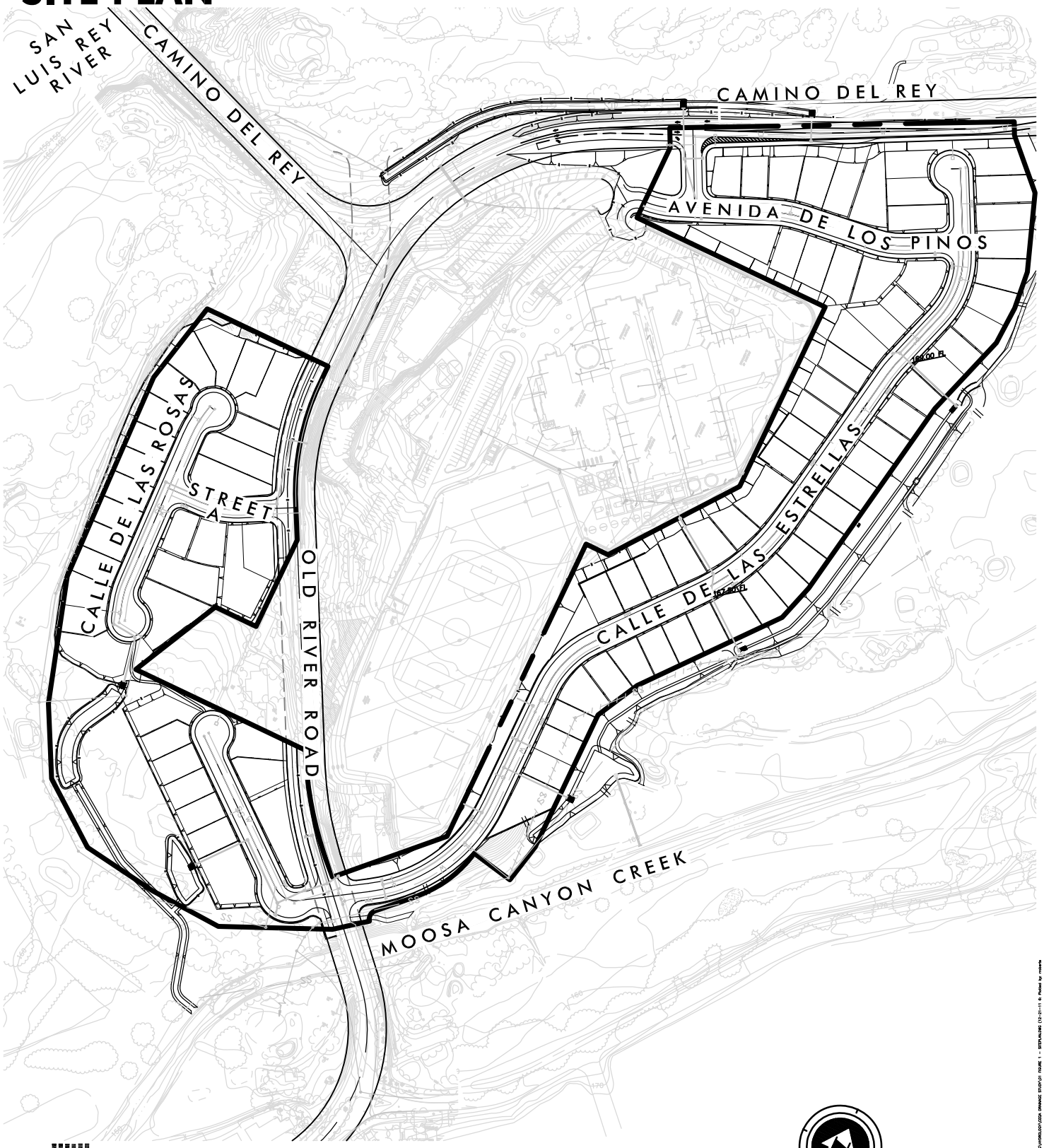
Proposed Conditions:

The Project site is located on a hill between the San Luis Rey Downs golf course and Bonsall Elementary School. The site wraps around the school and is split into a west and an east half by Old River Road which runs north and south. Because of this the drainage on either side has no effect on the other.

The drainage system for the Golf Green Estates development has been designed for a system of inlets that will safely convey a 100-year storm event. The project site was divided into three sub-basins as shown in Figure 4, to quantify the flow leaving the site. The North Watershed which includes Basin 1, an East Watershed which includes Basin 2, and a West Watershed which includes Basin 3.

A hydrology map for proposed conditions is included in Appendix H.

FIGURE 1
GOLF GREEN ESTATES
SITE PLAN



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full circle thinking

SCALE: 1" = 300'

0 300 600 1200

FEET

FIGURE 2
GOLF GREEN ESTATES
VICINITY MAP

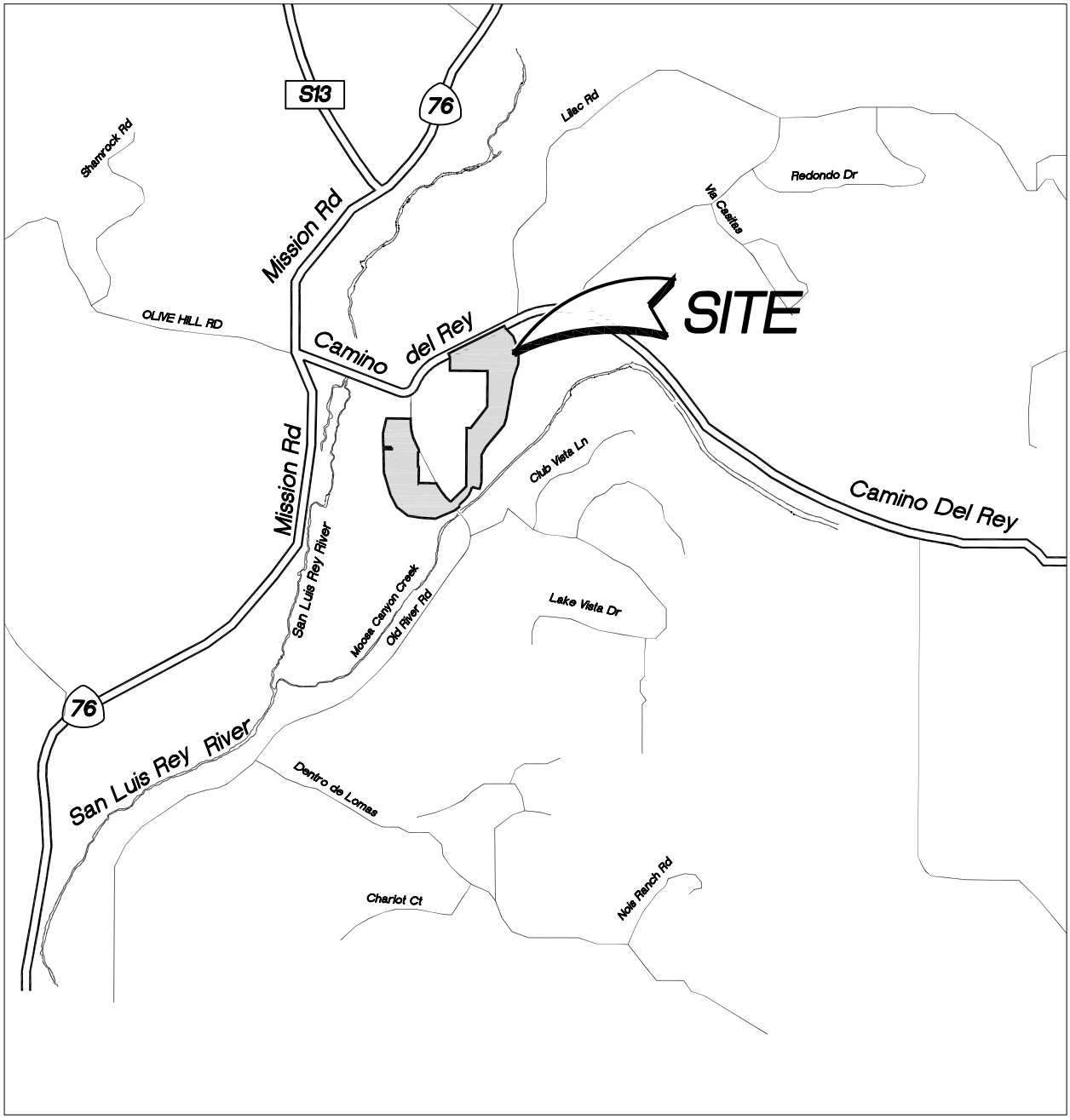

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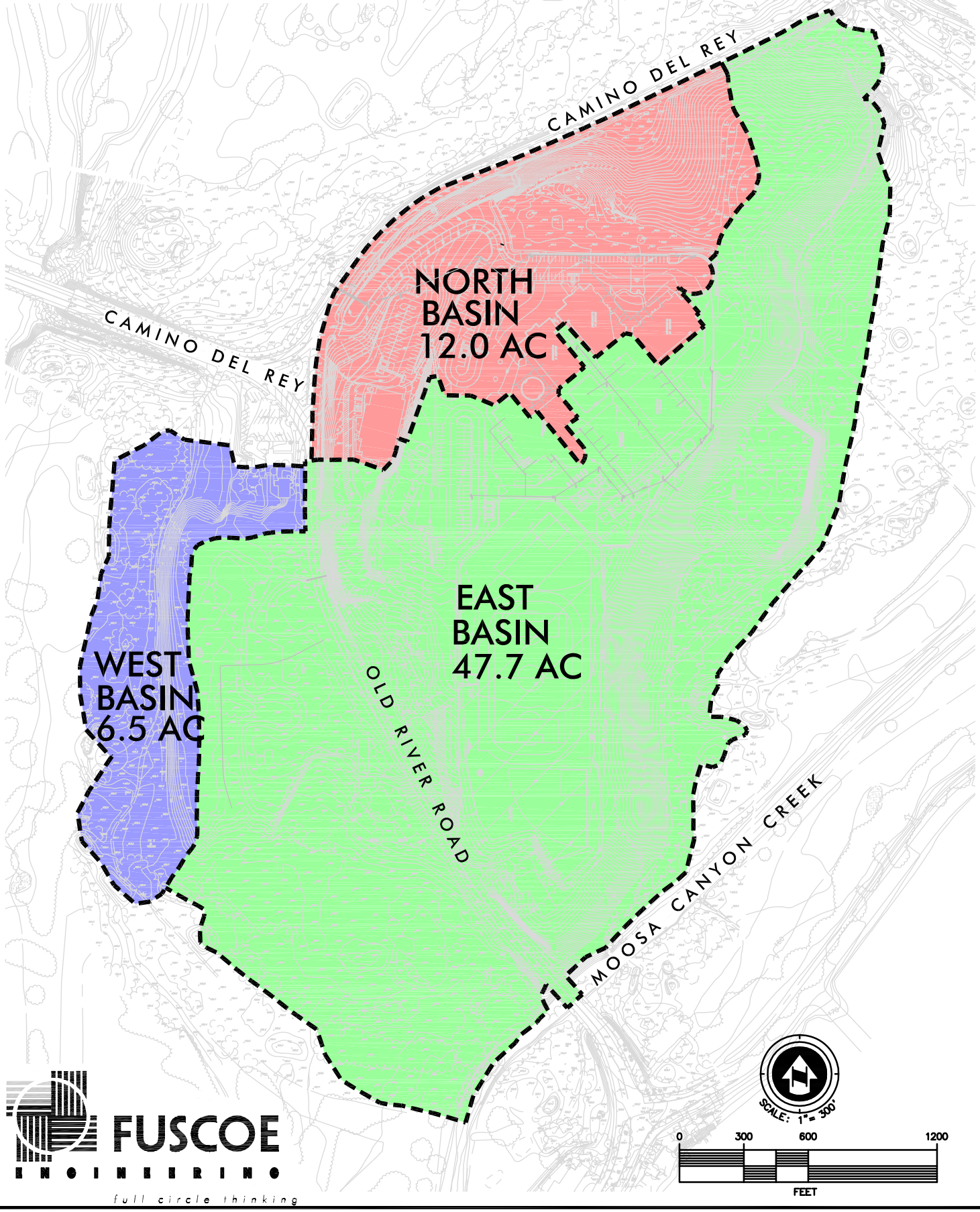
FIGURE 3
GOLF GREEN ESTATES
EXISTING BASINS



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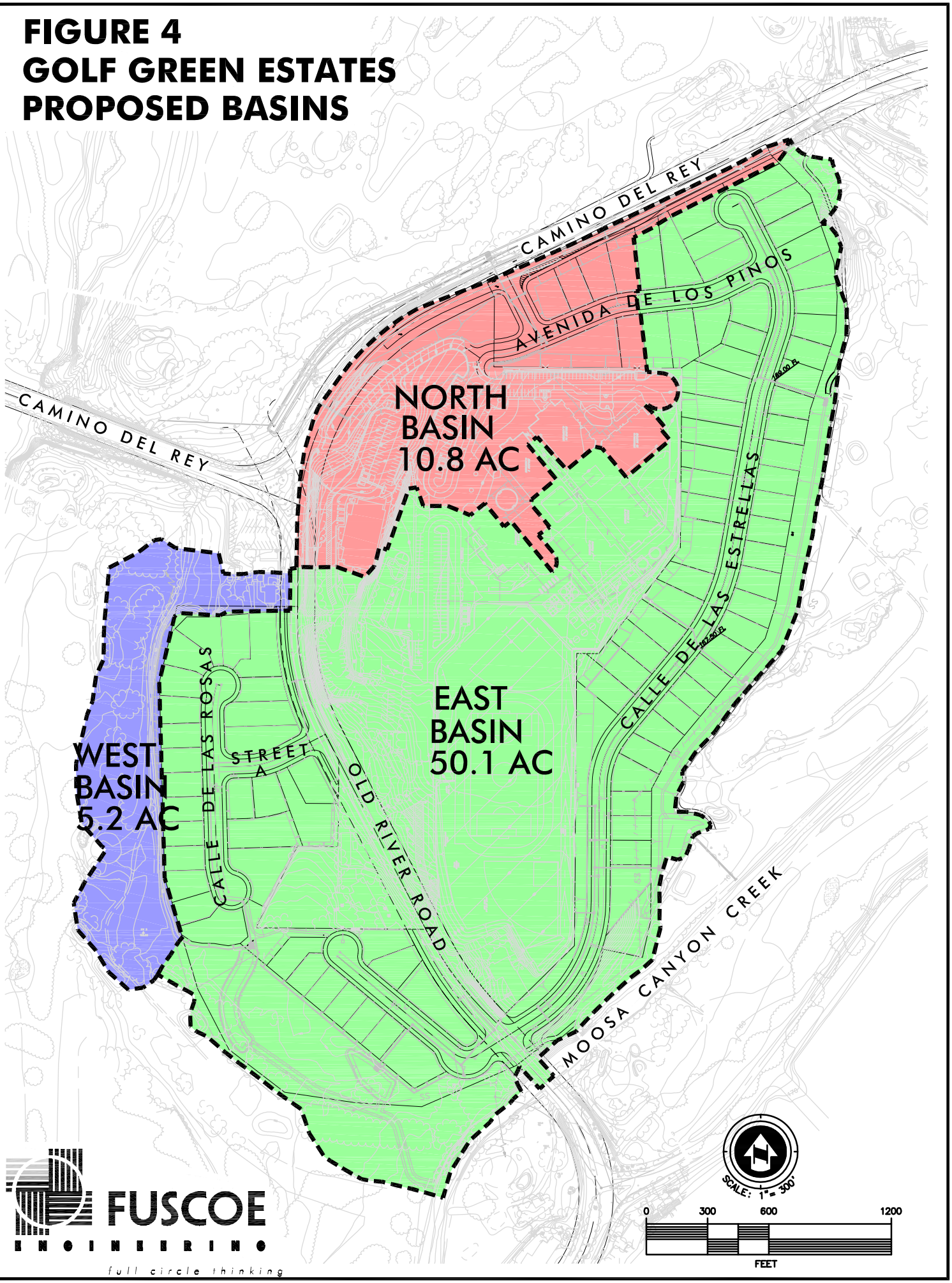
M:\PROJECTS\2518- SAN LUIS REY DOWNS LLC\02A- GOLF GREEN\ENG\HYDROLOGY\CEQA DRAINAGE STUDY\03 FIGURE 3 - EXISTING BASINS.DWG (12-2 Plotted by: roberts

FIGURE 4
GOLF GREEN ESTATES
PROPOSED BASINS



M:\PROJECTS\2518- SAN LUIS REY DOWNS LLC\02A- GOLF GREEN\ENG\HYDROLOGY\CEQA DRAINAGE STUDY\04 FIGURE 4 - PROPOSED BASINS.DWG (12-2 Plotted by: rroberts

The East Watershed flows toward the perimeter of the project to extended detention basins that ultimately outlet to Moosa Canyon Creek. The North Watershed flows north under the road through a proposed storm drain culvert to bioretention areas on the golf course to the north. The West Watershed flows west and then south, eventually arriving at Point of Interest 3. No bioretention or detention basins are proposed at that location due to there being no change in perviousness within the proposed basin's boundaries. Between existing and proposed conditions, the watersheds generally maintain their original paths.

The proposed locations for stormwater BMPs are shown in Appendix C. Please refer to the project Stormwater Management Plan (SWMP) for discussion of BMP maintenance, anticipated costs, and responsibility.

It should be noted that the North watershed leads to the San Luis Rey River, while the east and west watershed leads to Moosa Canyon Creek. Both the San Luis Rey River and Moosa Canyon Creek then confluence on the San Luis Rey Downs golf course immediately to the southwest of the project. This golf course which surrounds the development is owned by the same party that is developing the residential site. All grading along the perimeter of the project as well as creation of the bioswales that occur on the San Luis Rey Golf Course will be done so with a letter of permission from San Luis Rey Downs LLC, owners of both properties. The proposed BMPs will be Catergory 3, requiring a County Maintenance District to be assigned to the proposed lots, ensuring the funding of BMP maintenance by the County. Access easements will also be dedicated to ensure that the County's maintenance crews will be able to access the BMP locations.

A hydrology map for proposed conditions is included in Appendix H.

3. HYDROLOGIC ANALYSIS: METHODOLOGY

Computer Software Package: AES-2010

Design Storm: 100-year return interval

Land Use: Natural, Medium Density Residential (7.3 DU/Ac) and General Commercial Development (used for the existing school site)

Soil Group: . Hydrologic Soil Groups for each subbasin were determined from the US Dept. of Agriculture's 1973 San Diego County Soil Suvey. Maps showing soil type and Hydrologic Soil Group classifications for existing and proposed conditions are included in Appendix B.

Runoff Coefficient: Runoff coefficients were selected in accordance with the San Diego County Hydrology Manual (June 2003). To calculate the runoff coefficient (C) for individual subareas, the amount of area within each model subarea associated with each hydrologic soil group was determined, and the value of C for each subarea was calculated as a

weighted average, using the appropriate runoff coefficients from the San Diego County Hydrology Manual, Table 3.1.

Runoff: The Rational Method is the most widely used hydrologic model for estimating peak runoff rates. Applied to small urban and semi-urban areas with drainage areas less than 0.5 square miles, the Rational Method relates storm rainfall intensity, a runoff coefficient, and drainage area to peak runoff rate. This relationship is expressed by the equation:

Q = CIA, where:

Q = The peak runoff rate in cubic feet per second at the point of analysis.

C = A runoff coefficient representing the area – averaged ratio of runoff to rainfall intensity.

I = The time-averaged rainfall intensity in inches per hour corresponding to the time of concentration.

A = The drainage basin area in acres.

To perform a node-link study, the total watershed area is divided into sub-areas which discharge at designated nodes.

The procedure for the sub-area summation model is as follows:

(1) Subdivide the watershed into an initial sub-area and subsequent sub-areas. Per the 2003 San Diego County Hydrology Manual, flow-line for initial sub-area ranges from 50 ft to 100 ft long; initial sub-areas generally are less than 1 acre in size.

(2) Assign upstream and downstream node numbers to each sub-area.

(3) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation.

(4) Using the initial T_c, determine the corresponding values of I. Then Q = CIA.

(5) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows. The AES-2007 computer sub-area menu is shown in Table 7.

Table 7. Subarea Hydrologic Processes

Process #	Description of Process
1	Confluence analysis at node
2	Initial sub-area analysis (including time of concentration calculation)
3	Pipeflow travel time (computer estimated)
4	Pipeflow travel time (user specified)
5	Trapezoidal channel travel time
6	Street flow analysis through subarea
7	User-specified information at node
8	Addition of subarea runoff to main line
9	V-gutter flow through area
10	Copy main stream data to memory bank
11	Confluence main stream data with a memory bank
12	Clear a memory bank

Intensity: Rainfall intensity was calculated using the following equation, which is given in the Manual:

$$I = 7.44 \times P_6 \times (Tc^{-0.645})$$

Where:
I = Rainfall Intensity in inches per hour (in/hr)
P_6 = Rainfall in inches for the 6-hour storm event
Tc = Time of concentration in minutes

Time of Concentration: Time of concentration was calculated for overland flow areas (sheet drainage) using the equation developed by the Federal Aviation Administration, which is given as:

$$Tc = [1.8 \times (1.1 - C) \times (L^{1/2})] / (S^{1/3})$$

Where:
Tc = Time of concentration in minutes
C = Runoff coefficient
L = Length of travel of runoff in feet
S = Slope in percent

The initial times of concentration and maximum overland flow lengths were selected from Table 3-2 in the Manual. The initial time of concentration then combined with the travel time

to arrive at the time of concentration for each basin. Relevant excerpts from the Manual are given in Appendix A.

Time of travel in storm drain pipes and drainage channels was calculated using the Manning equation. For HDPE and RCP storm drains, a Manning "n" of 0.012 and 0.013 were used, respectively. For brow ditches, a Manning "n" of 0.013 was used while a Manning "n" of 0.030 was selected for flow in the bioswales. Time of travel in gutters was used using the gutter flow velocity charts given the Manual.

At the confluence point of two or more basins, the following procedure is used to combine peak flow rates to account for differences in the basin's times of concentration. This adjustment is based on the assumption that each basin's hydrographs are triangular in shape.

(1). If the collection streams have the same times of concentration, then the Q values are directly summed,

$Q_p = Q_a + Q_b$; $T_p = T_a = T_b$

(2). If the collection streams have different times of concentration, the smaller of the tributary Q values may be adjusted as follows:

(i). The most frequent case is where the collection stream with the longer time of concentration has the larger Q. The smaller Q value is adjusted by a ratio of rainfall intensities.

$Q_p = Q_b + Q_a (I_b/I_a)$; $T_p = T_a$

(ii). In some cases, the collection stream with the shorter time of concentration has the larger Q. Then the smaller Q is adjusted by a ratio of the T values.

$Q_p = Q_b + Q_a (T_b/T_a)$; $T_p = T_b$

4. HYDROLOGIC ANALYSIS: SUMMARY OF RESULTS

Hydrologic Parameters

A summary of hydrologic parameters and results for existing and proposed conditions is included in Table 1a and 1b. The Points of Interest listed in the table correspond to the runoff discharge locations indicated on the maps in Appendix H. AES input and output from the hydrologic analysis is included in Appendix D.

Table 1a. Summary of Hydrologic Modeling Results by Sub-basin

Existing Conditions							Proposed Conditions						
Point	C (avg)	Tc (min)	I (in/hr)	A (acre)	V (ft/s)	Q (cfs)	Point	C (avg)	Tc (min)	I (in/hr)	A (acre)	V (ft/s)	Q (cfs)
1	0.61	6.4	6.7	12.0	3.6	50	1	0.75	6.4	6.7	10.8	3.9	49
2	0.43	20.1	3.2	47.7	3.3	87	2	0.57	16.5	4.1	50.1	3.7	117
3	0.23	20.9	3.2	6.5	0.9	6	3	0.21	21.4	3.1	5.2	0.9	4

Table 1b. Summary of Hydrologic Modeling Results by Watershed

	Existing Conditions			Proposed Conditions			Change	
Drainage Area	Sub-Basin	Area (acre)	Q (cfs)	Sub-basins	Area (acre)	Q (cfs)	Area (acre)	ΔQ (cfs)
North Watershed	1	12	50	1	10.8	49	-1.2	-1
East Watershed	2	47.7	87	2	50.1	117	+2.4	+30
West Watershed	3	6.5	6	3	5.2	4	-1.3	-2

As expected, when the three watersheds are combined, the modeled peak flow under proposed conditions is larger than the modeled peak flow under existing conditions, due to the increased amount of impervious area associated with the development. The discharge from the North and West Watersheds is expected to decrease slightly from 50 cfs to 49 cfs and from 6 to 4 cfs respectively. The East Watershed flow is expected to increase from 87 cfs to 117 cfs. If the increases in peak flow from the three watersheds are summed, the overall increase in peak flow would be 27 cfs.

Given the nature of this site, the change in flow associated with this development is not expected to result in negative impacts downstream. Even using the highly conservative assumption of summing peak flows, the increase in flow is only 27 cfs, which is 0.2% of the corresponding flow in Moosa Canyon Creek (13,500 cfs, per existing HEC-2 model) and approximately 0.1% of the corresponding flow in the San Luis Rey River (41,000 cfs, per

existing HEC-2 model) at this location. Furthermore, under proposed conditions, flow from the site discharges into what is already mapped as floodplain area. The minor flow increase will not result in any change in flood condition. In order to decrease velocities before being conveyed onto the golf course, rip rap will be utilized at the outlet points to eliminate any localized areas of erosion. Because the contribution to the downstream flow is insignificant, it is not expected to lead to an exceedance in downstream capacity, nor will it lead to an increase in downstream erosion or loss of habitat. Refer to Section 4 for further analysis of pre and post construction flood conditions. Also, given the relatively small contribution to overall flow originating from the project site, a scour analysis is not warranted for either the San Luis Rey River or Moosa Canyon Creek. Additional analysis of the flood conditions is given in Section 4 of this report.

The runoff coefficient listed above in Table 1a is the area-weighted average runoff coefficient for the entire drainage area at the indicated point of interest. To calculate the runoff coefficient C for individual subareas, the amount of area within each model subarea associated with each hydrologic soil group was determined, and the value of C for each subarea was calculated as a weighted average, using the appropriate runoff coefficients from the San Diego County Hydrology Manual, Table 3.1. Additional details regarding C value calculation are included in Section 4.

Changes to Downstream Owners

As shown in Table 1b. the North and West basins will be slightly smaller in the proposed condition, while the East basin will have an equivalent increase in size. All three of these basins confluence at the southwest corner of the adjacent San Luis Rey Downs Golf Course. The golf course is owned by the same party that is developing the project site, and as such they have no objection to the small diversion of flow. In addition they will give themselves permission to grade and record easements to ensure access in perpetuity to the County to ensure accessibility for maintenance crews.

Detention Required Due to Flooding at Old River Road Bridge

From the floodway data which is discussed further in Section 5, it was discovered that the southern end of the bridge is topped during a 100 year flood (Refer to existing and proposed cross sections 0.505 in Appendix E) . Due to this condition, an extended detention basin will be constructed along the eastern edge of the project that will detain enough flows so that the proposed flows under the bridge do not exceed that in the existing condition.

Existing Node 245 at bridge	63.5 cfs
Proposed Node 246 at bridge	76.3 cfs
Increase due to development	Q=12.8 cfs

As you can see in the table above, if left undetained, the amount of flow at the bridge would increase by 12.8 cfs. Extended detention basin 2C along the eastern edge of the project will need to detain enough to cut the proposed 100 year flows by 12.8 cfs.

Autodesk's Hydrographs Extension to Civil 3D 2012 was used to analyze the detention basin. The existing 100 year storm flows at proposed hydrology node 220.1 were input into Rick Engineering's "Rick Rat Hydro" program to determine a model 100 year storm event. The output can be found in Appendix J. Stage-Storage and Stage-Discharge graphs were determined by Civil 3D based on the input hydrograph calculated by Rick Rat Hydro and the orifices calculated as part of the hydromod report as well as the physical features listed below. It should be noted that a tailwater equal to the Moosa Canyon Creek 100 year storm elevation was included in the calculations.

Bottom elevation of detention basin	164
Westerly side slope	2:1
Easterly side slope	3:1
Width of bottom	8.5'
Length of Pond Bottom	735'
Emergency spillway elevation	169
Top of berm	170
100 Year storm tailwater elevation	168.0

The post-detention output from the program can be found in Appendix J and is summarized below.

Peak Discharge at Node 220.1	3.7 cfs
Time to Peak	4.6 hrs
Max Elevation of ponding	168.8
Max Storage	73,002 cu-ft

As can be seen below, the detention basin will decrease the peak 100 year flows by 36.9 cfs, thus ensuring that the flows at the bridge will not be increased due to development.

Increase in flow at bridge if left undetained	12.8 cfs
Undetained flows at Node 220.1	Q=40.6 cfs Tc=7.2 min
Post-detention flows at Node 220.1	Q=3.7 cfs Tc=4.6 hrs
Decrease due to detention	Q=36.9 cfs

5. FLOODWAY / FLOODPLAIN ANALYSIS

FEMA Maps

The County's flood studies have defined base flood elevations along with floodplain and floodway lines, as shown on County Map 406-1701 in Appendix F. FEMA's maps of the project area are based upon the County mapping, however FEMA did not formally adopt the base flood elevations or the additional floodway lines shown on the County flood map.

There are significant discrepancies in the FEMA mapping. The general shapes of the FEMA flood plain mapping are similar to the County's mapping (refer to Appendix G for a comparison). However, when we attempted to plot the FEMA mapping by importing the GIS linework from SANGIS we found that the 100 year flood lines bear no correspondence to the topography. On the other hand, the County's lines do correspond with the natural topography and base flood elevations. Based on this analysis we recommend that all detailed analysis be based on the County's data.

The floodplain analysis that we have done was based upon the County's data from the original study, which was contained in two HEC-RAS files that we received from them. Because the original data from the county included a floodway, floodplain, base flood elevations, and cross sectional information, it was clearly the most stringent data source and thus was relied upon to do the additional flood analysis for the proposed conditions. A CLOMR/LOMR will be required per County Ordinance Section 811.503(b), and NFIP regulations where there are changes proposed to the mapped floodplain.

Compliance with Floodway Setbacks

When development areas infringe upon the 100 year flood plain, County ordinance 9842 SEC 86.604 d 4 states that an additional setback shall be placed equal to 15% of the width of the floodway or 100', whichever is less. On the southwestern portion of the project near lots 28 thru 34 the development area was pulled back 100' from the floodway in order to comply. Along lots 34 thru 36 on the southern edge of the project, a setback equal to 15% of the floodway width was utilized. North of lot 36, the development lies more than 100' from the floodway.

Adjacent to lots 5 thru 17 a wall with an approximate height of 5' was placed outside the County's 100 year flood plain limits so that the development area does not encroach into the floodplain, and thus avoid the need for an additional setback. As stated previously, there are some discrepancies between FEMA and the County's linework, and this location is no exception. A LOMA has been filed with FEMA in order to get them to adopt the County's flood lines and fix the discrepancies in this area. This would ensure that the proposed project does not encroach the County or FEMA floodplain boundary. This process is ongoing and is critical due to the fact that an additional floodway setback would force a redesign of the project.

Change in Floodwater Elevations due to Development

When development occurs near the San Luis River, County ordinance 9842 SEC 86.602I limits any rise in floodwaters due to proposed grading to 0.2 feet. However, Moosa Canyon Creek does not fall under the same ordinance, in which case a floodwater surface change of up to 1 ft would be acceptable.

Floodwater Analyis

In order to determine the floodwater elevations, a HEC-RAS analysis was completed. The original 1975 County models (SLR2.HEC and MOOSAIR1.HEC) were imported into HEC-RAS 4.1 and run for a baseline "Existing Condition" model. Along the San Luis Rey River, Sections 12679 and 12543 were modified for the "Proposed Conditions" model. Along Moosa Canyon Creek, Sections 0.43 through 0.87 were modified to show the grading along the northern edge for it's "Proposed Condition" model.

The HEC-4.1 output files for both existing and proposed conditions is included in the appendix. A summary of the results and a comparison with the original analysis is provided on the next page.

San Luis Rey River – 100 Year Storm Event

Sta	Exist Q (cfs)	Pro Q (cfs)	Exist. V (ft/s)	Pro V (ft/s)	ΔV (ft/s)	W.S. Elev Existing(ft)	W.S. Elev Proposed (ft)	ΔW.S. (ft)
17464	41,000	41,000	12.6	12.6	0	245.81	245.81	0
17425	41,000	41,000	9.63	9.63	0	245.92	245.92	0
17388	41,000	41,000	9.67	9.67	0	245.52	245.52	0
17350	41,000	41,000	9.36	9.36	0	245.21	245.21	0
17309	41,000	41,000	9.99	9.99	0	244.55	244.55	0
17241	41,000	41,000	6.92	6.92	0	243.18	243.18	0
17194	41,000	41,000	6.67	6.67	0	242.31	242.31	0
17086	41,000	41,000	6.37	6.37	0	240.39	240.39	0
16930	41,000	41,000	9.85	9.85	0	236.09	236.09	0
16724	41,000	41,000	8.99	8.99	0	231.8	231.8	0
16531	41,000	41,000	7.43	7.43	0	228.7	228.7	0
16359	41,000	41,000	6.46	6.46	0	225.26	225.26	0
16206	41,000	41,000	9.08	9.08	0	221.73	221.73	0
16032	41,000	41,000	4.68	4.68	0	219.54	219.54	0
15858	41,000	41,000	7.54	7.54	0	216.04	216.04	0
15669	41,000	41,000	4.73	4.73	0	212.67	212.67	0
15455	41,000	41,000	6.73	6.73	0	209.19	209.19	0
15256	41,000	41,000	5.28	5.28	0	206.22	206.22	0
15086	41,000	41,000	6.22	6.22	0	203.74	203.74	0
14891	41,000	41,000	5.97	5.97	0	200.45	200.45	0
14707	41,000	41,000	3.81	3.81	0	197.25	197.25	0
14516	41,000	41,000	5.15	5.15	0	193.5	193.5	0
14311	41,000	41,000	3.4	3.4	0	189.12	189.12	0
14171	41,000	41,000	3.51	3.51	0	186.2	186.2	0
13946	41,000	41,000	2.69	2.69	0	181.7	181.7	0
13827	41,000	41,000	1.49	1.49	0	179.64	179.64	0
13738	41,000	41,000	1.83	1.83	0	178.34	178.34	0
13617	41,000	41,000	2.49	2.49	0	177.1	177.1	0
13516	41,000	41,000	3.58	3.58	0	176.24	176.24	0
13402	41,000	41,000	3.75	3.75	0	174.3	174.3	0
13285	41,000	41,000	5.54	5.54	0	171.47	171.47	0
13158	41,000	41,000	5.19	5.19	0	168.75	168.75	0
13048	41,000	41,000	3.69	3.69	0	166.94	166.94	0
12938	41,000	41,000	2.02	2.02	0	166.23	166.24	0.01
12843	41,000	41,000	3.08	3.08	0	165.82	165.82	0
12805	41,000	41,000	5.11	5.1	-0.01	165.47	165.47	0
12798	41,000	41,000	5.19	5.19	0	165.36	165.36	0
12795	41,000	41,000	6.6	6.59	-0.01	165.12	165.13	0.01
12793	41,000	41,000	5.74	5.74	0	165.13	165.14	0.01
12785	41,000	41,000	7.7	7.69	-0.01	164.43	164.44	0.01
12679	41,000	41,000	5.62	5.64	0.02	162.86	162.87	0.01
12543	41,000	41,000	6.71	6.71	0	161.4	161.38	-0.02
12469	48,000	48,000	5.16	5.16	0	160.94	160.94	0
12429	48,000	48,000	3.46	3.46	0	160.79	160.79	0

San Luis Rey River – 100 Year Storm Event (continued)

Sta	Exist Q (cfs)	Pro Q (cfs)	Exist. V (ft/s)	Pro V (ft/s)	ΔV (ft/s)	W.S. Elev Existing(ft)	W.S. Elev Proposed (ft)	ΔW.S. (ft)
12308	48,000	48000	4.52	4.52	0	160.29	160.29	0
12155	48,000	48000	5.19	5.19	0	159.5	159.5	0
12060	48,000	48000	7.05	7.05	0	158.66	158.66	0
12020	48,000	48000	5.41	5.41	0	158.49	158.49	0
11965	48,000	48000	12.5	12.5	0	155.61	155.61	0
11872	48,000	48000	7.56	7.56	0	154.61	154.61	0
11762	48,000	48000	6.98	6.98	0	153.8	153.8	0
11667	48,000	48000	6.11	6.11	0	153.23	153.23	0
11591	48,000	48000	7.06	7.06	0	152.68	152.68	0
11477	48,000	48000	5.44	5.44	0	152.19	152.19	0
11371	48,000	48000	5.65	5.65	0	151.28	151.28	0
11312	48,000	48000	6.1	6.1	0	150.47	150.47	0
11191	48,000	48000	4.95	4.95	0	149.73	149.73	0
11093	48,000	48000	2.95	2.95	0	149.11	149.11	0
11051	48,000	48000	3.21	3.21	0	148.95	148.95	0
11002	48,000	48000	2.81	2.81	0	148.73	148.73	0
10939	48,000	48000	3.16	3.16	0	148.4	148.4	0
10854	48,000	48000	3.62	3.62	0	147.67	147.67	0
10778	48,000	48000	3.66	3.66	0	146.71	146.71	0
10742	48,000	48000	4.41	4.41	0	146.18	146.18	0
10640	48,000	48000	2.44	2.44	0	144.59	144.59	0
10541	48,000	48000	5.17	5.17	0	143.53	143.53	0
10482	48,000	48000	5.21	5.21	0	142.48	142.48	0
10474	48,000	48000	5.45	5.45	0	142.29	142.29	0
10470	Bridge	Bridge			0			0
10466	48,000	48000	5.46	5.46	0	142.26	142.26	0
10457	48,000	48000	5.56	5.56	0	142.08	142.08	0
10409	48,000	48000	5.98	5.98	0	140.94	140.94	0
10359	48,000	48000	9.17	9.17	0	138.02	138.02	0
10243	48,000	48000	7.3	7.3	0	133.91	133.91	0
10120	48,000	48000	6.89	6.89	0	132.26	132.26	0
10020	48,000	48000	7.88	7.88	0	130.54	130.54	0
9920	48,000	48000	5.84	5.84	0	129.28	129.28	0
9820	48,000	48000	5.61	5.61	0	128.63	128.63	0
9720	48,000	48000	9.08	9.08	0	126.61	126.61	0
9620	48,000	48000	8.61	8.61	0	124.19	124.19	0

As you can see from the results above, the water surface elevation for the San Luis Rey River never changes more than 0.02 ft, well under the 0.2 ft cap from the County Ordinance. In addition, there is no significant increase in the velocity of the water due to development, thus erosion and/or scouring downstream is not expected.

Moosa Canyon Creek – 100 Year Storm Event

Sta	Exist Q (cfs)	Pro Q (cfs)	Exist. V (ft/s)	Pro V (ft/s)	ΔV (ft/s)	W.S. Elev Existing(ft)	W.S. Elev Proposed (ft)	ΔW.S. (ft)
1.88	13500	13500	11.76	11.76	0	186.16	186.16	0
1.87	13500	13500	11.62	11.62	0	182.65	182.65	0
1.84	13500	13500	8.59	8.59	0	180.82	180.82	0
1.78	13500	13500	11.95	11.95	0	178.94	178.94	0
1.65	13500	13500	5.6	5.6	0	178.02	178.02	0
1.64	13500	13500	5.51	5.51	0	177.88	177.88	0
1.63	13500	13500	6.95	6.95	0	177.35	177.35	0
1.625	Bridge	Bridge			0			0
1.62	13500	13500	10.36	10.36	0	176.35	176.35	0
1.6	13500	13500	12.09	12.09	0	173.66	173.66	0
1.53	13500	13500	6.63	6.63	0	172.09	172.09	0
1.52	13500	13500	6.08	6.08	0	172.02	172.02	0
1.47	13500	13500	4.26	4.26	0	171.94	171.94	0
1.39	13500	13500	3.89	3.89	0	171.69	171.69	0
1.34	13500	13500	5.21	5.21	0	171.35	171.35	0
1.28	13500	13500	3.35	3.35	0	171.29	171.29	0
1.23	13500	13500	2.86	2.86	0	171.21	171.21	0
1.19	13500	13500	3.21	3.21	0	171.12	171.12	0
1.18	13500	13500	6.42	6.42	0	170.48	170.48	0
1.175	Bridge	Bridge			0			0
1.17	13500	13500	7.98	7.98	0	169.96	169.96	0
1.15	13500	13500	11.7	11.7	0	168.87	168.87	0
1.04	13500	13500	3.42	3.38	0.04	168.43	168.51	0.08
0.95	13500	13500	5.37	5.23	0.14	168.05	168.15	0.1
0.93	13500	13500	3.81	3.72	0.09	168.04	168.14	0.1
0.87	13500	13500	3.23	3.46	-0.23	167.94	168.02	0.08
0.76	13500	13500	3.62	4.01	-0.39	167.71	167.73	0.02
0.62	13500	13500	2.95	3.44	-0.49	167.56	167.53	-0.03
0.56	13500	13500	3.74	3.74	0	167.42	167.42	0
0.54	13500	13500	3.19	3.14	0.05	167.41	167.41	0
0.52	13500	13500	3.96	3.84	0.12	167.29	167.3	0.01
0.51	13500	13500	6.27	6.27	0	166.85	166.85	0
0.505	Bridge	Bridge			0			0
0.5	13500	13500	9.13	8.63	0.5	162.32	162.6	0.28
0.49	13500	13500	8.9	9.21	-0.31	162.26	162.35	0.09
0.48	13500	13500	6.31	6.5	-0.19	162.53	162.65	0.12
0.46	13500	13500	5.73	6.98	-1.25	162.43	162.35	-0.08
0.43	13500	13500	4.17	4.41	-0.24	162.41	162.42	0.01
0.35	13500	13500	9.92	9.92	0	160.41	160.41	0

As you can see in the results above, the change in floodwater elevations due to development along Moosa Canyon Creek stayed well under 1 ft. There were also no significant increases in velocity, thus erosion or scouring would not be expected. The floodwater elevations were

compared to the pad elevations at each section, and on Lot 35 it showed that the building pad needed to be raised to a minimum of 168.5 to stay one ft above the 100 year flood elevation.

Effects of 10 Year Storm on Extended Detention Basins

HEC-RAS was used to determine the 10 year flood elevations of both Moosa Canyon Creek and the San Luis Rey River (Refer to Appendix E for results). As can be seen on the exhibit on the following page, along the San Luis Rey River the 10 year flood elevations were relatively far away from the site and do not pose a threat. Moosa Canyon Creek is more prone to flooding the surrounding area, and thus further analysis of the extended detention basins was warranted.

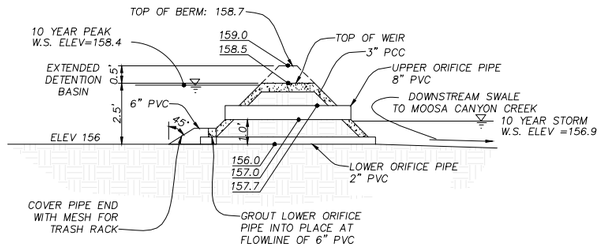
Although a 10 year peak in Moosa Canyon Creek would probably have a short duration, the extended detention basins (EDBs) were tested having a continuous tailwater acting on them equal to that of the 10 year storm peak in Moosa Canyon Creek. Autodesk's Hydrographs Extension to Civil 3D 2012 was used to check for overtopping and the results are summarized below. Refer to Appendix J for additional information.

Moosa Canyon Creek – 10 Year Storm

EDB	Moosa Canyon W.S Elevation (Tailwater)	EDB Spillway Elevation	EDB Top of berm	Max W.S. elevation in EDB	Overtopped?
2A	156.9	158.5	159	158.4	No
2B	156.9	158.5	159	158.4	No
2C	161.3	169	170	167.5	No
2D	160.2	N/A	161.5	161.0	No

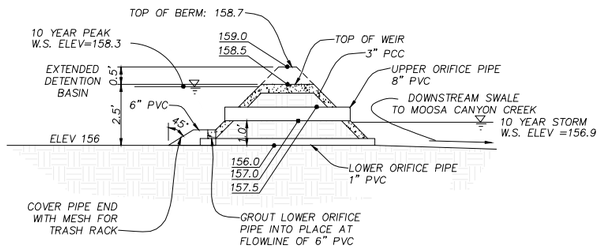
In all cases, the EDBs did not overtop due to the effects of a 10 Year tailwater.

APPENDIX G: EXTENDED DETENTION BASIN DETAILS WITH 10 YEAR FLOOD ELEVATIONS



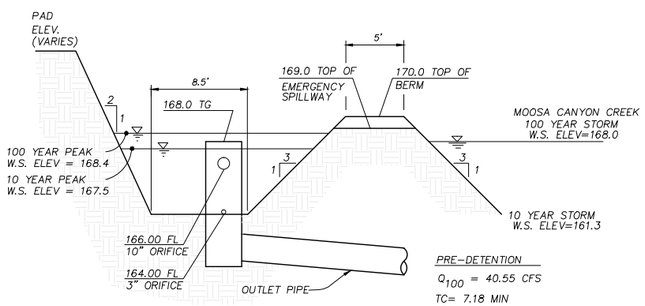
EXTENDED DETENTION BASINS 2A

NOT TO SCALE



EXTENDED DETENTION BASINS 2B

NOT TO SCALE



PRE-DETENTION

Q_{100} = 40.55 CFS

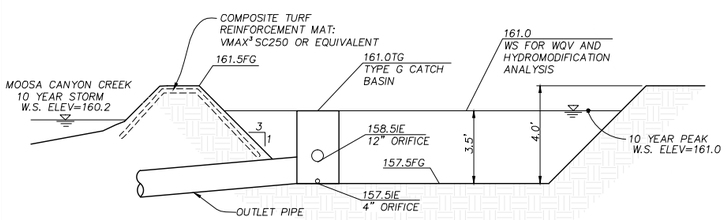
TC= 7.18 MIN

POST-DETENTION

Q_{100} = 9.5 @ 4.2 HOURS

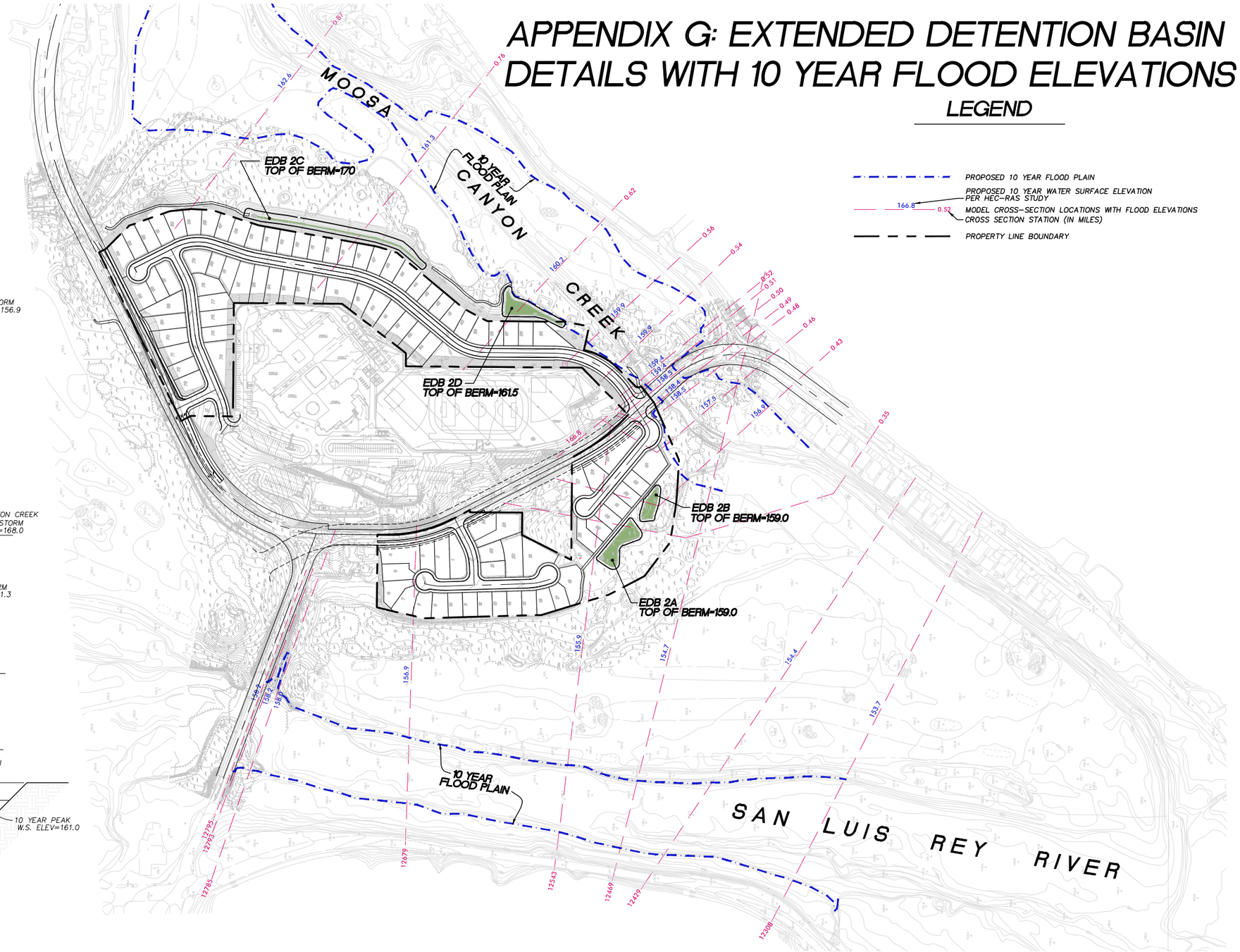
EXTENDED DETENTION BASIN 2C

NOT TO SCALE



EXTENDED DETENTION BASIN 2D

NOT TO SCALE



LEGEND

- PROPOSED 10 YEAR FLOOD PLAIN
- PROPOSED 10 YEAR WATER SURFACE ELEVATION PER HEC-RAS STUDY
- 166.8 — 0.52 — MODEL CROSS-SECTION LOCATIONS WITH FLOOD ELEVATIONS; CROSS SECTION STATION (IN MILES)
- PROPERTY LINE BOUNDARY

SCALE: 1" = 200'

200 100 0 200 400 600

GRAPHIC SCALE IN FEET

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M:\PROJECTS\2518- SAN LUIS REY DOWNS LLC\02A- GOLF GREEN\ENG\HYDROLOGY\GSGA DRAINAGE STUDY\APPENDIX G3 10 YEAR FLOOD ELEVATIONS.DW Plotted by: roberts

Effects of 100 Year Storm on Extended Detention Basins

Although EDB 2C is tall enough to keep100 year floodwaters out, EDBs 2A, 2B and 2D will all be overtopped during a 100 year storm. The outlet berms of EDBs 2A and 2B will be covered with 3" of concrete to protect the outlets. The sideslopes will be planted with turf which generally can withstand velocities less than 5 ft/sec.

In order to determine if additional armoring of sideslopes would be required, the 100 year velocities from the HEC-RAS runs were studied.

EDB	Waterway	HEC-RAS Station	100 Year Storm Velocity
2A	San Luis Rey River	12543	6.7 ft/sec
2B	Moosa Canyon Creek	0.43	4.2 ft/sec
2D	Moosa Canyon Creek	0.62	3.0 ft/sec

Only EDB 2A showed a velocity over 5 ft/sec. Knowing that the velocity of river flow decreases at it's edges, we are comfortable assuming that the velocity on the eastern edge where EDB 2A is located will have velocities in the 5 ft/sec range.

Even though EDB 2D has a relatively low velocity, it's close proximity to Moosa Canyon Creek is a potential concern, thus armoring it's berm is desirable. We recommend that a permanent turf reinforcement mat be placed along the sideslopes of EDB 2D to minimize any potential for erosion in the future. Said mat should be capable of withstanding velocities up to 6 ft/sec such as Vmax SC250 by Tensar or an equivalent. Refer to Appendix K for additional information.

6. REFERENCES

The San Diego County Drainage Design Manual, July 2005

Hydrology Manual, San Diego County: June 2003

Advanced Engineering Systems (AES) 2004a, Hydrology Software

San Diego County Flood Hazard Map, Sheet 406-1701

APPENDIX A

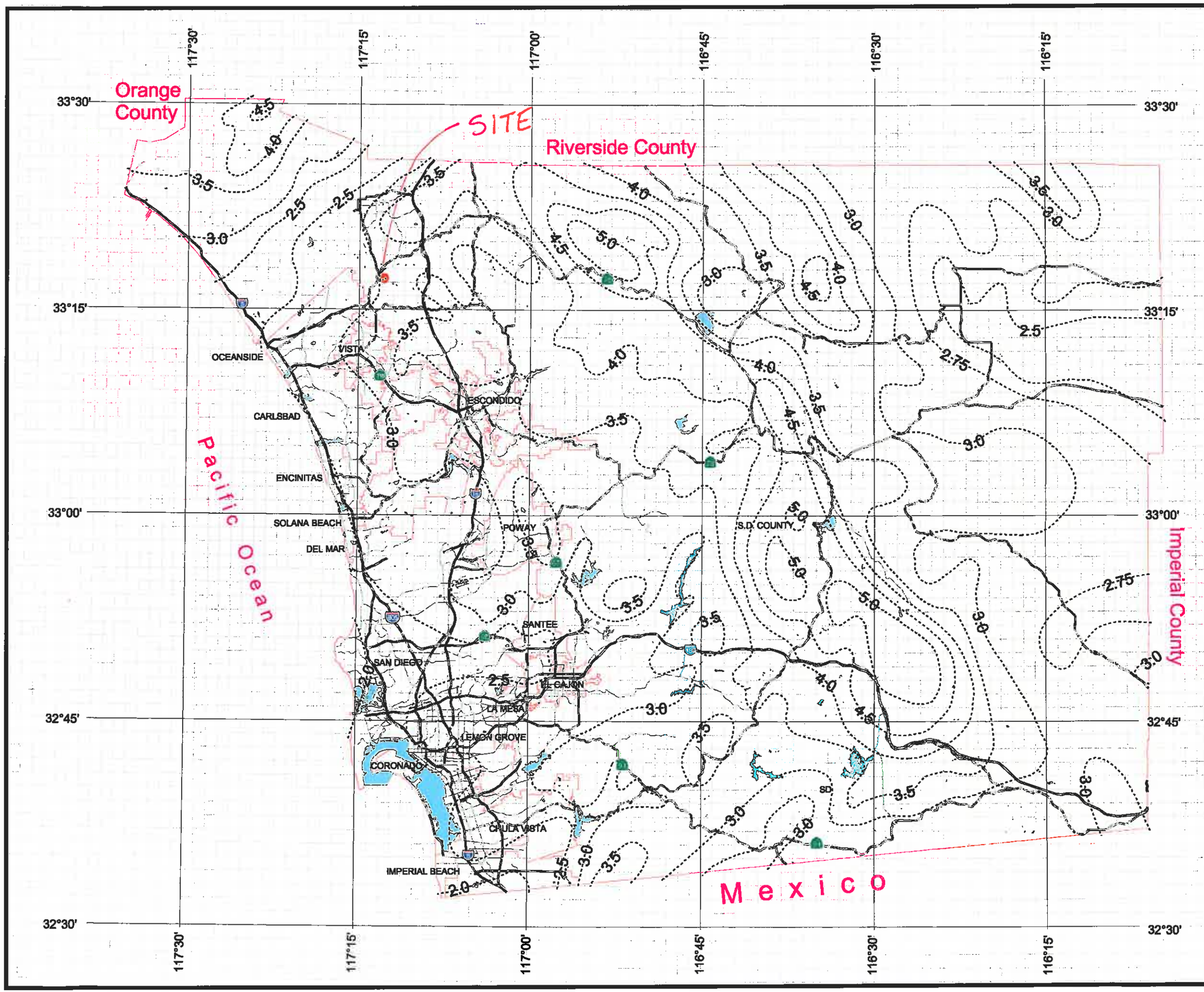
<u>Isopluvial Maps</u>
100 Year Rainfall Event – 6 Hours
100 Year Rainfall Event – 24 Hours
10 Year Rainfall Event – 6 Hours
10 Year Rainfall Event – 24 Hours

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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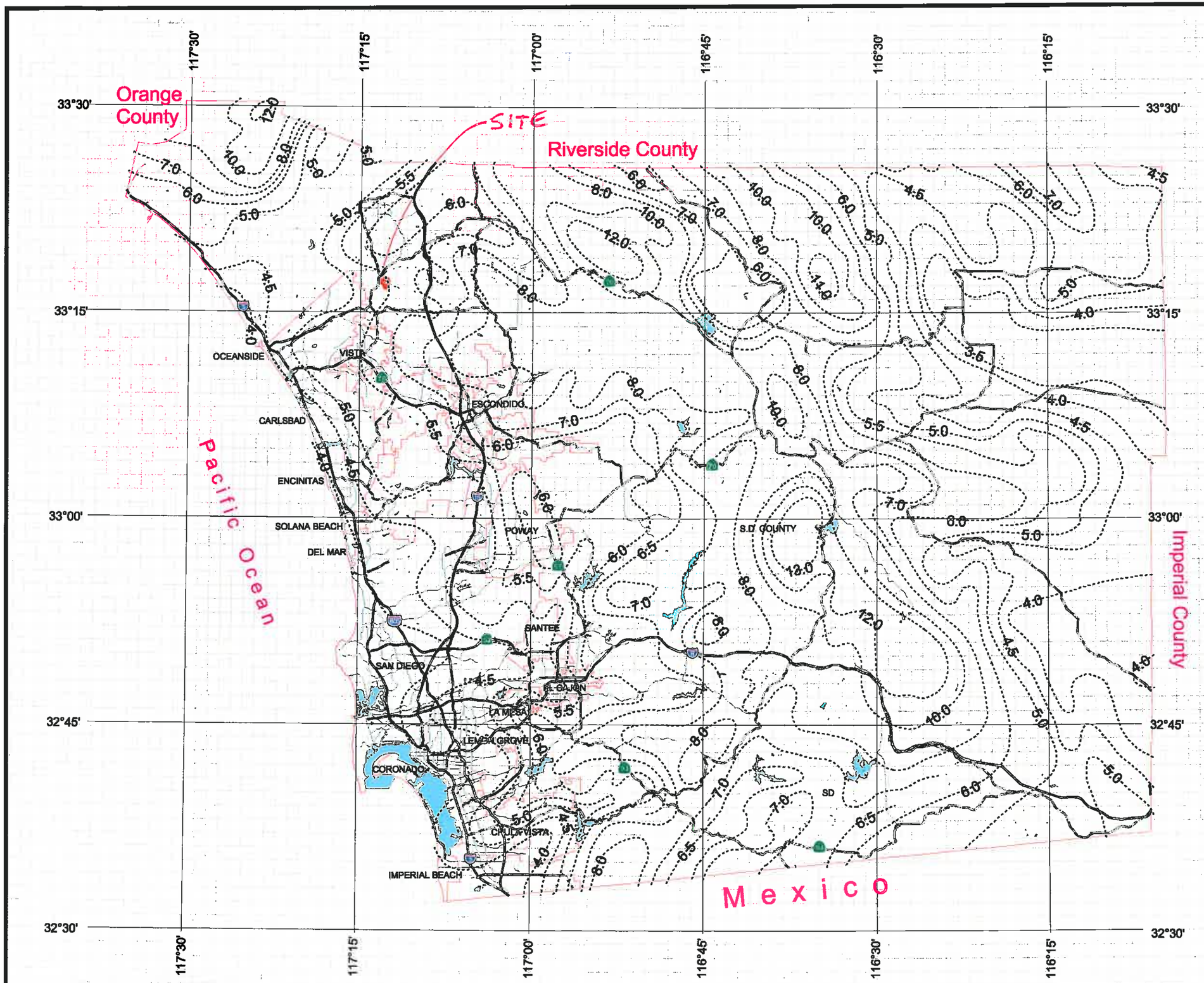
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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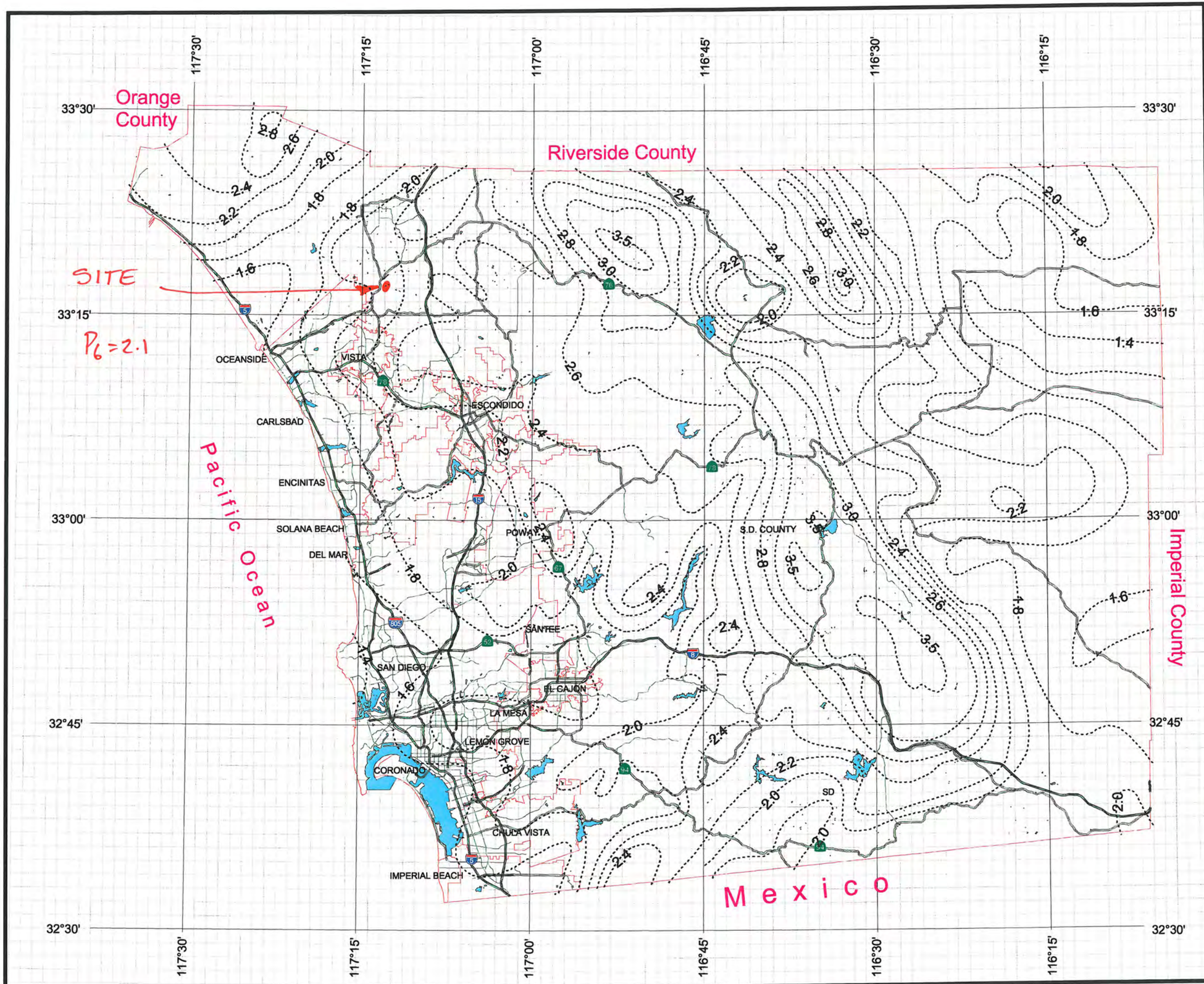
Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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3 0 3 Miles

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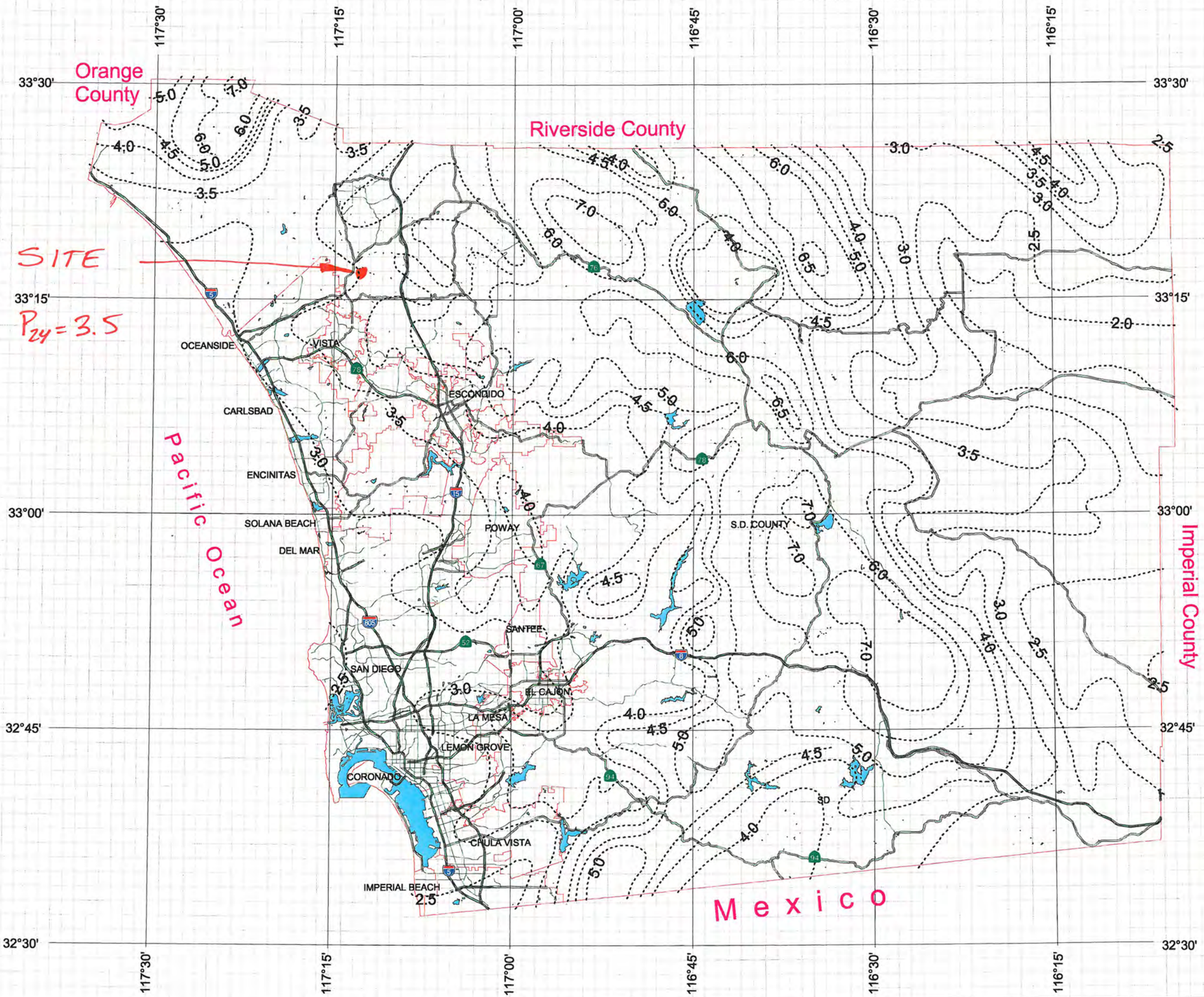
Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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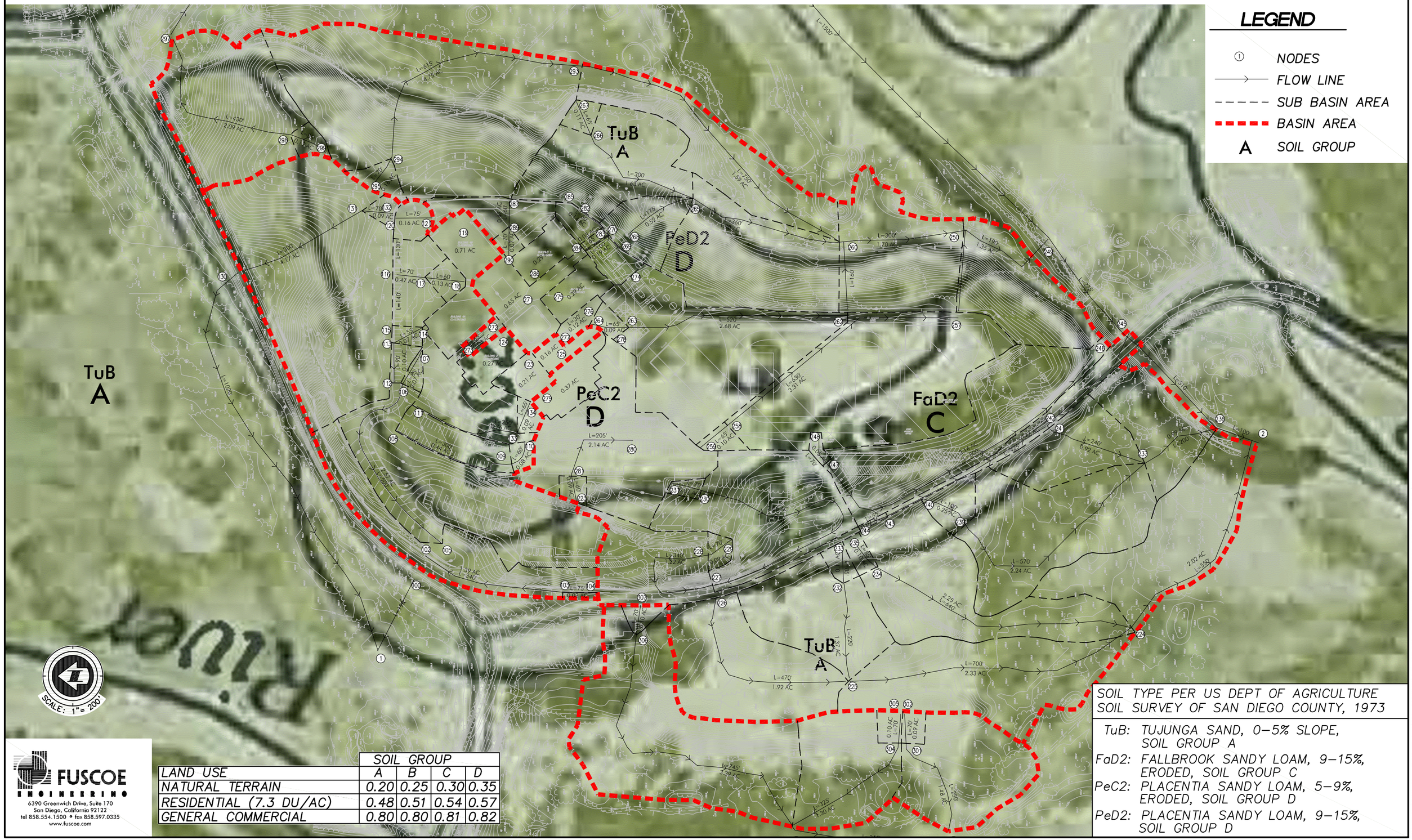
3 0 3 Miles

APPENDIX B

<u>Soil Group Maps</u>
Soil Groups- Existing Conditions
Soil Groups- Proposed Conditions

APPENDIX B
HYDROLOGIC SOIL GROUPS: EXISTING CONDITION



SOIL TYPE PER US DEPT OF AGRICULTURE
SOIL SURVEY OF SAN DIEGO COUNTY, 1973

TuB: TUJUNGA SAND, 0–5% SLOPE, SOIL GROUP A
FaD2: FALLBROOK SANDY LOAM, 9–15%, ERODED, SOIL GROUP C
PeC2: PLACENTIA SANDY LOAM, 5–9%, ERODED, SOIL GROUP D
PeD2: PLACENTIA SANDY LOAM, 9–15%, SOIL GROUP D

LAND USE	SOIL GROUP A	B	C	D
NATURAL TERRAIN	0.20	0.25	0.30	0.35
RESIDENTIAL (7.3 DU/AC)	0.48	0.51	0.54	0.57
GENERAL COMMERCIAL	0.80	0.80	0.81	0.82

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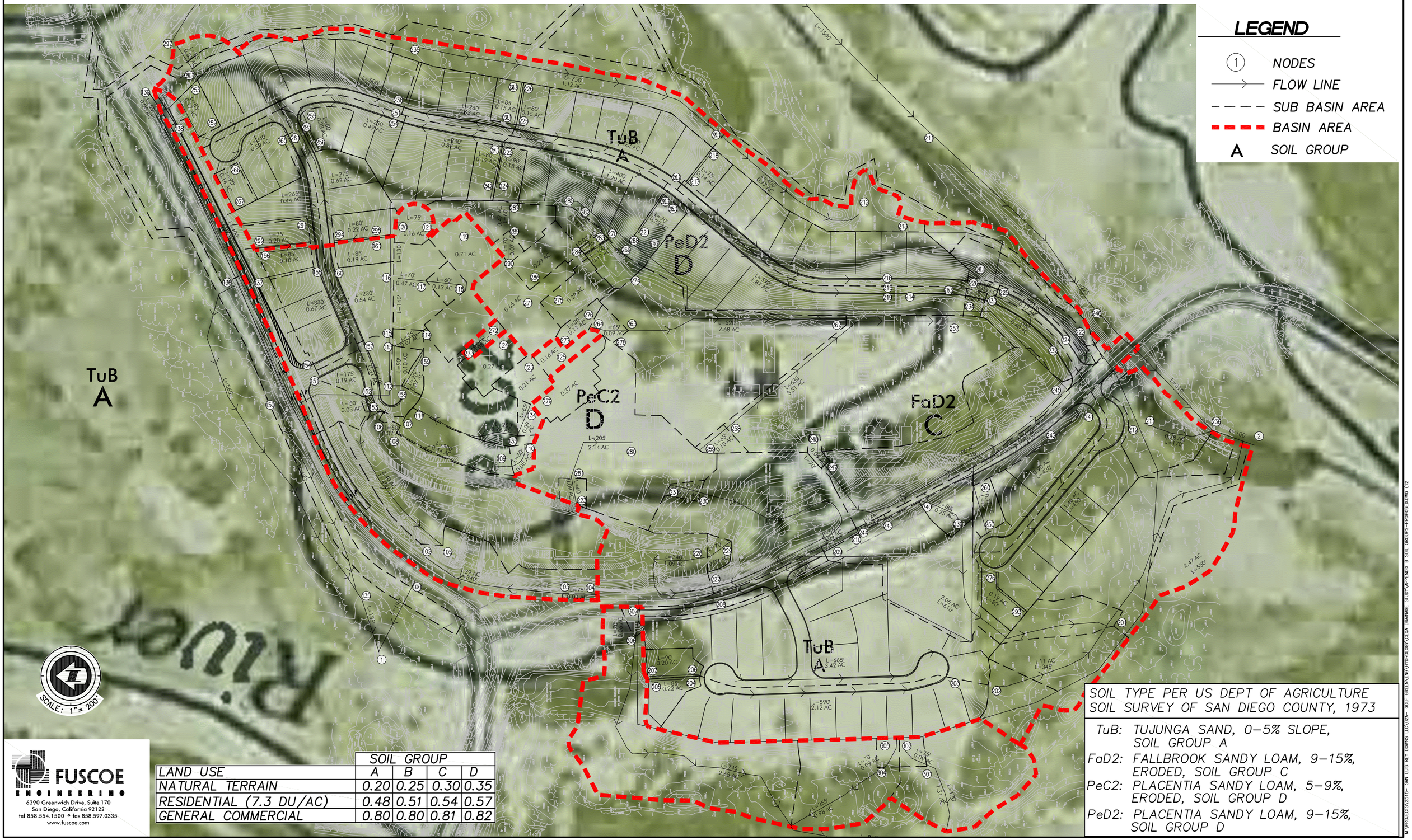
APPENDIX B
HYDROLOGIC SOIL GROUPS: PROPOSED CONDITIONS



SOIL TYPE PER US DEPT OF AGRICULTURE
SOIL SURVEY OF SAN DIEGO COUNTY, 1973

TuB: TUJUNGA SAND, 0–5% SLOPE, SOIL GROUP A

FaD2: FALLBROOK SANDY LOAM, 9–15%, ERODED, SOIL GROUP C

PeC2: PLACENTIA SANDY LOAM, 5–9%, ERODED, SOIL GROUP D

PeD2: PLACENTIA SANDY LOAM, 9–15%, SOIL GROUP D

LAND USE	SOIL GROUP A	B	C	D
NATURAL TERRAIN	0.20	0.25	0.30	0.35
RESIDENTIAL (7.3 DU/AC)	0.48	0.51	0.54	0.57
GENERAL COMMERCIAL	0.80	0.80	0.81	0.82

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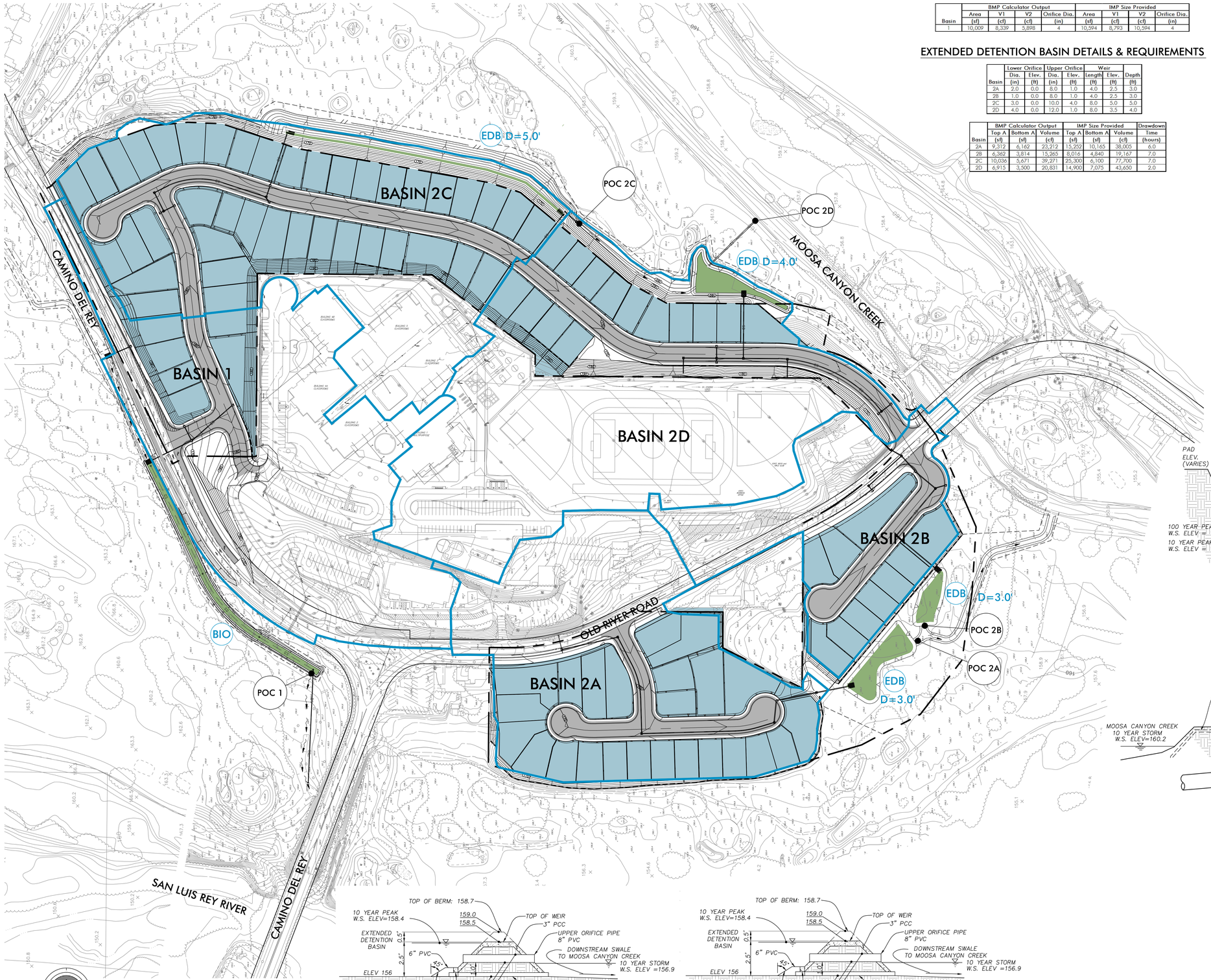
APPENDIX C

BMP Location Map



BIORETENTION BASIN DETAILS & REQUIREMENTS

	BMP Calculator Output				IMP Size Provided			
	Area	V1	V2	Orifice Dia.	Area	V1	V2	Orifice Dia.
Basin	(sf)	(cf)	(cf)	(in)	(sf)	(cf)	(cf)	(in)
1	10,009	8,339	5,898	4	10,594	8,793	10,594	4

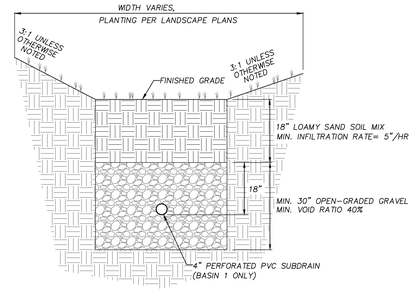
EXTENDED DETENTION BASIN DETAILS & REQUIREMENTS

	Lower Orifice		Upper Orifice		Weir			
	Dia.	Elev.	Dia.	Elev.	Length	Elev.	Depth
Basin	(in)	(ft)	(in)	(ft)	(ft)	(ft)	(ft)
2A	2.0	0.0	8.0	1.0	4.0	2.5	3.0
2B	1.0	0.0	8.0	1.0	4.0	2.5	3.0
2C	3.0	0.0	10.0	4.0	8.0	5.0	5.0
2D	4.0	0.0	12.0	1.0	8.0	3.5	4.0

	BMP Calculator Output			IMP Size Provided			Drawdown
	Top A	Bottom A	Volume	Top A	Bottom A	Volume	Time
Basin	(sf)	(sf)	(cf)	(sf)	(sf)	(cf)	(hours)
2A	9,312	6,162	23,212	15,252	10,165	38,005	6.0
2B	6,362	3,814	15,265	8,016	4,840	19,167	7.0
2C	10,036	5,671	39,271	25,300	6,100	77,700	7.0
2D	6,915	3,500	20,831	14,900	7,075	43,650	2.0

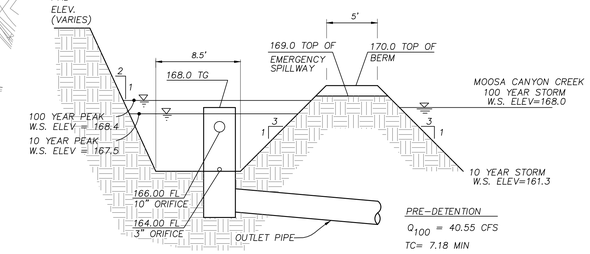
LEGEND

- PROPERTY LINE
- PROPOSED LOT LINE
- RIGHT-OF-WAY
- EXISTING CONTOUR
- EXISTING STORM DRAIN
- PROPOSED CONTOUR
- PROPOSED STORM DRAIN
- PROPOSED PAVEMENT
- PROPOSED LOTS (40% IMPERVIOUS)
- BASIN BOUNDARY
- POINT OF COMPLIANCE — POC #
- EXTENDED DETENTION BASIN — EDB
- BIORETENTION BASIN — BIO



TYPICAL DETAIL - BIORETENTION BASIN

NOT TO SCALE



PRE-DETENTION

Q_{100} = 40.55 CFS

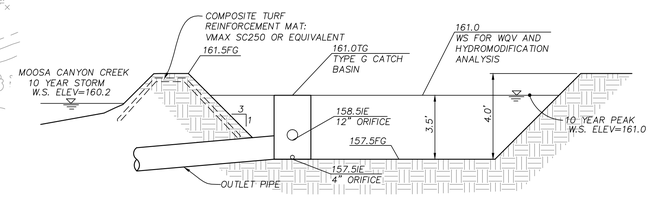
TC= 7.18 MIN

POST-DETENTION

Q_{100} = 9.5 @ 4.2 HOURS

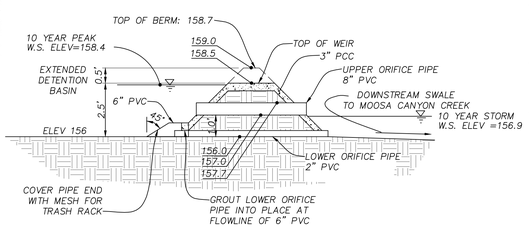
EXTENDED DETENTION BASIN 2C

NOT TO SCALE



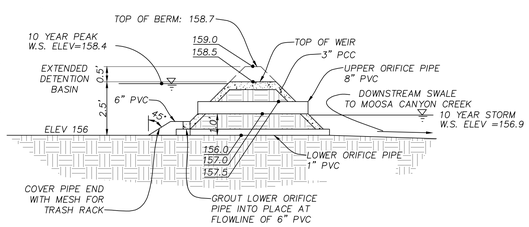
EXTENDED DETENTION BASIN 2D

NOT TO SCALE



EXTENDED DETENTION BASINS 2A

NOT TO SCALE



EXTENDED DETENTION BASINS 2B

NOT TO SCALE

GOLF GREEN ESTATES
HYDROMODIFICATION MANAGEMENT EXHIBIT
COUNTY OF SAN DIEGO, CA

PROJECT NUMBER: 02518-002-02
DATE: 3/9/12

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335
www.fuscoe.com

G:\PROJECTS\2518-JAN LUIS REY\DWGS\LLC\02A-2012 GREEN\SDC\HYDROMOD\HYDROMOD EXHIBIT.DWG, 03-09-12 2:33:38PM Plotted by: roberts

APPENDIX D

<u>AES Input and Output</u>

11″x17″ Existing Hydrology Exhibit

100 Year Storm - Existing Conditions- Basin 1

100 Year Storm - Existing Conditions- Basin 2

100 Year Storm - Existing Conditions- Basin 3

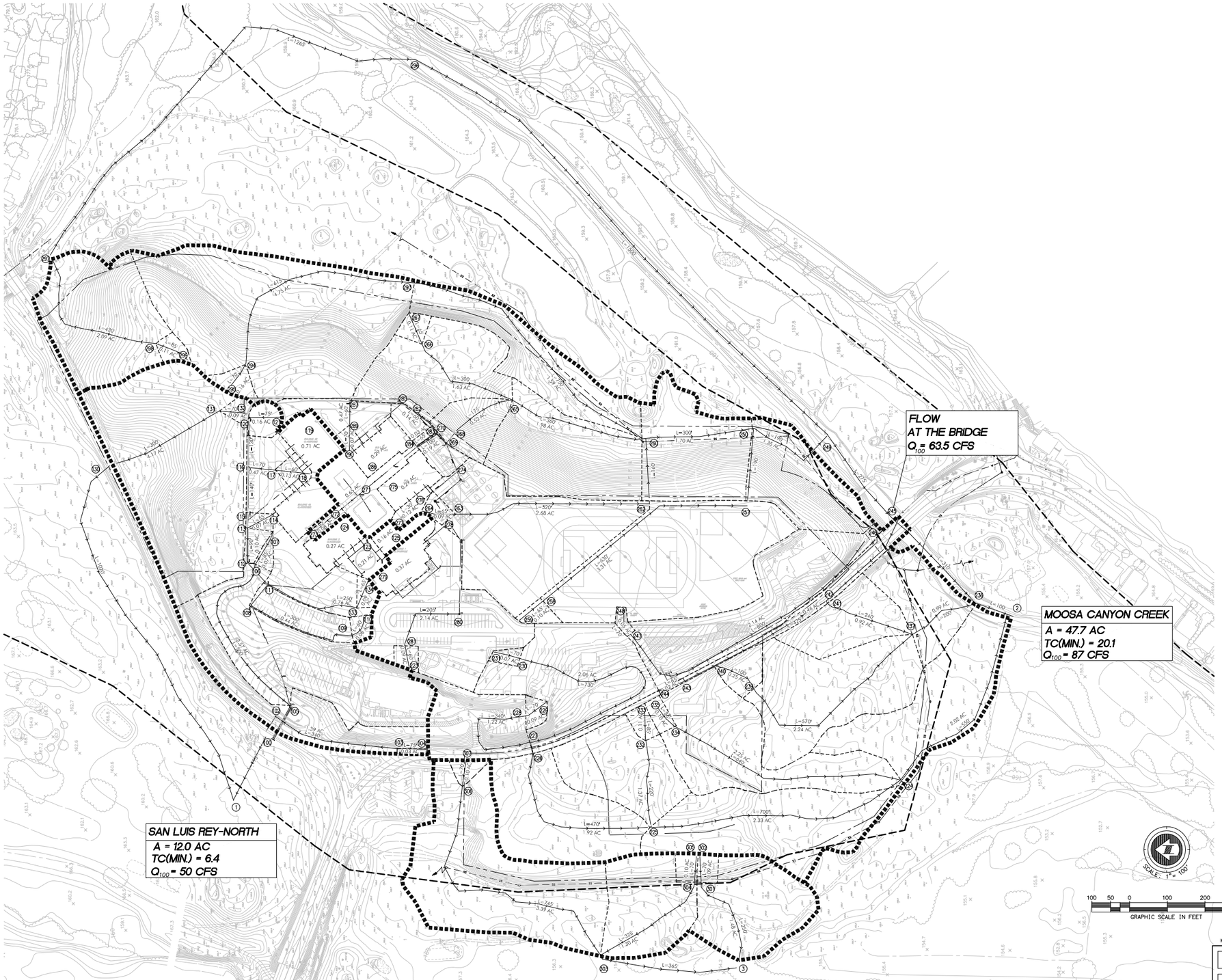
11″x17″ Proposed Hydrology Exhibit

100 Year Storm - Proposed Conditions- Basin 1

100 Year Storm - Proposed Conditions- Basin 2

10 Year Storm - Proposed Conditions- Basin 2

100 Year Storm - Proposed Conditions- Basin 3



MDRA NO. _____

Sheet 01	COUNTY OF SAN DIEGO Department of Development Services	01 Sheets

EXISTING HYDROLOGY FOR:

GOLF GREEN ESTATES

California Coordinate Index

City Engineer

R.C.E.	Expires

Engineer of Work: Randall Roberts

R.C.E.41903 EXP. 9/30/09

REGISTERED PROFESSIONAL ENGINEER
RANDALL T. ROBERTS
No. RCE 65697
EXP. 9-30-11
Civil
STATE OF CALIFORNIA

FUSCOE ENGINEERING
full circle thinking

M:\PROJECTS\2518- SAN LUIS REY DOWNS LLC\GGA- GOLF GREEN\ENV\HYDROLOGY\GGA DRAINAGE STUDY\APPENDIX H EXISTING HYDROLOGY EXHIBIT.D

FUSCOE
ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

Job Name: Golf Green Estates RPL3
Existing Hydrology

Date: Dec 2010

Job #: 2518.02a

Run Name: GG-X-1.DAT

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
132	131	2	197.00	192.00	70	0.35	0.09	
131	130	5	192.00	169.00	300			
131	130	8				0.33	4.17	
130	1	5	169.00	159.00	1020			
1	1	10						Save to Bank 1
121	120	2	196.85	194.96	75	0.82	0.16	
120	116	3	191.96	190.61	130			
116	116	1						1 of 2
118	117	2	197.37	196.35	60	0.82	0.13	
117	116	5	195.85	194.35	70			
117	116	8				0.82	0.47	
116	116	1						2 of 2
116	115	3	190.61	188.51	140			
119	115	8				0.90	0.71	
115	112	3	188.51	186.91	115			
112	112	1						1 of 2
114	113	2	196.83	196.18	55	0.82	0.07	
113	112	5	196.18	192.64	90			
113	112	8				0.82	0.10	
112	112	1						2 of 2
112	111	3	186.91	185.51	70			
111	111	1						1 of 2
134	133	2	197.25	195.92	65	0.82	0.09	
133	111	5	195.92	191.95	250			
133	111	8				0.82	0.76	
125	111	8				0.90	0.16	
124	111	8				0.90	0.27	
123	111	8				0.82	0.21	
111	111	1						2 of 2
111	108	3	185.51	183.20	65			
108	108	1						1 of 2
110	109	2	195.43	194.08	60	0.82	0.08	

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-X-1.DAT

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
109	108	5	194.43	190.43	300			
109	108	8				0.82	0.44	
108	108	1						2 of 2
108	105	3	190.43	166.69	285			
105	105	1						1 of 2
107	106	2	196.43	192.81	85	0.82	0.07	
106	105	5	192.81	172.00	500			
106	105	8				0.82	0.07	
105	105	1						2 of 2
105	100	3	166.69	164.62	40			
100	100	1						1 of 2
104	103	2	176.40	174.50	75	0.81	0.03	
103	102	5	174.50	167.00	340			
103	102	8				0.81	1.39	
102	100	3	164.00	162.40	50			
100	100	1						2 of 2
100	1	5	162.40	159.00	190			
1	1	11						Add Bank 1

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2007 Advanced Engineering Software (aes)
            Ver. 3.0 Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:

                   FUSCOE ENGINEERING - SAN DIEGO, INC.
                     6390 GREENWICH DRIVE, SUITE 170
                       SAN DIEGO, CALIFORNIA 92122
                            (858) 554-1500

 ************************** DESCRIPTION OF STUDY **************************
* GOLF GREEN ESTATES RPL 3                                                 *
* BASIN 1, EXISTING HYDROLOGY                                              *
* 2518.02A NOV 2010                                                        *
 ***************************************************************************

  FILE NAME: GG-X-1.DAT
  TIME/DATE OF STUDY: 10:41 11/04/2010
---------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
---------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    131.00 IS CODE =  21
---------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    197.00
  DOWNSTREAM ELEVATION(FEET) =    192.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.865
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.131
```

```
  SUBAREA RUNOFF(CFS) =       0.22
  TOTAL AREA(ACRES) =       0.09   TOTAL RUNOFF(CFS) =       0.22

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    130.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    192.00  DOWNSTREAM(FEET) =    169.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0767
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.22
  FLOW VELOCITY(FEET/SEC) =   4.15 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE    132.00 TO NODE    130.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.322
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3304
  SUBAREA AREA(ACRES) =    4.17   SUBAREA RUNOFF(CFS) =    8.70
  TOTAL AREA(ACRES) =        4.3   TOTAL RUNOFF(CFS) =       8.90
  TC(MIN.) =    7.07

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE      1.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    169.00  DOWNSTREAM(FEET) =    159.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1020.00   CHANNEL SLOPE =  0.0098
  CHANNEL FLOW THRU SUBAREA(CFS) =        8.90
  FLOW VELOCITY(FEET/SEC) =   2.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.07   Tc(MIN.) =   14.14
  LONGEST FLOWPATH FROM NODE    132.00 TO NODE      1.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    196.85
  DOWNSTREAM ELEVATION(FEET) =    194.96
  ELEVATION DIFFERENCE(FEET) =      1.89
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.208
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      1.04
TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.04

****************************************************************************
FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   191.96  DOWNSTREAM(FEET) =   190.61
FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.86
ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       1.04
PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    3.77
LONGEST FLOWPATH FROM NODE    121.00 TO NODE    116.00 =     205.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    3.77
RAINFALL INTENSITY(INCH/HR) =   7.90
TOTAL STREAM AREA(ACRES) =     0.16
PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.04

****************************************************************************
FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8200
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
UPSTREAM ELEVATION(FEET) =    197.37
DOWNSTREAM ELEVATION(FEET) =    196.35
ELEVATION DIFFERENCE(FEET) =      1.02
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.271
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.84
TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.84

****************************************************************************
FLOW PROCESS FROM NODE    117.00 TO NODE    116.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    195.85  DOWNSTREAM(FEET) =    194.35
CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0214
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) =       0.84
FLOW VELOCITY(FEET/SEC) =   2.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =    3.80
LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     130.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    116.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    3.05
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =      3.89
  TC(MIN.) =    3.80

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.80
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        1.04      3.77        7.904         0.16
     2        3.89      3.80        7.904         0.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        4.89      3.77       7.904
     2        4.93      3.80       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.93   Tc(MIN.) =    3.80
  TOTAL AREA(ACRES) =        0.8
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    116.00 =     205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.61  DOWNSTREAM(FEET) =   188.51
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.53
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.93
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    4.16
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    115.00 =     345.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8586
  SUBAREA AREA(ACRES) =    0.71   SUBAREA RUNOFF(CFS) =    5.05
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =      9.98
  TC(MIN.) =    4.16

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   188.51  DOWNSTREAM(FEET) =   186.91
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.98
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    4.42
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    112.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.42
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.98

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    113.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    196.83
  DOWNSTREAM ELEVATION(FEET) =    196.18
  ELEVATION DIFFERENCE(FEET) =      0.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.535
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.18  DOWNSTREAM(FEET) =    192.64
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0393
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   2.97 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =    4.04
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    112.00 =     145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.65
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       1.10
  TC(MIN.) =    4.04

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.04
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         9.98     4.42        7.904         1.47
     2         1.10     4.04        7.904         0.17

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        11.08     4.04       7.904
     2        11.08     4.42       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.08   Tc(MIN.) =    4.42
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    112.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   186.91  DOWNSTREAM(FEET) =   185.51
FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      11.08
PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.55
LONGEST FLOWPATH FROM NODE    121.00 TO NODE    111.00 =     530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    4.55
RAINFALL INTENSITY(INCH/HR) =   7.90
TOTAL STREAM AREA(ACRES) =     1.64
PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.08

****************************************************************************
FLOW PROCESS FROM NODE    134.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8200
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
UPSTREAM ELEVATION(FEET) =    197.25
DOWNSTREAM ELEVATION(FEET) =    195.92
ELEVATION DIFFERENCE(FEET) =      1.33
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.201
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.58
TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
FLOW PROCESS FROM NODE    133.00 TO NODE    111.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    195.92  DOWNSTREAM(FEET) =    191.95
CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0159
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) =       0.58
FLOW VELOCITY(FEET/SEC) =   1.89 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =    5.41
LONGEST FLOWPATH FROM NODE    134.00 TO NODE    111.00 =     315.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    133.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
*USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =     0.76   SUBAREA RUNOFF(CFS) =     4.68
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       5.24
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8327
  SUBAREA AREA(ACRES) =     0.16   SUBAREA RUNOFF(CFS) =     1.08
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       6.32
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8469
  SUBAREA AREA(ACRES) =     0.27   SUBAREA RUNOFF(CFS) =     1.83
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       8.15
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8431
  SUBAREA AREA(ACRES) =     0.21   SUBAREA RUNOFF(CFS) =     1.29
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.44
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.41
  RAINFALL INTENSITY(INCH/HR) =   7.52
  TOTAL STREAM AREA(ACRES) =     1.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.44

  ** CONFLUENCE DATA **
```

```
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       11.08     4.55       7.904         1.64
    2        9.44     5.41       7.517         1.49

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       19.03     4.55       7.904
    2       19.98     5.41       7.517

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      19.98   Tc(MIN.) =    5.41
TOTAL AREA(ACRES) =        3.1
LONGEST FLOWPATH FROM NODE    121.00 TO NODE    111.00 =     530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    111.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   185.51  DOWNSTREAM(FEET) =   183.20
FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      19.98
PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.49
LONGEST FLOWPATH FROM NODE    121.00 TO NODE    108.00 =     595.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    5.49
RAINFALL INTENSITY(INCH/HR) =   7.44
TOTAL STREAM AREA(ACRES) =     3.13
PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.98

****************************************************************************
FLOW PROCESS FROM NODE    110.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8200
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
UPSTREAM ELEVATION(FEET) =    195.43
DOWNSTREAM ELEVATION(FEET) =    194.08
ELEVATION DIFFERENCE(FEET) =      1.35
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.979
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.52
TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.52
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    108.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    194.08  DOWNSTREAM(FEET) =    190.43
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0122
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.52
  FLOW VELOCITY(FEET/SEC) =   1.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.026
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.44   SUBAREA RUNOFF(CFS) =    2.54
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       3.00
  TC(MIN.) =    6.00

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.00
  RAINFALL INTENSITY(INCH/HR) =   7.03
  TOTAL STREAM AREA(ACRES) =     0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.98     5.49        7.442          3.13
     2        3.00     6.00        7.026          0.52

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       22.72     5.49        7.442
     2       21.86     6.00        7.026

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.72   Tc(MIN.) =    5.49
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    108.00 =     595.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    108.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.43  DOWNSTREAM(FEET) =   166.69
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       22.72
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.75
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    105.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.75
  RAINFALL INTENSITY(INCH/HR) =   7.22
  TOTAL STREAM AREA(ACRES) =     3.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.72

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    196.43
  DOWNSTREAM ELEVATION(FEET) =    192.81
  ELEVATION DIFFERENCE(FEET) =      3.62
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.867
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    192.81  DOWNSTREAM(FEET) =    172.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00   CHANNEL SLOPE =  0.0416
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   3.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.72   Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    105.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.356
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8200
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
SUBAREA AREA(ACRES) =    2.57   SUBAREA RUNOFF(CFS) =   15.50
TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =      15.92
TC(MIN.) =    5.59

****************************************************************************
FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    5.59
RAINFALL INTENSITY(INCH/HR) =   7.36
TOTAL STREAM AREA(ACRES) =     2.64
PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.92

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       22.72     5.75        7.220         3.65
    2       15.92     5.59        7.356         2.64

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       38.22     5.59       7.356
    2       38.35     5.75       7.220

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      38.35   Tc(MIN.) =    5.75
TOTAL AREA(ACRES) =        6.3
LONGEST FLOWPATH FROM NODE    121.00 TO NODE    105.00 =     880.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    105.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   166.69  DOWNSTREAM(FEET) =   164.62
FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  17.21
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      38.35
PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.79
LONGEST FLOWPATH FROM NODE    121.00 TO NODE    100.00 =     920.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.79
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     6.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.35

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    176.40
  DOWNSTREAM ELEVATION(FEET) =    174.50
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.316
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    174.50  DOWNSTREAM(FEET) =    167.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00   CHANNEL SLOPE =  0.0221
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.19
  FLOW VELOCITY(FEET/SEC) =   2.23 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =    5.86
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    102.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.135
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    1.39   SUBAREA RUNOFF(CFS) =    8.03
  TOTAL AREA(ACRES) =       1.4   TOTAL RUNOFF(CFS) =      8.21
  TC(MIN.) =    5.86

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   164.00  DOWNSTREAM(FEET) =   162.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.80
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =        8.21
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.94
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    100.00 =     465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   7.07
  TOTAL STREAM AREA(ACRES) =     1.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       38.35     5.79        7.189          6.29
     2        8.21     5.94        7.069          1.42

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       46.35     5.79       7.189
     2       45.92     5.94       7.069

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.35   Tc(MIN.) =    5.79
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    100.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE      1.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    162.40  DOWNSTREAM(FEET) =    159.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   190.00   CHANNEL SLOPE =  0.0179
  CHANNEL FLOW THRU SUBAREA(CFS) =      46.35
  FLOW VELOCITY(FEET/SEC) =   5.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE      1.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       46.35     6.42       6.729        7.71
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE      1.00 =    1110.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
```

```
STREAM     RUNOFF      Tc      INTENSITY     AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
   1         8.90    14.14       4.042        4.26
LONGEST FLOWPATH FROM NODE    132.00 TO NODE      1.00 =    1390.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF       Tc      INTENSITY
NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
   1      50.38       6.42        6.729
   2      36.74      14.14        4.042

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      50.38   Tc(MIN.) =    6.42
TOTAL AREA(ACRES) =       12.0
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =       12.0  TC(MIN.) =      6.42
PEAK FLOW RATE(CFS)   =      50.38
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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Date: Dec 2010

Job #: 2518.02a

Run Name: GG-X-2.dat

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Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
223	281	2	197.70	196.62	60	0.81	0.09	
281	280	5	196.12	194.20	205			
281	280	8				0.81	2.14	
280	278	3	191.21	188.74	250			
279	278	8				0.90	0.37	
278	274	3	188.74	186.87	180			
274	274	1						1 of 2
277	276	2	197.50	197.11	30	0.80	0.12	2 of 2
275	274	8				0.90	0.29	
276	274	1						
274	269	3	186.10	75.00				
275	269	8				0.80	0.19	
269	269	10						Save to bank 1
290	289	2	197.50	196.50	70	0.80	0.07	
289	287	5	196.50	195.25	60			
289	287	8				0.80	0.47	
287	285	3	192.25	190.91	135			
286	285	8				0.90	0.29	
285	282	3	190.91	190.55	35			
282	282	1						1 of 2
284	283	2	197.25	196.18	65	0.80	0.03	
283	282	5	196.18	195.87	60			
283	282	8				0.80	0.14	
282	282	1						2 of 2
282	270	3	190.55	187.24	80			
270	270	1						
273	272	2	197.50	196.56	65	0.81	0.08	
272	271	3	194.56	193.37	100			
272	271	8				0.81	0.65	
271	270	3	187.24	186.10	40			
270	270	1						2 of 2
270	269	3	187.24	186.10	40			
269	269	11						
269	269	12						

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Job #: 2518.02a Run Name: GG-X-2.dat

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Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
269	268	3	186.10	184.00	40			
268	265	5	184.00	163.30	175			
268	265	8				0.20	0.52	
265	265	1						1 of 2
267	266	2	178.20	177.30	65	0.20	0.11	
266	265	5	177.30	163.30	300			
266	265	8				0.20	1.63	
265	265	1						2 of 2
265	260	5	163.30	159.50	360			
265	260	8				0.20	1.98	
260	260	1						1 of 3
295	294	2	193.60	191.00	70	0.20	0.16	
294	293	5	191.00	161.20	615			
294	293	8				0.20	4.75	
293	260	5	161.20	159.50	750			
293	260	8				0.20	1.59	
260	260	1						2 of 3
264	263	2	197.00	196.15	65	0.80	0.09	
263	262	5	196.15	190.00	520			
263	262	8				0.80	2.68	
262	260	5	190.00	159.50	160			
260	260	1						3 of 3
260	250	5	159.50	159.10	300			
260	250	8				0.20	1.70	
250	250	1						1 of 2
259	258	2	196.00	195.00	65	0.81	0.10	
258	257	5	195.00	187.00	630			
258	257	8				0.80	3.31	
257	250	5	187.00	159.10	190			
250	250	1						2 of 2
250	249	5	159.10	153.80	190			
250	249	8				0.21	1.35	
249	249	1						1 of 2

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Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
299	298	2	196.10	194.00	85	0.20	0.11	
298	297	5	194.00	163.80	430			
298	297	8				0.20	2.09	
297	296	5	163.80	158.00	1265			
296	249	5	158.00	153.80	1500			
249	249	1						2 of 2
249	245	5	153.80	153.50	275			
245	245	1						1 of 2
248	247	2	193.30	189.00	70	0.80	0.05	
247	246	5	189.00	163.00	800			
247	246	8				0.80	2.14	
246	245	3	162.00	153.50	90			
245	245	1						2 of 2
245	236	5	153.50	153.00	310			
236	236	10						save to bank 1
244	243	2	175.60	174.80	65	0.80	0.02	
243	242	5	174.80	163.00	425			
243	242	8				0.80	0.46	
242	241	3	162.80	162.00	15			
241	237	5	162.00	157.60	240			
241	237	8				0.24	0.92	
237	237	1						1 of 2
240	239	2	172.00	165.40	100	0.29	0.25	
239	237	5	165.40	157.60	570			
239	237	8				0.22	2.24	
237	237	1						2 of 2
237	236	5	157.60	152.00	200			
237	236	8				0.28	0.99	
236	236	11						add bank 1
236	236	12						clear bank 1
236	2	5	152.00	151.50	100			
2	2	10						save to bank 1

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Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
231	230	2	200.00	195.50	70	0.81	0.07	
230	227	5	195.50	171.00	730			
230	227	8				0.81	2.06	
227	227	1						1 of 2
229	228	2	189.00	188.00	70	0.80	0.09	
228	227	5	188.00	171.00	340			
228	227	8				0.81	1.22	
227	227	1						2 of 2
227	226	3	171.00	170.90	35			
226	225	5	170.90	166.70	470			
226	225	8				0.23	1.92	
225	225	1						1 of 2
233	232	2	174.20	171.10	85	0.25	0.11	
232	225	5	171.10	166.70	220			
232	225	8				0.24	1.37	
225	225	1						2 of 2
225	224	5	166.70	158.50	700			
225	224	8				0.20	2.33	
224	224	1						1 of 2
235	234	2	174.00	170.60	85	0.32	0.10	
234	224	5	170.60	158.50	640			
234	224	8				0.28	2.25	
224	224	1						2 of 2
224	2	5	158.50	151.50	550			
224	2	8				0.26	2.02	
2	2	11						add bank 1

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
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                          Analysis prepared by:

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                       SAN DIEGO, CALIFORNIA 92122
                             (858) 554-1500

 ************************** DESCRIPTION OF STUDY **************************
* GOLF GREEN ESTATES RPL3                                                  *
* BASIN 2, EXISTING HYDROLOGY                                              *
* November 2010                                                            *
 ***************************************************************************

  FILE NAME: GG-X-2.DAT
  TIME/DATE OF STUDY: 15:20 11/04/2010
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    281.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    197.70
  DOWNSTREAM ELEVATION(FEET) =    196.62
  ELEVATION DIFFERENCE(FEET) =      1.08
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.209
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.58
  TOTAL AREA(ACRES) =       0.09   TOTAL RUNOFF(CFS) =       0.58

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    280.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.12  DOWNSTREAM(FEET) =    194.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   205.00   CHANNEL SLOPE =  0.0094
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.58
  FLOW VELOCITY(FEET/SEC) =   1.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    280.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.379
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    2.14   SUBAREA RUNOFF(CFS) =   12.95
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      13.49
  TC(MIN.) =    5.56

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    278.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.21  DOWNSTREAM(FEET) =   188.74
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.49
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    6.16
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    278.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    279.00 TO NODE    278.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.912
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8314
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    2.30
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =      14.94
  TC(MIN.) =    6.16

****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    274.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   188.74  DOWNSTREAM(FEET) =   186.87
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.94
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    6.57
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    274.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.57
  RAINFALL INTENSITY(INCH/HR) =   6.63
  TOTAL STREAM AREA(ACRES) =     2.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.94

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    276.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    30.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    197.11
  ELEVATION DIFFERENCE(FEET) =      0.39
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.529
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    274.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8766
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    2.06
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =      2.84
  TC(MIN.) =    2.53

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    274.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    2.53
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.84

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       14.94      6.57        6.629         2.60
     2        2.84      2.53        7.904         0.41

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        8.59      2.53        7.904
     2       17.32      6.57        6.629

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.32   Tc(MIN.) =    6.57
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    274.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.87  DOWNSTREAM(FEET) =   186.10
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.69
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.32
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    269.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    269.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.525
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8413
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    1.12
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      17.57
  TC(MIN.) =    6.73

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    289.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    196.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.744
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    287.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.50  DOWNSTREAM(FEET) =    195.25
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0208
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   2.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =    4.21
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    287.00 =     130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    3.05
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =      3.50
  TC(MIN.) =    4.21

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    285.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   192.25  DOWNSTREAM(FEET) =   190.91
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.50
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    4.64
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    285.00 =     265.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    286.00 TO NODE    285.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8480
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    2.06
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =      5.56
  TC(MIN.) =    4.64

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    282.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.91  DOWNSTREAM(FEET) =   190.55
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.56
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    4.75
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    282.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.75
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.25
  DOWNSTREAM ELEVATION(FEET) =    196.18
  ELEVATION DIFFERENCE(FEET) =      1.07
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.441
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    282.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.18  DOWNSTREAM(FEET) =    195.87
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0052
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.19
  FLOW VELOCITY(FEET/SEC) =   1.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.37
  LONGEST FLOWPATH FROM NODE    284.00 TO NODE    282.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    282.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       1.10
  TC(MIN.) =    4.37

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.37
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         5.56     4.75        7.904          0.83
     2         1.10     4.37        7.904          0.17

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1         6.22     4.37       7.904
     2         6.66     4.75       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.66   Tc(MIN.) =    4.75
  TOTAL AREA(ACRES) =        1.0
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    282.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.55  DOWNSTREAM(FEET) =   187.24
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.66
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.88
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    270.00 =     380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.88
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.66

****************************************************************************
  FLOW PROCESS FROM NODE    273.00 TO NODE    272.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    196.56
  ELEVATION DIFFERENCE(FEET) =      0.94
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.593
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    271.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   194.56  DOWNSTREAM(FEET) =   193.37
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.37
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.52
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    4.09
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    271.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    271.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    4.21
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       4.73
  TC(MIN.) =    4.09

****************************************************************************
  FLOW PROCESS FROM NODE    271.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   193.37  DOWNSTREAM(FEET) =   187.24
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.62
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.73
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    4.63
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    270.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.63
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.73

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         6.66     4.88        7.904         1.00
     2         4.73     4.63        7.904         0.73

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       11.40     4.63       7.904
     2       11.40     4.88       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.40   Tc(MIN.) =    4.88
  TOTAL AREA(ACRES) =        1.7
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    270.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   187.24  DOWNSTREAM(FEET) =   186.10
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.40
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    4.94
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    269.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       11.40     4.94       7.904        1.73
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    269.00 =     455.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       17.57     6.73       6.525        3.20
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    269.00 =     770.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF      Tc      INTENSITY
  NUMBER     (CFS)    (MIN.)   (INCH/HOUR)
     1      24.30      4.94        7.904
     2      26.97      6.73        6.525

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.97   Tc(MIN.) =    6.73
  TOTAL AREA(ACRES) =        4.9

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    268.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.10  DOWNSTREAM(FEET) =   184.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.97
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.77
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    268.00 =     810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    265.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    184.00  DOWNSTREAM(FEET) =    163.30
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.1183
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      26.97
  FLOW VELOCITY(FEET/SEC) =  10.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    7.06
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    265.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    265.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.329
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7957
  SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    1.28
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      27.45
  TC(MIN.) =    7.06

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   6.33
  TOTAL STREAM AREA(ACRES) =     5.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.45

****************************************************************************
  FLOW PROCESS FROM NODE    267.00 TO NODE    266.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    178.20
  DOWNSTREAM ELEVATION(FEET) =    177.30
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.718
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.563
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    265.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    177.30  DOWNSTREAM(FEET) =    163.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0467
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.10
  FLOW VELOCITY(FEET/SEC) =   3.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   13.26
  LONGEST FLOWPATH FROM NODE    267.00 TO NODE    265.00 =     365.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    265.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.213
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2562
  SUBAREA AREA(ACRES) =    1.63   SUBAREA RUNOFF(CFS) =    1.79
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =      1.88
  TC(MIN.) =   13.26

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.26
  RAINFALL INTENSITY(INCH/HR) =   4.21
  TOTAL STREAM AREA(ACRES) =     1.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.88

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       27.45     7.06        6.329         5.45
     2        1.88    13.26        4.213         1.74

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       28.45     7.06        6.329
     2       20.15    13.26        4.213

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.45   Tc(MIN.) =    7.06
  TOTAL AREA(ACRES) =        7.2
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    265.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    260.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.30  DOWNSTREAM(FEET) =    159.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   360.00   CHANNEL SLOPE =  0.0106
  CHANNEL FLOW THRU SUBAREA(CFS) =      28.45
  FLOW VELOCITY(FEET/SEC) =   3.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    8.83
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    260.00 =    1345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    260.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.478
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5885
  SUBAREA AREA(ACRES) =     1.98   SUBAREA RUNOFF(CFS) =     3.36
  TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      29.56
  TC(MIN.) =    8.83

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.83
  RAINFALL INTENSITY(INCH/HR) =   5.48
  TOTAL STREAM AREA(ACRES) =     9.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.56

****************************************************************************
  FLOW PROCESS FROM NODE    295.00 TO NODE    294.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    193.60
  DOWNSTREAM ELEVATION(FEET) =    191.00
  ELEVATION DIFFERENCE(FEET) =      2.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.294
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.196
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    294.00 TO NODE    293.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    191.00  DOWNSTREAM(FEET) =    161.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   615.00   CHANNEL SLOPE =  0.0485
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.35
  FLOW VELOCITY(FEET/SEC) =   3.30 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    293.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    294.00 TO NODE    293.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.929
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2600
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2629
  SUBAREA AREA(ACRES) =     4.75   SUBAREA RUNOFF(CFS) =     6.09
  TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =       6.36
  TC(MIN.) =   10.40

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    260.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    161.20  DOWNSTREAM(FEET) =    159.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.0023
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.36
  FLOW VELOCITY(FEET/SEC) =   1.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  11.75   Tc(MIN.) =   22.15
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    260.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.027
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2475
  SUBAREA AREA(ACRES) =     1.59   SUBAREA RUNOFF(CFS) =     0.96
  TOTAL AREA(ACRES) =        6.5   TOTAL RUNOFF(CFS) =       6.36
  TC(MIN.) =   22.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.15
  RAINFALL INTENSITY(INCH/HR) =   3.03
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.36

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    263.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.00
  DOWNSTREAM ELEVATION(FEET) =    196.15
  ELEVATION DIFFERENCE(FEET) =      0.85
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.716
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.58
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    262.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.15  DOWNSTREAM(FEET) =    190.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0118
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.58
  FLOW VELOCITY(FEET/SEC) =   1.63 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.31   Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    262.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.399
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    2.68   SUBAREA RUNOFF(CFS) =   11.86
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      12.26
  TC(MIN.) =    9.03

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    260.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    190.00  DOWNSTREAM(FEET) =    159.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.1906
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      12.26
  FLOW VELOCITY(FEET/SEC) =   8.33 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.32   Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    260.00 =     745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   5.28
  TOTAL STREAM AREA(ACRES) =     2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       29.56     8.83        5.478          9.17
     2        6.36    22.15        3.027          6.50
     3       12.26     9.35        5.279          2.77
```

```
RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       43.68     8.83       5.478
    2       43.44     9.35       5.279
    3       29.73    22.15       3.027

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      43.68   Tc(MIN.) =    8.83
TOTAL AREA(ACRES) =        18.4
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    260.00 =    1435.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    260.00 TO NODE    250.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    159.50  DOWNSTREAM(FEET) =    159.10
CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0013
CHANNEL FLOW THRU SUBAREA(CFS) =      43.68
FLOW VELOCITY(FEET/SEC) =   1.36 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =   12.50
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    250.00 =    1735.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    260.00 TO NODE    250.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .2900
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.4851
SUBAREA AREA(ACRES) =    1.70   SUBAREA RUNOFF(CFS) =    2.16
TOTAL AREA(ACRES) =       20.1   TOTAL RUNOFF(CFS) =      43.68
TC(MIN.) =   12.50
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   12.50
RAINFALL INTENSITY(INCH/HR) =   4.38
TOTAL STREAM AREA(ACRES) =    20.14
PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.68

****************************************************************************
FLOW PROCESS FROM NODE    259.00 TO NODE    258.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8200
S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    196.00
  DOWNSTREAM ELEVATION(FEET) =    195.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.520
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    257.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.00  DOWNSTREAM(FEET) =    187.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   630.00   CHANNEL SLOPE =  0.0127
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.65
  FLOW VELOCITY(FEET/SEC) =   1.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.21   Tc(MIN.) =    9.73
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    257.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    257.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.144
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    3.31   SUBAREA RUNOFF(CFS) =   13.97
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      14.40
  TC(MIN.) =    9.73

****************************************************************************
  FLOW PROCESS FROM NODE    257.00 TO NODE    250.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    187.00  DOWNSTREAM(FEET) =    159.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   190.00   CHANNEL SLOPE =  0.1468
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      14.40
  FLOW VELOCITY(FEET/SEC) =   8.68 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.36   Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    250.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.10
  RAINFALL INTENSITY(INCH/HR) =   5.02
  TOTAL STREAM AREA(ACRES) =     3.41
```

```
PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.40

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc       INTENSITY      AREA
NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1       43.68     12.50        4.376        20.14
    2       14.40     10.10        5.023         3.41

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc       INTENSITY
NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       52.44     10.10        5.023
    2       56.22     12.50        4.376

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      56.22   Tc(MIN.) =   12.50
TOTAL AREA(ACRES) =       23.6
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    250.00 =    1735.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    250.00 TO NODE    249.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    159.10  DOWNSTREAM(FEET) =    153.80
CHANNEL LENGTH THRU SUBAREA(FEET) =   190.00   CHANNEL SLOPE =  0.0279
CHANNEL FLOW THRU SUBAREA(CFS) =      56.22
FLOW VELOCITY(FEET/SEC) =   6.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   0.47   Tc(MIN.) =   12.98
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    249.00 =    1925.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    250.00 TO NODE    249.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.272
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .2600
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5188
SUBAREA AREA(ACRES) =    1.35   SUBAREA RUNOFF(CFS) =    1.50
TOTAL AREA(ACRES) =      24.9   TOTAL RUNOFF(CFS) =      56.22
TC(MIN.) =   12.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   12.98
RAINFALL INTENSITY(INCH/HR) =   4.27
TOTAL STREAM AREA(ACRES) =    24.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =     56.22

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    299.00 TO NODE    298.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    196.10
  DOWNSTREAM ELEVATION(FEET) =    194.00
  ELEVATION DIFFERENCE(FEET) =      2.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.453
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.242
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    298.00 TO NODE    297.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    194.00  DOWNSTREAM(FEET) =    163.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.00   CHANNEL SLOPE =  0.0702
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.19
  FLOW VELOCITY(FEET/SEC) =   3.98 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    297.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    298.00 TO NODE    297.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.683
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2920
  SUBAREA AREA(ACRES) =    2.09   SUBAREA RUNOFF(CFS) =    2.84
  TOTAL AREA(ACRES) =       2.2   TOTAL RUNOFF(CFS) =      3.01
  TC(MIN.) =   11.26

****************************************************************************
  FLOW PROCESS FROM NODE    297.00 TO NODE    296.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.80  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1265.00   CHANNEL SLOPE =  0.0046
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.01
  FLOW VELOCITY(FEET/SEC) =   1.27 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  16.57   Tc(MIN.) =   27.83
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    296.00 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    296.00 TO NODE    249.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    158.00  DOWNSTREAM(FEET) =    153.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00   CHANNEL SLOPE =  0.0028
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.01
  FLOW VELOCITY(FEET/SEC) =   0.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  25.15   Tc(MIN.) =   52.97
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    249.00 =    3280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   52.97
  RAINFALL INTENSITY(INCH/HR) =   1.72
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       56.22    12.98        4.272         24.90
     2        3.01    52.97        1.725          2.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       56.96    12.98        4.272
     2       25.70    52.97        1.725

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      56.96   Tc(MIN.) =   12.98
  TOTAL AREA(ACRES) =       27.1
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    249.00 =    3280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    245.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    153.80  DOWNSTREAM(FEET) =    153.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0011
  CHANNEL FLOW THRU SUBAREA(CFS) =      56.96
  FLOW VELOCITY(FEET/SEC) =   1.33 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.45   Tc(MIN.) =   16.43
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    245.00 =    3555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    245.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.43
  RAINFALL INTENSITY(INCH/HR) =   3.67
  TOTAL STREAM AREA(ACRES) =    27.10
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     56.96

****************************************************************************
  FLOW PROCESS FROM NODE    248.00 TO NODE    247.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    193.30
  DOWNSTREAM ELEVATION(FEET) =    189.00
  ELEVATION DIFFERENCE(FEET) =      4.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.385
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    246.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    189.00  DOWNSTREAM(FEET) =    163.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0325
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.32
  FLOW VELOCITY(FEET/SEC) =   2.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.93   Tc(MIN.) =    7.32
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    246.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.184
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    2.14   SUBAREA RUNOFF(CFS) =   10.72
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      10.97
  TC(MIN.) =    7.32

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    245.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   162.00  DOWNSTREAM(FEET) =   153.50
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.93
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.97
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    245.00 =     960.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    245.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.41
  RAINFALL INTENSITY(INCH/HR) =   6.13
  TOTAL STREAM AREA(ACRES) =     2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        56.96    16.43        3.669        27.10
     2        10.97     7.41        6.133         2.19

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        45.05     7.41       6.133
     2        63.52    16.43       3.669

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.52   Tc(MIN.) =   16.43
  TOTAL AREA(ACRES) =       29.3
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    245.00 =    3555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    236.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    153.50  DOWNSTREAM(FEET) =    153.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.0016
  CHANNEL FLOW THRU SUBAREA(CFS) =      63.52
  FLOW VELOCITY(FEET/SEC) =   1.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   19.53
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    236.00 =    3865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    243.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    175.60
  DOWNSTREAM ELEVATION(FEET) =    174.80
```

```
  ELEVATION DIFFERENCE(FEET) =       0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.927
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.13
  TOTAL AREA(ACRES) =       0.02   TOTAL RUNOFF(CFS) =       0.13

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    242.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    174.80  DOWNSTREAM(FEET) =    163.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   425.00   CHANNEL SLOPE =  0.0259
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.13
  FLOW VELOCITY(FEET/SEC) =   2.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.94   Tc(MIN.) =    6.86
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    242.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    242.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.444
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    0.46   SUBAREA RUNOFF(CFS) =    2.40
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.51
  TC(MIN.) =    6.86

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    241.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   162.80  DOWNSTREAM(FEET) =   162.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.85
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.51
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.89
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    241.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    237.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    162.00  DOWNSTREAM(FEET) =    157.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   240.00   CHANNEL SLOPE =  0.0183
  CHANNEL FLOW THRU SUBAREA(CFS) =        2.51
  FLOW VELOCITY(FEET/SEC) =   2.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    8.53
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    237.00 =     745.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    237.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.602
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4223
  SUBAREA AREA(ACRES) =    0.92   SUBAREA RUNOFF(CFS) =    1.13
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.31
  TC(MIN.) =    8.53

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    237.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   5.60
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.31

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    172.00
  DOWNSTREAM ELEVATION(FEET) =    165.40
  ELEVATION DIFFERENCE(FEET) =      6.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.677
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.994
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    237.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    165.40  DOWNSTREAM(FEET) =    157.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00   CHANNEL SLOPE =  0.0137
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   1.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.41   Tc(MIN.) =   13.09
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    237.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    237.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.249
```

```
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .2100
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.2190
SUBAREA AREA(ACRES) =    2.24   SUBAREA RUNOFF(CFS) =    2.00
TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       2.32
TC(MIN.) =   13.09

****************************************************************************
FLOW PROCESS FROM NODE    237.00 TO NODE    237.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   13.09
RAINFALL INTENSITY(INCH/HR) =   4.25
TOTAL STREAM AREA(ACRES) =     2.49
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.32

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        3.31     8.53        5.602         1.40
    2        2.32    13.09        4.249         2.49

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        4.82     8.53       5.602
    2        4.83    13.09       4.249

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       4.83   Tc(MIN.) =   13.09
TOTAL AREA(ACRES) =        3.9
LONGEST FLOWPATH FROM NODE    244.00 TO NODE    237.00 =     745.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    237.00 TO NODE    236.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    157.60  DOWNSTREAM(FEET) =    152.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0280
CHANNEL FLOW THRU SUBAREA(CFS) =       4.83
FLOW VELOCITY(FEET/SEC) =   3.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   0.95   Tc(MIN.) =   14.04
LONGEST FLOWPATH FROM NODE    244.00 TO NODE    236.00 =     945.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    237.00 TO NODE    236.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.060
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .2000
S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2735
  SUBAREA AREA(ACRES) =     0.99   SUBAREA RUNOFF(CFS) =     0.80
  TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =       5.42
  TC(MIN.) =   14.04

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1         5.42    14.04       4.060        4.88
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    236.00 =     945.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        63.52    19.53       3.282       29.29
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE    236.00 =    3865.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      51.09      14.04        4.060
     2      67.90      19.53        3.282

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      67.90   Tc(MIN.) =   19.53
  TOTAL AREA(ACRES) =       34.2

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    152.00  DOWNSTREAM(FEET) =    151.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0050
  CHANNEL FLOW THRU SUBAREA(CFS) =      67.90
  FLOW VELOCITY(FEET/SEC) =   2.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.56   Tc(MIN.) =   20.09
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE      2.00 =    3965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    230.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    200.00
  DOWNSTREAM ELEVATION(FEET) =    195.50
  ELEVATION DIFFERENCE(FEET) =      4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.268
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    227.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.50  DOWNSTREAM(FEET) =    171.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   730.00   CHANNEL SLOPE =  0.0336
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   2.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.43   Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    227.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.547
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8103
  SUBAREA AREA(ACRES) =    2.06   SUBAREA RUNOFF(CFS) =   10.92
  TOTAL AREA(ACRES) =       2.1   TOTAL RUNOFF(CFS) =      11.30
  TC(MIN.) =    6.70

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   6.55
  TOTAL STREAM AREA(ACRES) =     2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.30

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    228.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    189.00
```

```
  DOWNSTREAM ELEVATION(FEET) =     188.00
  ELEVATION DIFFERENCE(FEET) =       1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     3.878
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.58
  TOTAL AREA(ACRES) =       0.09   TOTAL RUNOFF(CFS) =       0.58

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    188.00  DOWNSTREAM(FEET) =    171.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00   CHANNEL SLOPE =  0.0500
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.58
  FLOW VELOCITY(FEET/SEC) =   3.35 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    5.57
  LONGEST FLOWPATH FROM NODE    229.00 TO NODE    227.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.375
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    1.22   SUBAREA RUNOFF(CFS) =    7.29
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       7.83
  TC(MIN.) =    5.57

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.57
  RAINFALL INTENSITY(INCH/HR) =   7.37
  TOTAL STREAM AREA(ACRES) =     1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.83

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       11.30      6.70        6.547         2.13
     2        7.83      5.57        7.375         1.31

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       17.22      5.57        7.375
     2       18.25      6.70        6.547
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.25   Tc(MIN.) =    6.70
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    227.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.00  DOWNSTREAM(FEET) =   170.90
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.25
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    226.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    170.90  DOWNSTREAM(FEET) =    166.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   470.00   CHANNEL SLOPE =  0.0089
  CHANNEL FLOW THRU SUBAREA(CFS) =      18.25
  FLOW VELOCITY(FEET/SEC) =   2.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.83   Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    225.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.172
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5952
  SUBAREA AREA(ACRES) =    1.92   SUBAREA RUNOFF(CFS) =    2.09
  TOTAL AREA(ACRES) =        5.4   TOTAL RUNOFF(CFS) =      18.25
  TC(MIN.) =    9.65
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.65
  RAINFALL INTENSITY(INCH/HR) =   5.17
  TOTAL STREAM AREA(ACRES) =     5.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.25

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    232.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    174.20
  DOWNSTREAM ELEVATION(FEET) =    171.10
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.949
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.430
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    225.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    171.10  DOWNSTREAM(FEET) =    166.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   220.00   CHANNEL SLOPE =  0.0200
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.16
  FLOW VELOCITY(FEET/SEC) =   2.12 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE    233.00 TO NODE    225.00 =     305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    225.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.845
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2145
  SUBAREA AREA(ACRES) =    1.37   SUBAREA RUNOFF(CFS) =    1.39
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       1.54
  TC(MIN.) =   10.68

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   4.85
  TOTAL STREAM AREA(ACRES) =     1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.54

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       18.25      9.65        5.172         5.36
     2        1.54     10.68        4.845         1.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       19.64     9.65       5.172
    2       18.64    10.68       4.845

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      19.64   Tc(MIN.) =    9.65
TOTAL AREA(ACRES) =        6.8
LONGEST FLOWPATH FROM NODE    231.00 TO NODE    225.00 =    1305.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    225.00 TO NODE    224.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    166.70  DOWNSTREAM(FEET) =    158.50
CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0117
CHANNEL FLOW THRU SUBAREA(CFS) =      19.64
FLOW VELOCITY(FEET/SEC) =   3.23 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   3.62   Tc(MIN.) =   13.27
LONGEST FLOWPATH FROM NODE    231.00 TO NODE    224.00 =    2005.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    225.00 TO NODE    224.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.212
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .2000
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.4333
SUBAREA AREA(ACRES) =    2.33   SUBAREA RUNOFF(CFS) =    1.96
TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      19.64
TC(MIN.) =   13.27
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   13.27
RAINFALL INTENSITY(INCH/HR) =   4.21
TOTAL STREAM AREA(ACRES) =     9.17
PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.64

****************************************************************************
FLOW PROCESS FROM NODE    235.00 TO NODE    234.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .2800
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
UPSTREAM ELEVATION(FEET) =    174.00
```

```
  DOWNSTREAM ELEVATION(FEET) =     170.60
  ELEVATION DIFFERENCE(FEET) =       3.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     8.573
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.582
  SUBAREA RUNOFF(CFS) =       0.16
  TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.16

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    224.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    170.60  DOWNSTREAM(FEET) =    158.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   640.00   CHANNEL SLOPE =  0.0189
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.16
  FLOW VELOCITY(FEET/SEC) =   2.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.17   Tc(MIN.) =   13.74
  LONGEST FLOWPATH FROM NODE    235.00 TO NODE    224.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    224.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.117
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2226
  SUBAREA AREA(ACRES) =     2.25   SUBAREA RUNOFF(CFS) =     2.04
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       2.15
  TC(MIN.) =   13.74

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.74
  RAINFALL INTENSITY(INCH/HR) =   4.12
  TOTAL STREAM AREA(ACRES) =     2.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.15

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.64     13.27        4.212         9.17
     2        2.15     13.74        4.117         2.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       21.72     13.27        4.212
     2       21.35     13.74        4.117
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.72   Tc(MIN.) =   13.27
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    224.00 =    2005.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    158.50  DOWNSTREAM(FEET) =    151.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00   CHANNEL SLOPE =  0.0127
  CHANNEL FLOW THRU SUBAREA(CFS) =      21.72
  FLOW VELOCITY(FEET/SEC) =   3.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =   15.92
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE      2.00 =    2555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.745
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3619
  SUBAREA AREA(ACRES) =    2.02   SUBAREA RUNOFF(CFS) =    1.51
  TOTAL AREA(ACRES) =       13.5   TOTAL RUNOFF(CFS) =      21.72
  TC(MIN.) =   15.92
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       21.72    15.92       3.745       13.54
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE      2.00 =    2555.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       67.90    20.09       3.223       34.17
  LONGEST FLOWPATH FROM NODE    299.00 TO NODE      2.00 =    3965.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      75.52      15.92       3.745
     2      86.59      20.09       3.223

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      86.59   Tc(MIN.) =   20.09
  TOTAL AREA(ACRES) =       47.7
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       47.7  TC(MIN.) =     20.09
```

```
  PEAK FLOW RATE(CFS)    =       86.59
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

```

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Job Name: Golf Green Estates RPL3
Existing Hydrology

Date: Dec 2010

Job #: 2518.02a

Run Name: GG-X-3.dat

Page: 1

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Friction Coeff.	Area (ac.)	Comments
307	306	2	175.00	169.00	70	0.32	0.10	
306	303	5	169.00	155.20	745			
306	303	8				0.25	3.39	
303	303	1						1 of 2
305	304	2	167.80	159.00	70	0.20	0.10	
304	303	5	159.00	155.20	325			
304	303	8				0.20	1.30	
303	303	1						2 of 2
303	3	5	155.20	154.80	365			
3	3	1						1 of 2
302	301	2	167.70	158.50	70	0.20	0.09	
301	3	5	158.50	154.80	250			
301	3	8				0.20	1.48	
3	3	1						2 of 2

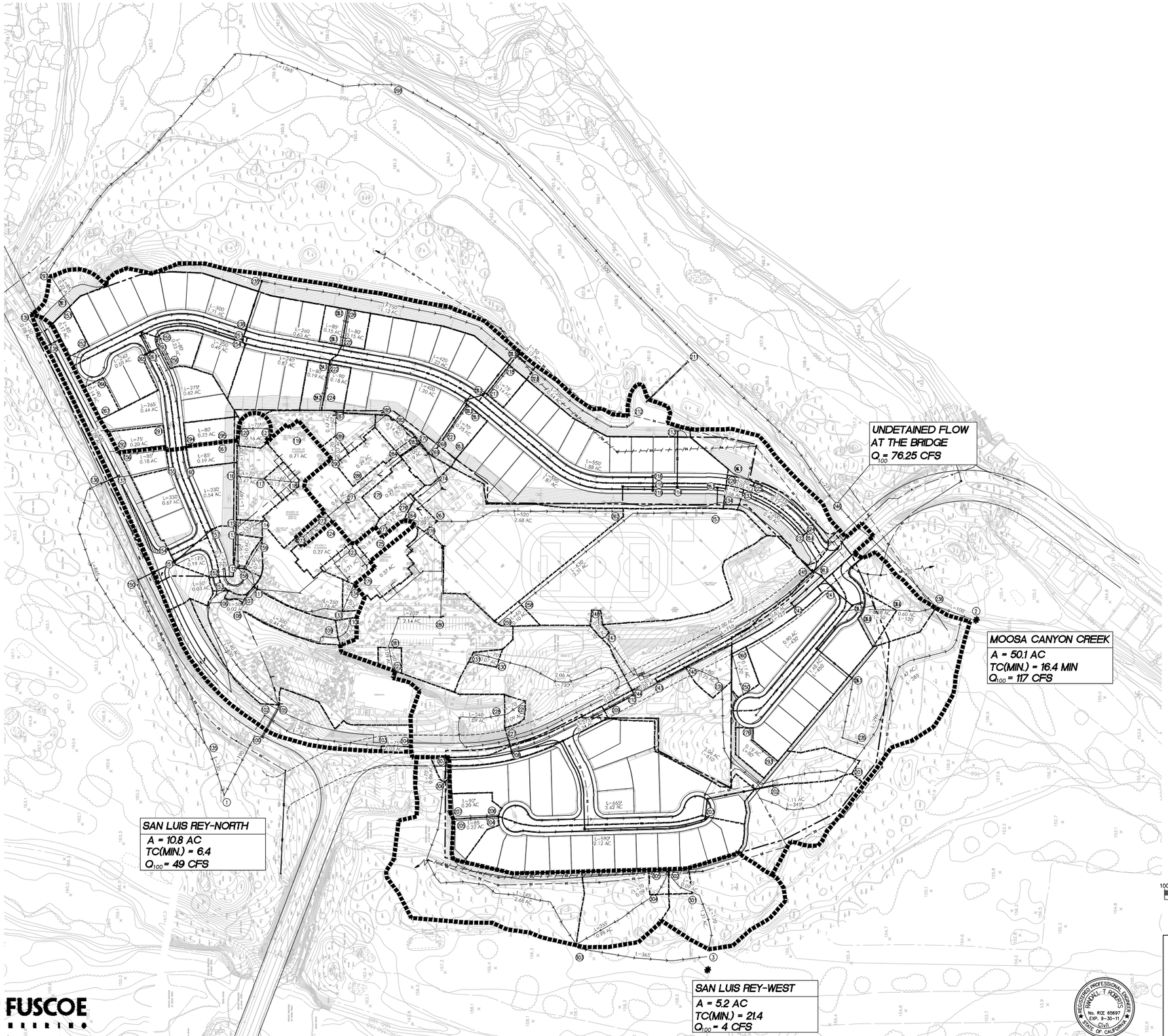
```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
             Ver. 3.0 Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:

                    FUSCOE ENGINEERING - SAN DIEGO, INC.
                      6390 GREENWICH DRIVE, SUITE 170
                        SAN DIEGO, CALIFORNIA 92122
                              (858) 554-1500

 ************************** DESCRIPTION OF STUDY **************************
* GOLF GREEN ESTATES RPL 3                                                 *
* BASIN 3, EXISTING HYDROLOGY                                              *
* November 2010                                                            *
 ***************************************************************************

  FILE NAME: GG-X-3.DAT
  TIME/DATE OF STUDY: 15:30 11/04/2010
---------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
---------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    306.00 IS CODE =  21
---------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    175.00
  DOWNSTREAM ELEVATION(FEET) =    169.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.887
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
```

```
  SUBAREA RUNOFF(CFS) =       0.21
  TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.21

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    303.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    169.00  DOWNSTREAM(FEET) =    155.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   745.00   CHANNEL SLOPE =  0.0185
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.21
  FLOW VELOCITY(FEET/SEC) =   2.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.08   Tc(MIN.) =   11.97
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    303.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.501
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2126
  SUBAREA AREA(ACRES) =    3.39   SUBAREA RUNOFF(CFS) =    3.20
  TOTAL AREA(ACRES) =        3.5   TOTAL RUNOFF(CFS) =       3.34
  TC(MIN.) =   11.97

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.97
  RAINFALL INTENSITY(INCH/HR) =   4.50
  TOTAL STREAM AREA(ACRES) =     3.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.34

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    167.80
  DOWNSTREAM ELEVATION(FEET) =    159.00
  ELEVATION DIFFERENCE(FEET) =      8.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.292
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.815
  SUBAREA RUNOFF(CFS) =       0.14
  TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.14

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    303.00 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    159.00  DOWNSTREAM(FEET) =    155.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.0117
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.14
  FLOW VELOCITY(FEET/SEC) =   1.62 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.34   Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE    305.00 TO NODE    303.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.179
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    1.35
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       1.45
  TC(MIN.) =    9.63

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.63
  RAINFALL INTENSITY(INCH/HR) =   5.18
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         3.34    11.97        4.501         3.49
     2         1.45     9.63        5.179         1.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1         4.14     9.63        5.179
     2         4.60    11.97        4.501

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.60   Tc(MIN.) =   11.97
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    303.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    155.20  DOWNSTREAM(FEET) =    154.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   365.00   CHANNEL SLOPE =  0.0011
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.60
  FLOW VELOCITY(FEET/SEC) =   0.68 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   8.88   Tc(MIN.) =   20.85
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE      3.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.85
  RAINFALL INTENSITY(INCH/HR) =   3.15
  TOTAL STREAM AREA(ACRES) =     4.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.60

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    167.70
  DOWNSTREAM ELEVATION(FEET) =    158.50
  ELEVATION DIFFERENCE(FEET) =      9.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.292
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.815
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    158.50  DOWNSTREAM(FEET) =    154.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0148
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.12
  FLOW VELOCITY(FEET/SEC) =   1.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =    8.57
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE      3.00 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.582
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
```

```
  SUBAREA AREA(ACRES) =     1.48   SUBAREA RUNOFF(CFS) =     1.65
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       1.75
  TC(MIN.) =    8.57

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.57
  RAINFALL INTENSITY(INCH/HR) =   5.58
  TOTAL STREAM AREA(ACRES) =     1.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.75

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.60     20.85        3.147         4.89
     2        1.75      8.57        5.582         1.57

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        4.35      8.57       5.582
     2        5.59     20.85       3.147

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.59   Tc(MIN.) =   20.85
  TOTAL AREA(ACRES) =        6.5
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE      3.00 =    1180.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        6.5  TC(MIN.) =     20.85
  PEAK FLOW RATE(CFS)    =       5.59
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

0
```



SCALE: 1" = 100'

100 50 0 100 200 300

GRAPHIC SCALE IN FEET

MDRA NO. _____

Sheet 01	COUNTY OF SAN DIEGO Department of Development Services	01 Sheets

PROPOSED HYDROLOGY FOR:

GOLF GREEN ESTATES

California Coordinate Index

City Engineer

R.C.E. Expires

Engineer of Work: Randall Roberts

R.C.E.41903 EXP. 9/30/09

REGISTERED PROFESSIONAL ENGINEER
RANDALL T. ROBERTS
No. RCE 65697
EXP. 9-30-11
Civil
STATE OF CALIFORNIA

FUSCOE ENGINEERING
full circle thinking

C:\USERS\ROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_3472\APPENDIX H PROPOSED HYDROLOGY EXHIBIT.DWG (02-16-12 10:04:07AM)

FUSCOE
ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335
www.fuscoe.com

Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-1-P.dat

Page: 1

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
121	120	2	196.85	194.96	75	0.82	0.16	
120	116	3	191.96	190.61	130			
116	116	1						1 of 2
118	117	2	197.37	196.35	60	0.82	0.13	
117	116	5	195.85	194.35	70			
117	116	8				0.82	0.47	
116	116	1						2 of 2
116	115	3	190.61	188.51	140			
119	115	8				0.90	0.71	
115	112	3	188.51	1186.91	115			
112	112	1						1 of 2
114	113	2	196.83	196.18	55	0.82	0.07	
113	112	5	196.18	192.64	90			
113	112	8				0.82	0.10	
112	112	1						2 of 2
112	111	3	186.91	185.51	70			
111	111	1						1 of 2
134	133	2	197.25	195.92	65	0.82	0.09	
133	111	5	195.92	191.95	250			
133	111	8				0.82	0.76	
125	111	8				0.90	0.16	
124	111	8				0.90	0.27	
123	111	8				0.82	0.21	
111	111	1						2 of 2
111	108	3	185.51	183.20	65			1 of 2
108	108	1						
110	109	2	195.43	194.08	60	0.82	0.08	
109	108	5	194.08	190.43	300			
109	108	8				0.82	0.44	
108	108	1						2 of 2
108	105	3	190.43	166.69	285			
105	105	1						1 of 2

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-1-P.dat

Page: 2

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
107	106	2	191.00	189.30	50	0.82	0.02	
106	105	5	189.30	172.00	400			
106	105	8				0.81	2.40	
105	105	1						2 of 2
105	100	3	166.69	164.62	40			
100	100	1						1 of 2
104	103	2	176.40	174.50	75	0.81	0.03	
103	102	5	174.50	167.00	340			
103	102	8				0.81	1.39	
102	100	3	164.00	162.40	50			
100	100	1						2 of 2
100	1	5	162.40	159.00	190			
1	1	10						save to bank 1
161	160	2	182.80	180.70	85	0.57	0.19	
160	157	6	180.20	175.70	230	0.57	0.54	
157	157	1						1 of 2
159	158	2	196.18	192.81	90	0.82	0.07	
158	157	6	192.81	175.70	240	0.67	0.31	
157	157	1						2 of 2
157	151	3	171.20	164.60	120			
151	151	1						1 of 3
156	155	2	182.90	180.70	85	0.54	0.18	
155	154	6	180.20	169.50	330	0.54	0.67	
154	151	3	165.00	164.60	40			
151	151	1						2 of 3
153	153	2	188.00	182.00	50	0.55	0.03	
152	151	6	182.00	169.50	175	0.55	0.19	
151	151	1						3 of 3
151	150	3	164.60	164.00	100			
150	135	5	164.00	160.00	485			

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-1-P.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
135	135	1						1 of 2
139	138	2	171.40	171.20	50	0.54	0.08	
138	137	6	171.20	170.40	400	0.54	1.09	
137	136	3	166.90	166.40	50			
136	135	5	166.40	160.00	865			
135	135	1						2 of 2
135	1	5	160.00	159.00	135			
1	1	11						add bank 1

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
             Ver. 3.0 Release Date: 06/01/2007  License ID 1355

                          Analysis prepared by:

                    FUSCOE ENGINEERING - SAN DIEGO, INC.
                      6390 GREENWICH DRIVE, SUITE 170
                        SAN DIEGO, CALIFORNIA 92122
                               (858) 554-1500

 ************************** DESCRIPTION OF STUDY **************************
* Golf Green RPL 3                                                         *
* Proposed Hydrology - Basin 1                                             *
* November 2010                                                            *
 ***************************************************************************

  FILE NAME: GG-P-1.DAT
  TIME/DATE OF STUDY: 13:54 11/04/2010
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    196.85
  DOWNSTREAM ELEVATION(FEET) =    194.96
  ELEVATION DIFFERENCE(FEET) =      1.89
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.208
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.04
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.04

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.96  DOWNSTREAM(FEET) =   190.61
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.04
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    3.79
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    116.00 =     205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.79
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.04

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    197.37
  DOWNSTREAM ELEVATION(FEET) =    196.35
  ELEVATION DIFFERENCE(FEET) =      1.02
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.271
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.84
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.84

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    116.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.85  DOWNSTREAM(FEET) =    194.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0214
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.84
  FLOW VELOCITY(FEET/SEC) =   2.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =    3.80
  LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     130.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    116.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    3.05
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       3.89
  TC(MIN.) =    3.80

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.80
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.04     3.79        7.904         0.16
      2        3.89     3.80        7.904         0.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.92     3.79       7.904
      2        4.93     3.80       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.93   Tc(MIN.) =    3.80
  TOTAL AREA(ACRES) =        0.8
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    116.00 =     205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.61  DOWNSTREAM(FEET) =   188.51
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.93
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    4.16
```

```
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    115.00 =     345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8586
  SUBAREA AREA(ACRES) =    0.71   SUBAREA RUNOFF(CFS) =    5.05
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.98
  TC(MIN.) =    4.16

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   188.51  DOWNSTREAM(FEET) =   186.91
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.98
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    4.42
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    112.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.42
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.98

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    113.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    196.83
  DOWNSTREAM ELEVATION(FEET) =    196.18
  ELEVATION DIFFERENCE(FEET) =      0.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.535
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.18  DOWNSTREAM(FEET) =    192.64
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.00   CHANNEL SLOPE =  0.0393
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   2.97 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =    4.04
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    112.00 =     145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.65
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       1.10
  TC(MIN.) =    4.04

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.04
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.98     4.42        7.904          1.47
      2        1.10     4.04        7.904          0.17

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.08     4.04       7.904
      2       11.08     4.42       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.08   Tc(MIN.) =    4.42
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    112.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.91  DOWNSTREAM(FEET) =   185.51
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.08
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.55
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    111.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.55
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.08

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.25
  DOWNSTREAM ELEVATION(FEET) =    195.92
  ELEVATION DIFFERENCE(FEET) =      1.33
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.201
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    111.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.92  DOWNSTREAM(FEET) =    191.95
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0159
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.58
  FLOW VELOCITY(FEET/SEC) =   1.89 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =    5.41
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    111.00 =     315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    4.68
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       5.24
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8327
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    1.08
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       6.32
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8469
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    1.83
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       8.15
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.517
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8431
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    1.29
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.44
  TC(MIN.) =    5.41

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.41
  RAINFALL INTENSITY(INCH/HR) =   7.52
  TOTAL STREAM AREA(ACRES) =     1.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.44
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.08     4.55        7.904          1.64
      2        9.44     5.41        7.517          1.49

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       19.02     4.55       7.904
      2       19.98     5.41       7.517

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.98   Tc(MIN.) =    5.41
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    111.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   185.51  DOWNSTREAM(FEET) =   183.20
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.98
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    108.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   7.44
  TOTAL STREAM AREA(ACRES) =     3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.98

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    195.43
  DOWNSTREAM ELEVATION(FEET) =    194.08
  ELEVATION DIFFERENCE(FEET) =      1.35
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.979
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.52
```

```
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    108.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    194.08  DOWNSTREAM(FEET) =    190.43
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0122
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.52
  FLOW VELOCITY(FEET/SEC) =   1.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.026
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.44   SUBAREA RUNOFF(CFS) =    2.54
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       3.00
  TC(MIN.) =    6.00

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.00
  RAINFALL INTENSITY(INCH/HR) =   7.03
  TOTAL STREAM AREA(ACRES) =     0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       19.98     5.49        7.442          3.13
      2        3.00     6.00        7.026          0.52

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       22.72     5.49       7.442
      2       21.86     6.00       7.026

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.72   Tc(MIN.) =    5.49
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    108.00 =     595.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.43  DOWNSTREAM(FEET) =   166.69
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.72
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.75
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    105.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.75
  RAINFALL INTENSITY(INCH/HR) =   7.22
  TOTAL STREAM AREA(ACRES) =     3.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.72

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    191.00
  DOWNSTREAM ELEVATION(FEET) =    189.30
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.370
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    189.30  DOWNSTREAM(FEET) =    172.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0433
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.13
  FLOW VELOCITY(FEET/SEC) =   3.12 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.14   Tc(MIN.) =    4.51
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    105.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8101
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =   15.37
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =      15.50
  TC(MIN.) =    4.51

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.51
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     2.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.72     5.75        7.220          3.65
      2       15.50     4.51        7.904          2.42

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       36.25     4.51       7.904
      2       36.87     5.75       7.220

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.87   Tc(MIN.) =    5.75
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    105.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   166.69  DOWNSTREAM(FEET) =   164.62
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.08
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.87
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.79
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    100.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.79
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     6.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.87

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    176.40
  DOWNSTREAM ELEVATION(FEET) =    174.50
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.316
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    174.50  DOWNSTREAM(FEET) =    167.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00   CHANNEL SLOPE =  0.0221
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.19
  FLOW VELOCITY(FEET/SEC) =   2.23 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =    5.86
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    102.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.135
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    1.39   SUBAREA RUNOFF(CFS) =    8.03
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       8.21
  TC(MIN.) =    5.86

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   164.00  DOWNSTREAM(FEET) =   162.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.21
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.94
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    100.00 =     465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   7.07
  TOTAL STREAM AREA(ACRES) =     1.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       36.87     5.79        7.189          6.07
      2        8.21     5.94        7.070          1.42

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       44.87     5.79       7.189
      2       44.47     5.94       7.070

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.87   Tc(MIN.) =    5.79
  TOTAL AREA(ACRES) =        7.5
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    100.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE      1.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    162.40  DOWNSTREAM(FEET) =    159.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   190.00   CHANNEL SLOPE =  0.0179
  CHANNEL FLOW THRU SUBAREA(CFS) =      44.87
  FLOW VELOCITY(FEET/SEC) =   5.02 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE      1.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    160.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    182.80
  DOWNSTREAM ELEVATION(FEET) =    180.70
  ELEVATION DIFFERENCE(FEET) =      2.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.506
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.669
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.72

******************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    157.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  180.20  DOWNSTREAM ELEVATION(FEET) =  175.70
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =    7.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.853
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    1.80
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.48
  FLOW VELOCITY(FEET/SEC.) =  2.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    157.00 =     315.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   5.85
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.44
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    158.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    196.18
  DOWNSTREAM ELEVATION(FEET) =    192.81
  ELEVATION DIFFERENCE(FEET) =      3.37
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.079
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    157.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  192.81  DOWNSTREAM ELEVATION(FEET) =  175.70
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.01
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.698
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    1.64
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.10

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.75
  FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    157.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.01
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.44     7.97        5.853          0.73
      2        2.10     4.01        7.904          0.38

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.32     4.01       7.904
      2        3.99     7.97       5.853

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.99   Tc(MIN.) =    7.97
  TOTAL AREA(ACRES) =        1.1
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    157.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    151.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.20  DOWNSTREAM(FEET) =   164.60
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.99
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    151.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    151.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.17
  RAINFALL INTENSITY(INCH/HR) =   5.76
  TOTAL STREAM AREA(ACRES) =     1.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.99

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    155.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    182.90
  DOWNSTREAM ELEVATION(FEET) =    180.70
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.769
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.501
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  180.20  DOWNSTREAM ELEVATION(FEET) =  169.50
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    8.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.633
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    2.04
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.83
  FLOW VELOCITY(FEET/SEC.) =  3.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    156.00 TO NODE    154.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    151.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   165.00  DOWNSTREAM(FEET) =   164.60
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.59
```

```
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.60
  LONGEST FLOWPATH FROM NODE    156.00 TO NODE    151.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    151.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.60
  RAINFALL INTENSITY(INCH/HR) =   5.57
  TOTAL STREAM AREA(ACRES) =     0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.59

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    152.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    188.00
  DOWNSTREAM ELEVATION(FEET) =    182.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.250
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    151.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  182.00  DOWNSTREAM ELEVATION(FEET) =  169.50
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =    3.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.83
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   3.29
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    151.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    151.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.83
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.96

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.99     8.17        5.759          1.11
      2        2.59     8.60        5.573          0.85
      3        0.96     3.83        7.904          0.22

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.01     3.83       7.904
      2        7.14     8.17       5.759
      3        7.12     8.60       5.573

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.14   Tc(MIN.) =    8.17
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    156.00 TO NODE    151.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   164.60  DOWNSTREAM(FEET) =   164.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.14
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE    156.00 TO NODE    150.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    135.00 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    164.00  DOWNSTREAM(FEET) =    160.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   485.00   CHANNEL SLOPE =  0.0082
  CHANNEL FLOW THRU SUBAREA(CFS) =       7.14
  FLOW VELOCITY(FEET/SEC) =   2.09 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.87   Tc(MIN.) =   12.38
  LONGEST FLOWPATH FROM NODE    156.00 TO NODE    135.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.38
  RAINFALL INTENSITY(INCH/HR) =   4.41
  TOTAL STREAM AREA(ACRES) =     2.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.14

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    138.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    171.40
  DOWNSTREAM ELEVATION(FEET) =    171.20
  ELEVATION DIFFERENCE(FEET) =      0.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.980
  WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.418
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    137.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  171.20  DOWNSTREAM ELEVATION(FEET) =  170.40
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
  STREET FLOW TRAVEL TIME(MIN.) =   6.31   Tc(MIN.) =   15.29
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.844
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.09      SUBAREA RUNOFF(CFS) =    2.26
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  1.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    137.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    136.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   166.90  DOWNSTREAM(FEET) =   166.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.43
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   15.47
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    136.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    135.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    166.40  DOWNSTREAM(FEET) =    160.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   865.00   CHANNEL SLOPE =  0.0074
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.43
  FLOW VELOCITY(FEET/SEC) =   1.54 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   9.35   Tc(MIN.) =   24.81
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    135.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   24.81
  RAINFALL INTENSITY(INCH/HR) =   2.81
  TOTAL STREAM AREA(ACRES) =     1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.43

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.14    12.38        4.405          2.18
```

```
    2        2.43    24.81        2.813          1.17

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.35    12.38       4.405
      2        6.99    24.81       2.813

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.35   Tc(MIN.) =   12.38
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    135.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE      1.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    160.00  DOWNSTREAM(FEET) =    159.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   135.00   CHANNEL SLOPE =  0.0074
  CHANNEL FLOW THRU SUBAREA(CFS) =       8.35
  FLOW VELOCITY(FEET/SEC) =   2.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   13.47
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE      1.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.35    13.47       4.171        3.35
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE      1.00 =    1500.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       44.87     6.42       6.725        7.49
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE      1.00 =    1110.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      48.85       6.42        6.725
      2      36.18      13.47        4.171

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.85   Tc(MIN.) =    6.42
  TOTAL AREA(ACRES) =       10.8
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.8  TC(MIN.) =      6.42
  PEAK FLOW RATE(CFS)   =      48.85
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-P-2.dat

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Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
223	281	2	197.7	196.6	60	0.82	0.09	
281	280	5	196.1	194.2	205			
281	280	8				0.82	2.14	
280	278	3	191.2	188.7	250			
279	278	8				0.90	0.37	
278	274	3	188.7	186.9	180			
274	274	1						1 of 2
277	274	2	197.5	197.1	30	0.82	0.11	
275	274	8				0.90	0.29	
274	274	1						2 of 2
274	269	3	186.9	186.1	75			
275	269	8				0.90	0.19	
269	269	10						save to bank 1
290	289	2	197.5	196.5	70	0.82	0.07	
289	287	5	196.5	195.3	60			
289	287	8				0.82	0.47	
287	285	3	192.3	190.9	135			
286	285	8				0.90	0.29	
285	282	3	190.9	190.6	35			
282	282	1						1 of 2
284	283	2	197.3	196.2	65	0.82	0.03	
283	282	5	196.2	195.2	60			
282	282	8				0.82	0.14	
282	282	1						2 of 2
282	270	3	190.6	187.2	80			
270	270	1						1 of 2
273	272	2	197.5	196.6	65	0.82	0.08	
272	271	3	194.6	193.4	100			
272	271	8				0.82	0.65	
271	270	3	193.4	187.2	250			
270	270	1						2 of 2
270	269	3	187.2	186.1	40			
269	269	11						add bank 1

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Job #: 2518.02a Run Name: GG-P-2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
269	269	12						clear bank 1
269	268	3	186.1	184.0	40			
268	221	3	184.0	171.2	20			
221	220.3	3	171.2	168.4	120			30"
220.3	220.3	1						1 of 2
224	222	2	180.8	178.1	90	0.57	0.18	
222	220.3	6	177.9	173.4	400	0.57	1.20	
220.3	220.3	1						2 of 2
220.3	220.2	3	168.4	167.5	45			
220.2	220.2	1						1 of 2
226	225	2	180.5	178.5	80	0.48	0.15	
225	220.2	6	178.0	173.0	420	0.48	1.22	
220.2	220.2	1						2 of 2
220.2	220.1	3	167.5	160.0	150			
220.1	220.1	10						save to bank 1
256	255	2	179.0	176.0	80	0.57	0.23	
255	254	6	175.5	173.9	250	0.57	0.49	
254	254	1						1 of 2
254.2	254.1	2	180.2	178.4	80	0.57	0.19	
254.1	254	6	177.9	173.9	240	0.57	0.87	
254	254	1						2 of 2
254	251	3	169.4	169.3	15			
251	251	10						save to bank 2
292	291	2	182.6	180.7	75	0.54	0.20	
291	265	6	180.2	175.1	265	0.55	0.44	
265	265	1						1 of 2
267	266	2	180.8	178.1	90	0.54	0.14	
266	265	6	177.6	175.1	240	0.54	0.59	
265	265	1						2 of 2

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Job #: 2518.02a Run Name: GG-P-2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
265	261	3	170.6	170.3	10			
261	261	1						1 of 2
295	294	2	183.1	180.7	80	0.57	0.22	
294	293	6	180.2	175.1	275	0.57	0.62	
293	261	3	170.6	170.0	30			
261	261	1						2 of 2
261	251	3	170.3	169.3	350			
251	251	11						add bank 2
251	251	12						clear bank 2
251	238	3	169.3	169.0	30			
238	238	1						1 of 3
253	252	2	181.0	178.7	85	0.54	0.17	
252	238	6	178.2	173.8	500	0.53	1.71	
238	231	1						2 of 3
238.2	238.1	2	180.9	178.4	85	0.48	0.15	
238.1	238	6	177.9	173.8	260	0.50	0.63	
238	238	1						3 of 3
238	237	3	173.8	163.7	140			
237	220.1	5	163.7	160.0	750			
220.1	220.1	1						1 of 2
237	236.8	2	163.7	163.4	50	0.20	0.32	
236.8	220.1	5	163.4	160.0	700			
236.8	220.1	8				0.20	0.80	
220.1	220.1	1						2 of 2
220.1	220.11	11						add bank 1
220.1	220.1	12						clear bank 1
220.1	212	5	160.0	158.0	400			
212	212	1						1 of 2
220.1	212.8	2	160.0	159.7	50	0.20	0.13	
212.8	212	5	159.7	158.0	350			
212.8	212	8				0.20	0.64	

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Job #: 2518.02a Run Name: GG-P-2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
212	212	1						2 of 2
212	212	10						save bank 1
264	263	2	197.0	196.2	65	0.82	0.09	
263	262	5	196.2	190.0	520			
263	262	8				0.82	2.68	
262	215	3	186.0	161.3	140			
215	215	1						1 of 3
215.2	215.1	2	175.1	173.8	70	0.57	0.25	
215.1	219	6	173.3	165.9	590	0.56	1.87	
219	215	3	161.4	161.1	10			
215	215	1						2 of 3
218	217	2	175.0	173.5	75	0.48	0.14	
217	216	6	173.0	165.9	550	0.52	1.88	
216	215	3	161.4	161.1	30			
215	215	1						3 of 3
215	214	3	161.1	160.4	65			
214	214	10						Save to bank 3
259	258	2	196.0	195.0	65	0.82	0.10	
258	257	5	195.0	187.0	630			
258	257	8				0.82	3.31	
257	215.3	3	183.0	158.5	70			
215.3	215.3	10						Save to bank 2
234	233	2	166.7	166.5	45.0	0.54	0.06	
233	232	6	166.6	163.7	200.0	0.54	0.40	
232	215.4	3	160.0	160.0	6			
215.4	215.4	1						1 of 2
226	225	2	167.0	166.3	60	0.54	0.05	
225	224	6	166.3	163.7	215	0.54	0.17	
224	215.4	3	160.1	160.0	26			
215.4	215.4	1						2 of 2
215.4	215.3	3	159.9	158.5	274			
215.3	215.3	11						Add bank 2

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-P-2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
215.3	215.3	12						Clear bank 2
215.3	214	3	158.4	157.9	110			
214	214	11						Add bank 3
214	214	12						Clear bank 3
214	213	3	157.8	157.0	150			
213	212	5	159.0	158.0	45			
212	212	11						Add bank 1
212	212	12						Clear bank 1
212	211	3	158.0	157.1	180.0			
211	211	1						1 of 2
297.1	297	2	180.0	163.8	85.0	0.50	0.33	
297	296	5	163.8	158.0	1,265.0			
296	211	5	158.0	157.1	1,100.0			
211	211	1						2 of 2
211	246	5	157.1	154.0	578.0			
246.1	246	8				0.27	0.85	
246	236	5	154.0	152.0	390.0			
236	236	1						1 of 2
236.8	236.6	2	157.0	156.5	50	0.27	0.18	
236.6	236	5	156.5	152.0	120			
236.6	236	8				0.27	0.60	
236	236	1						2 of 2
236	2	5	152.0	151.0	100			
2	2	10						Save to bank 1
244	243	2	175.6	174.8	65.0	0.81	0.02	
243	242	6	174.8	163.8	425.0	0.54	0.61	
242	241.5	3	159.3	158.1	122.0			
241.5	241.5	1						1 of 2
248	247	2	193.3	189.0	70.0	0.81	0.05	
247	245	5	189.0	165.0	710.0			
247	245	8				0.81	2.00	
245	241.5	3	161.0	158.1	26.0			
241.5	241.5	1						2 of 2

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-P-2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
241.5	241	3	158.1	157.7	48			
241	241	1						1 of 2
260	250	2	166.5	165.0	70	0.51	0.17	
250	241	6	164.5	162.2	430	0.5	0.90	
241	241	1						2 of 2
241	236.2	3	157.7	157.3	80.0			
236.2	236.2	1						1 of 2
293	276	2	167.7	165.5	80.0	0.48	0.19	
276	236.2	6	165.0	161.8	450.0	0.48	1.48	
236.2	236.2	1						2 of 2
236.2	236.1	3	157.3	156.0	279.0			
236.1	235	5	156.0	155.4	115.0			
235	235	10						Save to bank 2
231	230	2	200.0	195.5	70.0	0.82	0.07	
230	227	5	195.5	171.0	730.0			
230	227	8				0.81	2.06	
227	227	1						1 of 2
229	228	2	189.0	188.0	70.0	0.81	0.09	
228	227	5	188.0	171.0	340.0			
228	227	8				0.81	1.09	
227	227	1						2 of 2
227	208	3	171.0	168.3	35.0			
208	208	1						1 of 2
210	209	2	175.6	175.0	55.0	0.90	0.03	
209	208	6	175.4	172.9	275.0	0.52	0.34	
208	208	1						2 of 2
208	203	3	168.4	160.0	745.0			
203	203	1						1 of 3
207	206	2	173.1	170.7	90.0	0.48	0.20	
206	203	6	170.2	164.6	665.0	0.48	3.42	

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Job #: 2518.02a

Run Name: GG-P-2.dat

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
203	203	1						2 of 3
205	204	2	173.2	170.8	85.0	0.48	0.22	
204	203	6	170.3	164.6	590.0	0.48	2.12	
203	203	1						3 of 3
203	202	3	160.0	159.4	100.0			
202	201	5	158.4	157.5	345.0	0.20	1.11	W=10', Z=5', Depth=1'
201	201	1						1 of 2
240	239	2	172.0	165.4	80.0	0.54	0.25	
239	201	5	165.4	157.5	610.0			
239	201	8				0.25	2.06	
201	201	1						2 of 2
201	235	5	157.5	155.4	296			
235	235	11						Add bank 2
235	235	12						Clear bank 2
235	2	5	155.4	151.0	285			
235	2	8				0.34	2.47	
2	2	10						Add bank 1

100 Year Storm


```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2010 Advanced Engineering Software (aes)
             Ver. 17.0 Release Date: 07/01/2010  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                             6390 Greenwich Dr.
                                 Suite 170
                            San Diego, CA 92122

 ************************** DESCRIPTION OF STUDY **************************
* Golf Green Estates RPL3                                                  *
* Proposed Hydrology - Basin 2                                             *
* December 2011                                                            *
 ***************************************************************************

  FILE NAME: GG-P-2.DAT
  TIME/DATE OF STUDY: 15:49 12/20/2011
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    281.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    197.70
  DOWNSTREAM ELEVATION(FEET) =    196.62
  ELEVATION DIFFERENCE(FEET) =      1.08
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.209
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

100 Year Storm


```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    280.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.12  DOWNSTREAM(FEET) =    194.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   205.00   CHANNEL SLOPE =  0.0094
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.58
  FLOW VELOCITY(FEET/SEC) =   1.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    280.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.379
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    2.14   SUBAREA RUNOFF(CFS) =   12.95
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      13.49
  TC(MIN.) =    5.56

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    278.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.21  DOWNSTREAM(FEET) =   188.74
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.49
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    6.16
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    278.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    279.00 TO NODE    278.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.912
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8314
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    2.30
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =      14.94
  TC(MIN.) =    6.16

****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    274.00 IS CODE =  31
```

100 Year Storm


```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   188.74  DOWNSTREAM(FEET) =   186.87
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.94
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    6.57
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    274.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.57
  RAINFALL INTENSITY(INCH/HR) =   6.63
  TOTAL STREAM AREA(ACRES) =     2.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.94

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    274.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    30.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    197.11
  ELEVATION DIFFERENCE(FEET) =      0.39
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.529
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.71

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    274.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8780
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    2.06
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       2.78
  TC(MIN.) =    2.53

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

100 Year Storm


```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    2.53
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.94     6.57        6.629          2.60
      2        2.78     2.53        7.904          0.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.53     2.53       7.904
      2       17.27     6.57       6.629

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.27   Tc(MIN.) =    6.57
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    274.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.87  DOWNSTREAM(FEET) =   186.10
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.27
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    269.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    269.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.525
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8413
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    1.12
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      17.51
  TC(MIN.) =    6.73

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================
```

100 Year Storm


```
****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    289.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    196.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.744
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    287.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.50  DOWNSTREAM(FEET) =    195.25
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0208
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   2.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =    4.21
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    287.00 =     130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    3.05
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       3.50
  TC(MIN.) =    4.21

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    285.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   192.25  DOWNSTREAM(FEET) =   190.91
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.50
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    4.64
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    285.00 =     265.00 FEET.
```

100 Year Storm


```
****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    285.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8480
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    2.06
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       5.56
  TC(MIN.) =    4.64

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    282.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.91  DOWNSTREAM(FEET) =   190.55
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.56
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    4.74
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    282.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.74
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.25
  DOWNSTREAM ELEVATION(FEET) =    196.18
  ELEVATION DIFFERENCE(FEET) =      1.07
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.441
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    282.00 IS CODE =  52
```

100 Year Storm


```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.18  DOWNSTREAM(FEET) =    195.87
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0052
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.19
  FLOW VELOCITY(FEET/SEC) =   1.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.37
  LONGEST FLOWPATH FROM NODE    284.00 TO NODE    282.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    282.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       1.10
  TC(MIN.) =    4.37

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.37
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.56     4.74        7.904          0.83
      2        1.10     4.37        7.904          0.17

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.22     4.37       7.904
      2        6.66     4.74       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.66   Tc(MIN.) =    4.74
  TOTAL AREA(ACRES) =        1.0
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    282.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
```

100 Year Storm


```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.55  DOWNSTREAM(FEET) =   187.24
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.66
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.87
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    270.00 =     380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.87
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.66

****************************************************************************
  FLOW PROCESS FROM NODE    273.00 TO NODE    272.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    196.56
  ELEVATION DIFFERENCE(FEET) =      0.94
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.593
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    271.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   194.56  DOWNSTREAM(FEET) =   193.37
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.52
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    4.12
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    271.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    271.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

100 Year Storm


```
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    4.21
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       4.73
  TC(MIN.) =    4.12

****************************************************************************
  FLOW PROCESS FROM NODE    271.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   193.37  DOWNSTREAM(FEET) =   187.24
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.73
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    4.66
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    270.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.66
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.73

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.66     4.87        7.904          1.00
      2        4.73     4.66        7.904          0.73

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.40     4.66       7.904
      2       11.40     4.87       7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.40   Tc(MIN.) =    4.87
  TOTAL AREA(ACRES) =        1.7
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    270.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
```

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```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   187.24  DOWNSTREAM(FEET) =   186.10
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.40
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    4.94
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    269.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.40     4.94       7.904        1.73
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    269.00 =     455.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       17.51     6.73       6.525        3.19
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    269.00 =     770.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      24.25       4.94        7.904
      2      26.92       6.73        6.525

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.92   Tc(MIN.) =    6.73
  TOTAL AREA(ACRES) =        4.9

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    268.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.10  DOWNSTREAM(FEET) =   184.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.84
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.92
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.77
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    268.00 =     810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    221.00 IS CODE =  31
```

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```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   184.00  DOWNSTREAM(FEET) =   171.20
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  40.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.92
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.78
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    221.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    220.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.20  DOWNSTREAM(FEET) =   168.40
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.65
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.92
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.95
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.30 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.30 TO NODE    220.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.95
  RAINFALL INTENSITY(INCH/HR) =   6.39
  TOTAL STREAM AREA(ACRES) =     4.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.92

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    180.80
  DOWNSTREAM ELEVATION(FEET) =    178.10
  ELEVATION DIFFERENCE(FEET) =      2.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.275
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.827
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    220.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

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```
==============================================================================
  UPSTREAM ELEVATION(FEET) =  177.90  DOWNSTREAM ELEVATION(FEET) =  173.40
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.84   Tc(MIN.) =    9.11
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.366
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.553
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.54
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.95
  FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE    224.00 TO NODE    220.30 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.30 TO NODE    220.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.11
  RAINFALL INTENSITY(INCH/HR) =   5.37
  TOTAL STREAM AREA(ACRES) =     1.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.09

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.92     6.95        6.390          4.92
      2        4.09     9.11        5.366          1.38

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       30.04     6.95       6.390
      2       26.70     9.11       5.366

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

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```
  PEAK FLOW RATE(CFS) =      30.04   Tc(MIN.) =    6.95
  TOTAL AREA(ACRES) =        6.3
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.30 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.30 TO NODE    220.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   168.40  DOWNSTREAM(FEET) =   167.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.04
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.02
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.20 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.20 TO NODE    220.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   6.35
  TOTAL STREAM AREA(ACRES) =     6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.04

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    180.50
  DOWNSTREAM ELEVATION(FEET) =    178.50
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.355
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.162
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    220.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  178.00  DOWNSTREAM ELEVATION(FEET) =  173.00
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

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```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   10.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.912
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  SUBAREA AREA(ACRES) =    1.22      SUBAREA RUNOFF(CFS) =    2.88
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.73
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    220.20 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.20 TO NODE    220.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   4.91
  TOTAL STREAM AREA(ACRES) =     1.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.23

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       30.04     7.02        6.350          6.30
      2        3.23    10.45        4.912          1.37

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       32.21     7.02       6.350
      2       26.47    10.45       4.912

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.21   Tc(MIN.) =    7.02
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.20 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.20 TO NODE    220.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

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```
  ELEVATION DATA: UPSTREAM(FEET) =   167.50  DOWNSTREAM(FEET) =   160.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.21
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.10 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    255.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    179.00
  DOWNSTREAM ELEVATION(FEET) =    176.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.492
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.439
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  175.50  DOWNSTREAM ELEVATION(FEET) =  173.90
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   2.36   Tc(MIN.) =    7.86
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.906
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
```

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```
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.65
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.83
  FLOW VELOCITY(FEET/SEC.) =  1.88   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    254.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.86
  RAINFALL INTENSITY(INCH/HR) =   5.91
  TOTAL STREAM AREA(ACRES) =     0.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.42

****************************************************************************
  FLOW PROCESS FROM NODE    254.20 TO NODE    254.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    180.20
  DOWNSTREAM ELEVATION(FEET) =    178.40
  ELEVATION DIFFERENCE(FEET) =      1.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.512
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.666
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE    254.10 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  177.90  DOWNSTREAM ELEVATION(FEET) =  173.90
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    8.03
```

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```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.824
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .5700
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
SUBAREA AREA(ACRES) =    0.87      SUBAREA RUNOFF(CFS) =    2.89
TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.52

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.36
FLOW VELOCITY(FEET/SEC.) =  2.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
LONGEST FLOWPATH FROM NODE    254.20 TO NODE    254.00 =     320.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    8.03
RAINFALL INTENSITY(INCH/HR) =   5.82
TOTAL STREAM AREA(ACRES) =     1.06
PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.52

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        2.42     7.86        5.906          0.72
    2        3.52     8.03        5.824          1.06

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        5.87     7.86       5.906
    2        5.91     8.03       5.824

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       5.91   Tc(MIN.) =    8.03
TOTAL AREA(ACRES) =        1.8
LONGEST FLOWPATH FROM NODE    256.00 TO NODE    254.00 =     330.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    254.00 TO NODE    251.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   169.40  DOWNSTREAM(FEET) =   169.25
FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       5.91
PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.07
LONGEST FLOWPATH FROM NODE    256.00 TO NODE    251.00 =     345.00 FEET.

****************************************************************************
```

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```
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    292.00 TO NODE    291.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    182.60
  DOWNSTREAM ELEVATION(FEET) =    180.70
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.404
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.738
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    291.00 TO NODE    265.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  180.20  DOWNSTREAM ELEVATION(FEET) =  175.07
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =    8.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.781
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.547
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.40
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.83
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    265.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =   1
```

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```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.12
  RAINFALL INTENSITY(INCH/HR) =   5.78
  TOTAL STREAM AREA(ACRES) =     0.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    267.00 TO NODE    266.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    180.80
  DOWNSTREAM ELEVATION(FEET) =    178.10
  ELEVATION DIFFERENCE(FEET) =      2.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.631
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.589
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    265.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  177.60  DOWNSTREAM ELEVATION(FEET) =  175.07
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   1.98   Tc(MIN.) =    8.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.566
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.59      SUBAREA RUNOFF(CFS) =    1.77
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.33
```

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```
  FLOW VELOCITY(FEET/SEC.) =  2.22   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    267.00 TO NODE    265.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.61
  RAINFALL INTENSITY(INCH/HR) =   5.57
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.19

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.02     8.12        5.781          0.64
      2        2.19     8.61        5.566          0.73

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.09     8.12       5.781
      2        4.14     8.61       5.566

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.14   Tc(MIN.) =    8.61
  TOTAL AREA(ACRES) =        1.4
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    265.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    261.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   175.07  DOWNSTREAM(FEET) =   170.30
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    261.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.62
  RAINFALL INTENSITY(INCH/HR) =   5.56
  TOTAL STREAM AREA(ACRES) =     1.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.14
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE    295.00 TO NODE    294.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    183.10
  DOWNSTREAM ELEVATION(FEET) =    180.70
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.917
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.091
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    294.00 TO NODE    293.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  180.20  DOWNSTREAM ELEVATION(FEET) =  175.10
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =    7.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.019
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    2.13
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.33
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    293.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    261.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

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```
  ELEVATION DATA: UPSTREAM(FEET) =   170.60  DOWNSTREAM(FEET) =   170.30
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.88
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.73
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    261.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.73
  RAINFALL INTENSITY(INCH/HR) =   5.97
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.88

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.14     8.62        5.563          1.37
      2        2.88     7.73        5.968          0.84

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.74     7.73       5.968
      2        6.83     8.62       5.563

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.83   Tc(MIN.) =    8.62
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    261.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    251.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   170.30  DOWNSTREAM(FEET) =   169.25
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.83
  PIPE TRAVEL TIME(MIN.) =   1.52    Tc(MIN.) =   10.14
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    251.00 =     735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

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```
** MAIN STREAM CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY     AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1        6.83    10.14       5.008        2.21
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    251.00 =     735.00 FEET.

** MEMORY BANK #  2 CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY     AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1        5.91     8.07       5.804        1.78
LONGEST FLOWPATH FROM NODE    256.00 TO NODE    251.00 =     345.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF       Tc      INTENSITY
NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      11.34       8.07        5.804
    2      11.93      10.14        5.008

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      11.93   Tc(MIN.) =   10.14
TOTAL AREA(ACRES) =        4.0

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.25  DOWNSTREAM(FEET) =   168.95
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.93
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.22
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    238.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.22
  RAINFALL INTENSITY(INCH/HR) =   4.99
  TOTAL STREAM AREA(ACRES) =     3.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.93

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    252.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
```

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```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    181.00
  DOWNSTREAM ELEVATION(FEET) =    178.70
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.669
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.564
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    238.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  178.20  DOWNSTREAM ELEVATION(FEET) =  173.83
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   3.77   Tc(MIN.) =   10.44
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.917
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.531
  SUBAREA AREA(ACRES) =    1.71      SUBAREA RUNOFF(CFS) =    4.46
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.55
  FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    253.00 TO NODE    238.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.92
  TOTAL STREAM AREA(ACRES) =     1.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.91

****************************************************************************
  FLOW PROCESS FROM NODE    238.20 TO NODE    238.10 IS CODE =  21
```

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```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    180.90
  DOWNSTREAM ELEVATION(FEET) =    178.40
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.182
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.258
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    238.10 TO NODE    238.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  177.90  DOWNSTREAM ELEVATION(FEET) =  173.83
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.07
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.383
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.496
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.70
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.30
  FLOW VELOCITY(FEET/SEC.) =  2.58   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    238.20 TO NODE    238.00 =     345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.07
```

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```
RAINFALL INTENSITY(INCH/HR) =   5.38
TOTAL STREAM AREA(ACRES) =     0.78
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.08

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       11.93    10.22        4.986          3.99
    2        4.91    10.44        4.917          1.88
    3        2.08     9.07        5.383          0.78

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       16.94     9.07       5.383
    2       18.66    10.22       4.986
    3       18.57    10.44       4.917

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      18.66   Tc(MIN.) =   10.22
TOTAL AREA(ACRES) =        6.6
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    238.00 =     765.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    238.00 TO NODE    237.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   173.83  DOWNSTREAM(FEET) =   163.70
FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  16.40
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      18.66
PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.36
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    237.00 =     905.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    237.00 TO NODE    220.10 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    163.70  DOWNSTREAM(FEET) =    160.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.0049
CHANNEL FLOW THRU SUBAREA(CFS) =      18.66
FLOW VELOCITY(FEET/SEC) =   2.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   6.05   Tc(MIN.) =   16.41
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    220.10 =    1655.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   16.41
RAINFALL INTENSITY(INCH/HR) =   3.67
```

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```
  TOTAL STREAM AREA(ACRES) =     6.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.66

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    236.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    163.70
  DOWNSTREAM ELEVATION(FEET) =    163.44
  ELEVATION DIFFERENCE(FEET) =      0.26
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   14.245
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.023
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.32   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    236.80 TO NODE    220.10 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.44  DOWNSTREAM(FEET) =    160.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0049
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.26
  FLOW VELOCITY(FEET/SEC) =   1.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  11.09   Tc(MIN.) =   25.34
  LONGEST FLOWPATH FROM NODE    237.00 TO NODE    220.10 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.80 TO NODE    220.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.775
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       0.62
  TC(MIN.) =   25.34

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.34
  RAINFALL INTENSITY(INCH/HR) =   2.77
  TOTAL STREAM AREA(ACRES) =     1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

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```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.66    16.41        3.672          6.65
      2        0.62    25.34        2.775          1.12

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       19.06    16.41       3.672
      2       14.72    25.34       2.775

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.06   Tc(MIN.) =   16.41
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    220.10 =    1655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       19.06    16.41       3.672        7.77
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    220.10 =    1655.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       32.21     7.18       6.260        7.67
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.10 =    1145.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      40.55       7.18        6.260
      2      37.96      16.41        3.672

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.55   Tc(MIN.) =    7.18
  TOTAL AREA(ACRES) =       15.4

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    212.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    160.00  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0050
  CHANNEL FLOW THRU SUBAREA(CFS) =      40.55
  FLOW VELOCITY(FEET/SEC) =   2.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =    9.76
```

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```
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    212.00 =    2055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   5.13
  TOTAL STREAM AREA(ACRES) =    15.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.55

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    212.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    160.00
  DOWNSTREAM ELEVATION(FEET) =    159.74
  ELEVATION DIFFERENCE(FEET) =      0.26
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   14.245
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.023
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE    212.80 TO NODE    212.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    159.74  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.0050
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.10
  FLOW VELOCITY(FEET/SEC) =   1.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.52   Tc(MIN.) =   19.76
  LONGEST FLOWPATH FROM NODE    220.10 TO NODE    212.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.80 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.258
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    0.64   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       0.50
  TC(MIN.) =   19.76

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

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```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.76
  RAINFALL INTENSITY(INCH/HR) =   3.26
  TOTAL STREAM AREA(ACRES) =     0.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       40.55     9.76        5.133         15.44
      2        0.50    19.76        3.258          0.77

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       40.80     9.76       5.133
      2       26.24    19.76       3.258

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.80   Tc(MIN.) =    9.76
  TOTAL AREA(ACRES) =       16.2
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    212.00 =    2055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    263.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.00
  DOWNSTREAM ELEVATION(FEET) =    196.15
  ELEVATION DIFFERENCE(FEET) =      0.85
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.716
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    262.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.15  DOWNSTREAM(FEET) =    190.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0118
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.58
```

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```
  FLOW VELOCITY(FEET/SEC) =   1.63 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.31   Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    262.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.399
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    2.68   SUBAREA RUNOFF(CFS) =   11.86
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      12.26
  TC(MIN.) =    9.03

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.00  DOWNSTREAM(FEET) =   161.25
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.26
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.14
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    215.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   5.36
  TOTAL STREAM AREA(ACRES) =     2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.26

****************************************************************************
  FLOW PROCESS FROM NODE    215.20 TO NODE    215.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    175.10
  DOWNSTREAM ELEVATION(FEET) =    173.75
  ELEVATION DIFFERENCE(FEET) =      1.35
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.413
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.732
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      0.96
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE    215.10 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  173.25  DOWNSTREAM ELEVATION(FEET) =  165.85
  STREET LENGTH(FEET) =   590.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   10.08
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.028
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.561
  SUBAREA AREA(ACRES) =    1.87      SUBAREA RUNOFF(CFS) =    5.26
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    215.20 TO NODE    219.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.35  DOWNSTREAM(FEET) =   161.05
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.98
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE    215.20 TO NODE    215.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.10
```

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```
  RAINFALL INTENSITY(INCH/HR) =   5.02
  TOTAL STREAM AREA(ACRES) =     2.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.98

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    217.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    175.00
  DOWNSTREAM ELEVATION(FEET) =    173.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.671
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.997
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    216.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  173.00  DOWNSTREAM ELEVATION(FEET) =  165.85
  STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =   11.33
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.664
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.517
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    4.56
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.52
  FLOW VELOCITY(FEET/SEC.) =  2.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    216.00 =     625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
```

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```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.35  DOWNSTREAM(FEET) =   161.05
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.87
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    215.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.42
  RAINFALL INTENSITY(INCH/HR) =   4.64
  TOTAL STREAM AREA(ACRES) =     2.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.87

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.26     9.14        5.356          2.77
      2        5.98    10.10        5.022          2.12
      3        4.87    11.42        4.640          2.02

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.58     9.14       5.356
      2       21.79    10.10       5.022
      3       21.03    11.42       4.640

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.79   Tc(MIN.) =   10.10
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    215.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.05  DOWNSTREAM(FEET) =   160.35
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.08
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    214.00 =     790.00 FEET.
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    258.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    196.00
  DOWNSTREAM ELEVATION(FEET) =    195.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.520
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    257.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.00  DOWNSTREAM(FEET) =    187.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   630.00   CHANNEL SLOPE =  0.0127
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.65
  FLOW VELOCITY(FEET/SEC) =   1.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.21   Tc(MIN.) =    9.73
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    257.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    257.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.144
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    3.31   SUBAREA RUNOFF(CFS) =   13.96
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      14.38
  TC(MIN.) =    9.73

****************************************************************************
  FLOW PROCESS FROM NODE    257.00 TO NODE    215.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   183.00  DOWNSTREAM(FEET) =   158.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.55
```

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```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.77
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    215.30 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    215.30 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    233.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    45.00
  UPSTREAM ELEVATION(FEET) =    166.70
  DOWNSTREAM ELEVATION(FEET) =    166.50
  ELEVATION DIFFERENCE(FEET) =      0.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.519
  WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.605
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    232.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  166.60  DOWNSTREAM ELEVATION(FEET) =  163.70
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   10.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.998
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.08
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.24
```

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```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.61
  FLOW VELOCITY(FEET/SEC.) =  2.24   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    232.00 =     245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    215.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   160.00  DOWNSTREAM(FEET) =   159.90
  FLOW LENGTH(FEET) =     6.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    215.40 =     251.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.40 TO NODE    215.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.20
  RAINFALL INTENSITY(INCH/HR) =   4.99
  TOTAL STREAM AREA(ACRES) =     0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    167.00
  DOWNSTREAM ELEVATION(FEET) =    166.30
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.417
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.129
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    224.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  166.30  DOWNSTREAM ELEVATION(FEET) =  163.70
  STREET LENGTH(FEET) =   215.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

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```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
  STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =    9.46
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.239
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.48
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.70
  FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.40
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    224.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    215.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   160.10  DOWNSTREAM(FEET) =   160.00
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.62
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.40 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.40 TO NODE    215.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.65
  RAINFALL INTENSITY(INCH/HR) =   5.17
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.24    10.20        4.991          0.46
      2        0.62     9.65        5.171          0.22

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

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```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        1.80     9.65       5.171
      2        1.84    10.20       4.991

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.84   Tc(MIN.) =   10.20
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.40 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.40 TO NODE    215.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   159.90  DOWNSTREAM(FEET) =   158.50
  FLOW LENGTH(FEET) =   274.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.84
  PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.30 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    215.30 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.84    11.55       4.606        0.68
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.30 =     575.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.38     9.77       5.130        3.41
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    215.30 =     765.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      15.94       9.77        5.130
      2      14.76      11.55        4.606

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.94   Tc(MIN.) =    9.77
  TOTAL AREA(ACRES) =        4.1

****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    215.30 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
```

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```
  FLOW PROCESS FROM NODE    215.30 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   158.40  DOWNSTREAM(FEET) =   157.90
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.94
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    214.00 =     875.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  11
----------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
======================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       15.94    10.11       5.021        4.09
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    214.00 =     875.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.79    10.24       4.979        6.91
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    214.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      37.45      10.11        5.021
      2      37.60      10.24        4.979

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.60   Tc(MIN.) =   10.24
  TOTAL AREA(ACRES) =       11.0

**********************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  12
----------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
======================================================================

**********************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   157.80  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.60
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    213.00 =    1025.00 FEET.
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    212.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    159.00  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    45.00   CHANNEL SLOPE =  0.0222
  CHANNEL FLOW THRU SUBAREA(CFS) =      37.60
  FLOW VELOCITY(FEET/SEC) =   5.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.14   Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    212.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       37.60    10.72       4.833       11.00
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    212.00 =    1070.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       40.80     9.76       5.133       16.21
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    212.00 =    2055.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      75.05       9.76        5.133
      2      76.02      10.72        4.833

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      76.02   Tc(MIN.) =   10.72
  TOTAL AREA(ACRES) =       27.2

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    211.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   158.00  DOWNSTREAM(FEET) =   157.10
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.35
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.02
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    211.00 =    2235.00 FEET.

****************************************************************************
```

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```
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   4.73
  TOTAL STREAM AREA(ACRES) =    27.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     76.02

****************************************************************************
  FLOW PROCESS FROM NODE    297.10 TO NODE    297.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    180.00
  DOWNSTREAM ELEVATION(FEET) =    163.80
  ELEVATION DIFFERENCE(FEET) =     16.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.622
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.30
  TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      1.30

****************************************************************************
  FLOW PROCESS FROM NODE    297.00 TO NODE    296.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.80  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1265.00   CHANNEL SLOPE =  0.0046
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.30
  FLOW VELOCITY(FEET/SEC) =   1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  19.73   Tc(MIN.) =   24.35
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    296.00 =    1350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    296.00 TO NODE    211.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    158.00  DOWNSTREAM(FEET) =    157.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00   CHANNEL SLOPE =  0.0008
  NOTE: CHANNEL SLOPE OF .001 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.30
  FLOW VELOCITY(FEET/SEC) =   0.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  36.73   Tc(MIN.) =   61.08
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    211.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

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```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   61.08
  RAINFALL INTENSITY(INCH/HR) =   1.57
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       76.02    11.08        4.731         27.21
      2        1.30    61.08        1.573          0.33

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       76.25    11.08       4.731
      2       26.58    61.08       1.573

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      76.25   Tc(MIN.) =   11.08
  TOTAL AREA(ACRES) =       27.5
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    211.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    246.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    157.10  DOWNSTREAM(FEET) =    154.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   578.00   CHANNEL SLOPE =  0.0054
  CHANNEL FLOW THRU SUBAREA(CFS) =      76.25
  FLOW VELOCITY(FEET/SEC) =   3.21 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.00   Tc(MIN.) =   14.08
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    246.00 =    3028.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    246.10 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.053
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6203
  SUBAREA AREA(ACRES) =    0.85   SUBAREA RUNOFF(CFS) =    0.93
  TOTAL AREA(ACRES) =       28.4   TOTAL RUNOFF(CFS) =      76.25
  TC(MIN.) =   14.08
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    236.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    152.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   390.00   CHANNEL SLOPE =  0.0051
```

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```
  CHANNEL FLOW THRU SUBAREA(CFS) =      76.25
  FLOW VELOCITY(FEET/SEC) =   3.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   16.16
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    236.00 =    3418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.16
  RAINFALL INTENSITY(INCH/HR) =   3.71
  TOTAL STREAM AREA(ACRES) =    28.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     76.25

****************************************************************************
  FLOW PROCESS FROM NODE    236.80 TO NODE    236.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    157.00
  DOWNSTREAM ELEVATION(FEET) =    156.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.564
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.879
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    236.60 TO NODE    236.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    156.50  DOWNSTREAM(FEET) =    152.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   120.00   CHANNEL SLOPE =  0.0375
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.24
  FLOW VELOCITY(FEET/SEC) =   2.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.69   Tc(MIN.) =   11.25
  LONGEST FLOWPATH FROM NODE    236.80 TO NODE    236.00 =     170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.60 TO NODE    236.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.684
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2700
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.76
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       0.99
  TC(MIN.) =   11.25

****************************************************************************
```

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```
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.25
  RAINFALL INTENSITY(INCH/HR) =   4.68
  TOTAL STREAM AREA(ACRES) =     0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       76.25    16.16        3.709         28.39
      2        0.99    11.25        4.684          0.78

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       61.37    11.25       4.684
      2       77.03    16.16       3.709

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.03   Tc(MIN.) =   16.16
  TOTAL AREA(ACRES) =       29.2
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    236.00 =    3418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    152.00  DOWNSTREAM(FEET) =    151.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0100
  CHANNEL FLOW THRU SUBAREA(CFS) =      77.03
  FLOW VELOCITY(FEET/SEC) =   4.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =   16.54
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE      2.00 =    3518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    243.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    175.60
  DOWNSTREAM ELEVATION(FEET) =    174.80
  ELEVATION DIFFERENCE(FEET) =      0.80
```

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```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.927
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    242.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  174.80  DOWNSTREAM ELEVATION(FEET) =  163.80
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =    6.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.704
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.549
  SUBAREA AREA(ACRES) =    0.61      SUBAREA RUNOFF(CFS) =    2.21
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.83
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    242.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    241.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   159.30  DOWNSTREAM(FEET) =   158.08
  FLOW LENGTH(FEET) =   122.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    6.90
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    241.50 =     612.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.50 TO NODE    241.50 IS CODE =   1
```

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```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.90
  RAINFALL INTENSITY(INCH/HR) =   6.42
  TOTAL STREAM AREA(ACRES) =     0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE    248.00 TO NODE    247.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    193.30
  DOWNSTREAM ELEVATION(FEET) =    189.00
  ELEVATION DIFFERENCE(FEET) =      4.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.385
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    245.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    189.00  DOWNSTREAM(FEET) =    165.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.0338
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.32
  FLOW VELOCITY(FEET/SEC) =   2.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.29   Tc(MIN.) =    6.68
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    245.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    245.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.560
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    2.00   SUBAREA RUNOFF(CFS) =   10.63
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =      10.89
  TC(MIN.) =    6.68

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    241.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.00  DOWNSTREAM(FEET) =   158.10
```

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```
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.85
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.89
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.50 =     806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.50 TO NODE    241.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   6.54
  TOTAL STREAM AREA(ACRES) =     2.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.32     6.90        6.423          0.63
      2       10.89     6.70        6.544          2.05

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       13.14     6.70       6.544
      2       13.01     6.90       6.423

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.14   Tc(MIN.) =    6.70
  TOTAL AREA(ACRES) =        2.7
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.50 =     806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.50 TO NODE    241.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   158.10  DOWNSTREAM(FEET) =   157.70
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.14
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    241.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

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```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   6.47
  TOTAL STREAM AREA(ACRES) =     2.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.14

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    250.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    166.50
  DOWNSTREAM ELEVATION(FEET) =    165.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.892
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.426
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    241.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  164.50  DOWNSTREAM ELEVATION(FEET) =  162.15
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   4.45   Tc(MIN.) =   11.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.661
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.502
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       2.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.39
  FLOW VELOCITY(FEET/SEC.) =  1.77   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    241.00 =     500.00 FEET.

****************************************************************************
```

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```
  FLOW PROCESS FROM NODE    241.00 TO NODE    241.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.34
  RAINFALL INTENSITY(INCH/HR) =   4.66
  TOTAL STREAM AREA(ACRES) =     1.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.14     6.82        6.467          2.68
      2        2.50    11.34        4.661          1.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       14.65     6.82       6.467
      2       11.97    11.34       4.661

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.65   Tc(MIN.) =    6.82
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    236.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   157.70  DOWNSTREAM(FEET) =   157.25
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.05
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    236.20 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.20 TO NODE    236.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.05
  RAINFALL INTENSITY(INCH/HR) =   6.33
  TOTAL STREAM AREA(ACRES) =     3.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.65

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    276.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

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```
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    167.70
  DOWNSTREAM ELEVATION(FEET) =    165.50
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.125
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.290
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.57

******************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    236.20 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  165.00  DOWNSTREAM ELEVATION(FEET) =  161.75
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   3.85   Tc(MIN.) =   10.98
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.760
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  SUBAREA AREA(ACRES) =    1.48      SUBAREA RUNOFF(CFS) =    3.38
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       3.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.80
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE    293.00 TO NODE    236.20 =     530.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    236.20 TO NODE    236.20 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.98
  RAINFALL INTENSITY(INCH/HR) =   4.76
  TOTAL STREAM AREA(ACRES) =     1.67
```

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```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.65     7.05        6.331         3.75
      2        3.82    10.98        4.760         1.67

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       17.10     7.05       6.331
      2       14.83    10.98       4.760

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.10   Tc(MIN.) =    7.05
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    236.20 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.20 TO NODE    236.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   157.25  DOWNSTREAM(FEET) =   156.00
  FLOW LENGTH(FEET) =   279.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.10
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    7.89
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    236.10 =    1213.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.10 TO NODE    235.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    156.00  DOWNSTREAM(FEET) =    155.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   115.00   CHANNEL SLOPE =  0.0052
  CHANNEL FLOW THRU SUBAREA(CFS) =      17.10
  FLOW VELOCITY(FEET/SEC) =   2.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    8.81
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    235.00 =    1328.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    230.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
```

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```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    200.00
  DOWNSTREAM ELEVATION(FEET) =    195.50
  ELEVATION DIFFERENCE(FEET) =      4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.268
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    227.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.50  DOWNSTREAM(FEET) =    171.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   730.00   CHANNEL SLOPE =  0.0336
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   2.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.43   Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    227.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.547
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8103
  SUBAREA AREA(ACRES) =    2.06   SUBAREA RUNOFF(CFS) =   10.92
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =      11.30
  TC(MIN.) =    6.70

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   6.55
  TOTAL STREAM AREA(ACRES) =     2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.30

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    228.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    189.00
  DOWNSTREAM ELEVATION(FEET) =    188.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

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```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.878
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    188.00  DOWNSTREAM(FEET) =    171.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00   CHANNEL SLOPE =  0.0500
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.58
  FLOW VELOCITY(FEET/SEC) =   3.35 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    5.57
  LONGEST FLOWPATH FROM NODE    229.00 TO NODE    227.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.375
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    1.09   SUBAREA RUNOFF(CFS) =    6.51
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       7.05
  TC(MIN.) =    5.57

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.57
  RAINFALL INTENSITY(INCH/HR) =   7.37
  TOTAL STREAM AREA(ACRES) =     1.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.30     6.70        6.547          2.13
      2        7.05     5.57        7.375          1.18

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       16.45     5.57       7.375
      2       17.56     6.70       6.547

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

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```
  PEAK FLOW RATE(CFS) =      17.56   Tc(MIN.) =    6.70
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    227.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.00  DOWNSTREAM(FEET) =   168.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.56
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    208.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.73
  RAINFALL INTENSITY(INCH/HR) =   6.53
  TOTAL STREAM AREA(ACRES) =     3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.56

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    175.60
  DOWNSTREAM ELEVATION(FEET) =    175.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.594
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    208.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  175.40  DOWNSTREAM ELEVATION(FEET) =  172.90
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

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```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   2.67   Tc(MIN.) =    5.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.651
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.551
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.35
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.30
  FLOW VELOCITY(FEET/SEC.) =  1.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    208.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   7.65
  TOTAL STREAM AREA(ACRES) =     0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.56

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.56     6.73        6.525          3.31
      2        1.56     5.26        7.651          0.37

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       16.54     5.26       7.651
      2       18.89     6.73       6.525

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.89   Tc(MIN.) =    6.73
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    208.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

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```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   168.40  DOWNSTREAM(FEET) =   160.00
  FLOW LENGTH(FEET) =   745.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.89
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    8.26
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    203.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.26
  RAINFALL INTENSITY(INCH/HR) =   5.72
  TOTAL STREAM AREA(ACRES) =     3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.89

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    173.10
  DOWNSTREAM ELEVATION(FEET) =    170.70
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.635
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.016
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  170.20  DOWNSTREAM ELEVATION(FEET) =  164.60
  STREET LENGTH(FEET) =   665.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.39
```

100 Year Storm


```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
 STREET FLOW TRAVEL TIME(MIN.) =   4.63   Tc(MIN.) =   12.27
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.431
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
 SUBAREA AREA(ACRES) =    3.42      SUBAREA RUNOFF(CFS) =    7.27
 TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =       7.70

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.36
 FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
 LONGEST FLOWPATH FROM NODE    207.00 TO NODE    203.00 =     755.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.27
 RAINFALL INTENSITY(INCH/HR) =   4.43
 TOTAL STREAM AREA(ACRES) =     3.62
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.70

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    204.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4800
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
 UPSTREAM ELEVATION(FEET) =    173.20
 DOWNSTREAM ELEVATION(FEET) =    170.80
 ELEVATION DIFFERENCE(FEET) =      2.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.280
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.203
 SUBAREA RUNOFF(CFS) =      0.66
 TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  170.30  DOWNSTREAM ELEVATION(FEET) =  164.60
 STREET LENGTH(FEET) =   590.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

100 Year Storm


```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.03
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   4.26   Tc(MIN.) =   11.54
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.609
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  SUBAREA AREA(ACRES) =    2.12      SUBAREA RUNOFF(CFS) =    4.69
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  2.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    203.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.54
  RAINFALL INTENSITY(INCH/HR) =   4.61
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.18

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.89     8.26        5.717         3.68
      2        7.70    12.27        4.431         3.62
      3        5.18    11.54        4.609         2.34

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       27.78     8.26       5.717
      2       27.65    11.54       4.609
      3       27.31    12.27       4.431

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.78   Tc(MIN.) =    8.26
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    203.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   160.00  DOWNSTREAM(FEET) =   159.40
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
```

100 Year Storm


```
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.78
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    202.00 =    1680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    201.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    158.40  DOWNSTREAM(FEET) =    157.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   345.00   CHANNEL SLOPE =  0.0026
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.658
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.02
  AVERAGE FLOW DEPTH(FEET) =   0.95   TRAVEL TIME(MIN.) =   2.85
  Tc(MIN.) =   11.35
  SUBAREA AREA(ACRES) =     1.11       SUBAREA RUNOFF(CFS) =    1.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.555
  TOTAL AREA(ACRES) =       10.8         PEAK FLOW RATE(CFS) =      27.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   2.01
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    201.00 =    2025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.35
  RAINFALL INTENSITY(INCH/HR) =   4.66
  TOTAL STREAM AREA(ACRES) =    10.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.80

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    172.00
  DOWNSTREAM ELEVATION(FEET) =    165.40
  ELEVATION DIFFERENCE(FEET) =      6.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.462
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      1.07
```

100 Year Storm


```
****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    201.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    165.40  DOWNSTREAM(FEET) =    157.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00   CHANNEL SLOPE =  0.0130
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.07
  FLOW VELOCITY(FEET/SEC) =   1.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.88   Tc(MIN.) =   10.35
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    201.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.945
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2814
  SUBAREA AREA(ACRES) =    2.06   SUBAREA RUNOFF(CFS) =    2.55
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       3.21
  TC(MIN.) =   10.35

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.35
  RAINFALL INTENSITY(INCH/HR) =   4.95
  TOTAL STREAM AREA(ACRES) =     2.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       27.80    11.35        4.658         10.75
      2        3.21    10.35        4.945          2.31

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       29.40    10.35       4.945
      2       30.83    11.35       4.658

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.83   Tc(MIN.) =   11.35
  TOTAL AREA(ACRES) =       13.1
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    201.00 =    2025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    235.00 IS CODE =  52
----------------------------------------------------------------------------
```

100 Year Storm


```
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    157.50  DOWNSTREAM(FEET) =    155.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   296.00   CHANNEL SLOPE =  0.0071
  CHANNEL FLOW THRU SUBAREA(CFS) =      30.83
  FLOW VELOCITY(FEET/SEC) =   2.84 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =   13.09
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    235.00 =    2321.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       30.83    13.09       4.249       13.06
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    235.00 =    2321.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       17.10     8.81       5.484        5.42
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    235.00 =    1328.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      37.86       8.81        5.484
      2      44.08      13.09        4.249

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.08   Tc(MIN.) =   13.09
  TOTAL AREA(ACRES) =       18.5

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    155.40  DOWNSTREAM(FEET) =    151.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   285.00   CHANNEL SLOPE =  0.0154
  CHANNEL FLOW THRU SUBAREA(CFS) =      44.08
  FLOW VELOCITY(FEET/SEC) =   4.64 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =   14.11
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE      2.00 =    2606.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.048
```

100 Year Storm


```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5156
  SUBAREA AREA(ACRES) =    2.47   SUBAREA RUNOFF(CFS) =    3.40
  TOTAL AREA(ACRES) =       20.9   TOTAL RUNOFF(CFS) =      44.08
  TC(MIN.) =   14.11
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       44.08    14.11       4.048       20.95
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE      2.00 =    2606.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       77.03    16.54       3.654       29.17
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE      2.00 =    3518.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     109.81      14.11        4.048
      2     116.83      16.54        3.654

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     116.83   Tc(MIN.) =   16.54
  TOTAL AREA(ACRES) =       50.1
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       50.1  TC(MIN.) =     16.54
  PEAK FLOW RATE(CFS)   =     116.83
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

10 YEAR STORM


```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2010 Advanced Engineering Software (aes)
             Ver. 17.0 Release Date: 07/01/2010  License ID 1355

                           Analysis prepared by:

                             Fuscoe Engineering
                             6390 Greenwich Dr.
                                 Suite 170
                            San Diego, CA 92122

 ************************** DESCRIPTION OF STUDY **************************
* 10 Year Storm Event - Golf Green Estates RPL3                            *
* Proposed Hydrology - Basin 2                                             *
* February 2012                                                            *
 ***************************************************************************

  FILE NAME: 10GGP2.DAT
  TIME/DATE OF STUDY: 15:35 02/13/2012
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    281.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    197.70
  DOWNSTREAM ELEVATION(FEET) =    196.62
  ELEVATION DIFFERENCE(FEET) =      1.08
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.209
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
```

10 YEAR STORM


```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    280.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.12  DOWNSTREAM(FEET) =    194.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   205.00   CHANNEL SLOPE =  0.0094
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.41
  FLOW VELOCITY(FEET/SEC) =   1.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    280.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    280.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.165
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    2.14   SUBAREA RUNOFF(CFS) =    9.06
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       9.44
  TC(MIN.) =    5.56

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    278.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.21  DOWNSTREAM(FEET) =   188.74
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.44
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    6.22
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    278.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    279.00 TO NODE    278.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.808
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8314
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    1.60
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =      10.39
  TC(MIN.) =    6.22

****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    274.00 IS CODE =  31
```

10 YEAR STORM


```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   188.74  DOWNSTREAM(FEET) =   186.87
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.39
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    6.65
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    274.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.65
  RAINFALL INTENSITY(INCH/HR) =   4.60
  TOTAL STREAM AREA(ACRES) =     2.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.39

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    274.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    30.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    197.11
  ELEVATION DIFFERENCE(FEET) =      0.39
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.529
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    274.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8780
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.44
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.94
  TC(MIN.) =    2.53

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    274.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

10 YEAR STORM


```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    2.53
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.39     6.65        4.601          2.60
      2        1.94     2.53        5.533          0.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.89     2.53       5.533
      2       12.01     6.65       4.601

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.01   Tc(MIN.) =    6.65
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    274.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.87  DOWNSTREAM(FEET) =   186.10
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.01
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    269.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    269.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.524
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8413
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.77
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      12.14
  TC(MIN.) =    6.83

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================
```

10 YEAR STORM


```
****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    289.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    196.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.744
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    287.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.50  DOWNSTREAM(FEET) =    195.25
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0208
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.32
  FLOW VELOCITY(FEET/SEC) =   2.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.46   Tc(MIN.) =    4.21
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    287.00 =     130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    289.00 TO NODE    287.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    2.13
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.45
  TC(MIN.) =    4.21

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    285.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   192.25  DOWNSTREAM(FEET) =   190.91
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.45
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    4.69
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    285.00 =     265.00 FEET.
```

10 YEAR STORM


```
****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    285.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8480
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.44
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.89
  TC(MIN.) =    4.69

****************************************************************************
  FLOW PROCESS FROM NODE    285.00 TO NODE    282.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.91  DOWNSTREAM(FEET) =   190.55
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.89
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.80
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    282.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.80
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.89

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.25
  DOWNSTREAM ELEVATION(FEET) =    196.18
  ELEVATION DIFFERENCE(FEET) =      1.07
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.441
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    282.00 IS CODE =  52
```

10 YEAR STORM


```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.18  DOWNSTREAM(FEET) =    195.87
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0052
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.14
  FLOW VELOCITY(FEET/SEC) =   1.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.37
  LONGEST FLOWPATH FROM NODE    284.00 TO NODE    282.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    282.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.64
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.77
  TC(MIN.) =    4.37

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.37
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.77

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.89     4.80        5.533          0.83
      2        0.77     4.37        5.533          0.17

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.32     4.37       5.533
      2        4.67     4.80       5.533

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.67   Tc(MIN.) =    4.80
  TOTAL AREA(ACRES) =        1.0
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    282.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
```

10 YEAR STORM


```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   190.55  DOWNSTREAM(FEET) =   187.24
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.67
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    4.94
  LONGEST FLOWPATH FROM NODE    290.00 TO NODE    270.00 =     380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.94
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.67

****************************************************************************
  FLOW PROCESS FROM NODE    273.00 TO NODE    272.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.50
  DOWNSTREAM ELEVATION(FEET) =    196.56
  ELEVATION DIFFERENCE(FEET) =      0.94
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.593
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    271.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   194.56  DOWNSTREAM(FEET) =   193.37
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.82
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.36
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    4.18
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    271.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    271.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

10 YEAR STORM


```
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    2.95
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.31
  TC(MIN.) =    4.18

****************************************************************************
  FLOW PROCESS FROM NODE    271.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   193.37  DOWNSTREAM(FEET) =   187.24
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.31
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    4.78
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    270.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.78
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.67     4.94        5.533          1.00
      2        3.31     4.78        5.533          0.73

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.98     4.78       5.533
      2        7.98     4.94       5.533

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.98   Tc(MIN.) =    4.94
  TOTAL AREA(ACRES) =        1.7
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    270.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    269.00 IS CODE =  31
----------------------------------------------------------------------------
```

10 YEAR STORM


```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   187.24  DOWNSTREAM(FEET) =   186.10
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.98
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    269.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.98     5.01       5.524        1.73
  LONGEST FLOWPATH FROM NODE    273.00 TO NODE    269.00 =     455.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       12.14     6.83       4.524        3.19
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    269.00 =     770.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      16.88       5.01        5.524
      2      18.67       6.83        4.524

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.67   Tc(MIN.) =    6.83
  TOTAL AREA(ACRES) =        4.9

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    269.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    269.00 TO NODE    268.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.10  DOWNSTREAM(FEET) =   184.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.67
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.88
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    268.00 =     810.00 FEET.

****************************************************************************
```

10 YEAR STORM


```
  FLOW PROCESS FROM NODE    268.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   184.00  DOWNSTREAM(FEET) =   171.20
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.67
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.89
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    221.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    220.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.20  DOWNSTREAM(FEET) =   168.40
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.64
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.67
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.08
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.30 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.30 TO NODE    220.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.08
  RAINFALL INTENSITY(INCH/HR) =   4.42
  TOTAL STREAM AREA(ACRES) =     4.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.67

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    180.80
  DOWNSTREAM ELEVATION(FEET) =    178.10
  ELEVATION DIFFERENCE(FEET) =      2.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.275
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.779
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    220.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

10 YEAR STORM


```
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  177.90  DOWNSTREAM ELEVATION(FEET) =  173.40
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   3.06   Tc(MIN.) =    9.34
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.698
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.553
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    2.44
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       2.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.27
  FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    224.00 TO NODE    220.30 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.30 TO NODE    220.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   3.70
  TOTAL STREAM AREA(ACRES) =     1.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.67     7.08        4.423          4.92
      2        2.82     9.34        3.698          1.38

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       20.81     7.08       4.423
      2       18.43     9.34       3.698
```

10 YEAR STORM


```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.81   Tc(MIN.) =    7.08
  TOTAL AREA(ACRES) =        6.3
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.30 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.30 TO NODE    220.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   168.40  DOWNSTREAM(FEET) =   167.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.08
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.81
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.15
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.20 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.20 TO NODE    220.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.15
  RAINFALL INTENSITY(INCH/HR) =   4.39
  TOTAL STREAM AREA(ACRES) =     6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.81

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    180.50
  DOWNSTREAM ELEVATION(FEET) =    178.50
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.355
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.314
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    220.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  178.00  DOWNSTREAM ELEVATION(FEET) =  173.00
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

10 YEAR STORM


```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   3.38   Tc(MIN.) =   10.74
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.379
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  SUBAREA AREA(ACRES) =    1.22      SUBAREA RUNOFF(CFS) =    1.98
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       2.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.14
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    220.20 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.20 TO NODE    220.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.38
  TOTAL STREAM AREA(ACRES) =     1.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.22

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.81     7.15        4.393          6.30
      2        2.22    10.74        3.379          1.37

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       22.29     7.15       4.393
      2       18.23    10.74       3.379

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.29   Tc(MIN.) =    7.15
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.20 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.20 TO NODE    220.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

10 YEAR STORM


```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   167.50  DOWNSTREAM(FEET) =   160.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.29
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    7.32
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.10 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    255.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    179.00
  DOWNSTREAM ELEVATION(FEET) =    176.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.492
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.208
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  175.50  DOWNSTREAM ELEVATION(FEET) =  173.90
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   2.58   Tc(MIN.) =    8.07
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.062
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
```

10 YEAR STORM


```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.13
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.23
  FLOW VELOCITY(FEET/SEC.) =  1.72   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    254.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.07
  RAINFALL INTENSITY(INCH/HR) =   4.06
  TOTAL STREAM AREA(ACRES) =     0.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE    254.20 TO NODE    254.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    180.20
  DOWNSTREAM ELEVATION(FEET) =    178.40
  ELEVATION DIFFERENCE(FEET) =      1.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.512
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.666
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE    254.10 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  177.90  DOWNSTREAM ELEVATION(FEET) =  173.90
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
```

10 YEAR STORM


```
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    8.15
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.037
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.87      SUBAREA RUNOFF(CFS) =    2.00
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       2.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.86
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE    254.20 TO NODE    254.00 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.15
  RAINFALL INTENSITY(INCH/HR) =   4.04
  TOTAL STREAM AREA(ACRES) =     1.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.67     8.07        4.062          0.72
      2        2.44     8.15        4.037          1.06

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.08     8.07       4.062
      2        4.10     8.15       4.037

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.10   Tc(MIN.) =    8.15
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    254.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    251.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.40  DOWNSTREAM(FEET) =   169.25
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.10
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    251.00 =     345.00 FEET.
```

10 YEAR STORM


```
****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    292.00 TO NODE    291.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    182.60
  DOWNSTREAM ELEVATION(FEET) =    180.70
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.404
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.717
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE    291.00 TO NODE    265.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  180.20  DOWNSTREAM ELEVATION(FEET) =  175.07
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    8.26
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.003
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.547
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    0.97
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.52
  FLOW VELOCITY(FEET/SEC.) =  2.58   DEPTH*VELOCITY(FT*FT/SEC.) =   0.66
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    265.00 =     340.00 FEET.

****************************************************************************
```

10 YEAR STORM


```
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.26
  RAINFALL INTENSITY(INCH/HR) =   4.00
  TOTAL STREAM AREA(ACRES) =     0.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE    267.00 TO NODE    266.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    180.80
  DOWNSTREAM ELEVATION(FEET) =    178.10
  ELEVATION DIFFERENCE(FEET) =      2.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.631
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.612
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    265.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  177.60  DOWNSTREAM ELEVATION(FEET) =  175.07
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   2.15   Tc(MIN.) =    8.78
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.847
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.59      SUBAREA RUNOFF(CFS) =    1.23
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.52

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

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```
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.92
  FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE    267.00 TO NODE    265.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    265.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.78
  RAINFALL INTENSITY(INCH/HR) =   3.85
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.52

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.40     8.26        4.003         0.64
      2        1.52     8.78        3.847         0.73

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.83     8.26       4.003
      2        2.86     8.78       3.847

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.86   Tc(MIN.) =    8.78
  TOTAL AREA(ACRES) =        1.4
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    265.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    261.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   175.07  DOWNSTREAM(FEET) =   170.30
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.86
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    261.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.79
  RAINFALL INTENSITY(INCH/HR) =   3.84
  TOTAL STREAM AREA(ACRES) =     1.37
```

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```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.86

****************************************************************************
  FLOW PROCESS FROM NODE    295.00 TO NODE    294.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    183.10
  DOWNSTREAM ELEVATION(FEET) =    180.70
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.917
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.964
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.62

****************************************************************************
  FLOW PROCESS FROM NODE    294.00 TO NODE    293.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  180.20  DOWNSTREAM ELEVATION(FEET) =  175.10
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.74
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.172
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.83
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    293.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    261.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

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```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   170.60  DOWNSTREAM(FEET) =   170.30
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.86
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    261.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.86
  RAINFALL INTENSITY(INCH/HR) =   4.13
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.86     8.79        3.845          1.37
      2        2.00     7.86        4.133          0.84

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.66     7.86       4.133
      2        4.72     8.79       3.845

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.72   Tc(MIN.) =    8.79
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    261.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    251.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   170.30  DOWNSTREAM(FEET) =   169.25
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.72
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    251.00 =     735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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```
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.72    10.47       3.435        2.21
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    251.00 =     735.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.10     8.20       4.022        1.78
  LONGEST FLOWPATH FROM NODE    256.00 TO NODE    251.00 =     345.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       7.79       8.20        4.022
      2       8.22      10.47        3.435

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.22   Tc(MIN.) =   10.47
  TOTAL AREA(ACRES) =        4.0

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.25  DOWNSTREAM(FEET) =   168.95
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.22
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.55
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    238.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.55
  RAINFALL INTENSITY(INCH/HR) =   3.42
  TOTAL STREAM AREA(ACRES) =     3.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.22

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    252.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
```

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```
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    181.00
  DOWNSTREAM ELEVATION(FEET) =    178.70
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.669
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.595
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    238.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  178.20  DOWNSTREAM ELEVATION(FEET) =  173.83
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   4.11   Tc(MIN.) =   10.78
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.371
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.531
  SUBAREA AREA(ACRES) =    1.71      SUBAREA RUNOFF(CFS) =    3.06
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.67
  FLOW VELOCITY(FEET/SEC.) =  2.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE    253.00 TO NODE    238.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.78
  RAINFALL INTENSITY(INCH/HR) =   3.37
  TOTAL STREAM AREA(ACRES) =     1.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.36

****************************************************************************
```

10 YEAR STORM


```
  FLOW PROCESS FROM NODE    238.20 TO NODE    238.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    180.90
  DOWNSTREAM ELEVATION(FEET) =    178.40
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.182
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.381
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    238.10 TO NODE    238.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  177.90  DOWNSTREAM ELEVATION(FEET) =  173.83
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   2.00   Tc(MIN.) =    9.18
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.738
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.496
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.98
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    238.20 TO NODE    238.00 =     345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
```

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```
  TIME OF CONCENTRATION(MIN.) =    9.18
  RAINFALL INTENSITY(INCH/HR) =   3.74
  TOTAL STREAM AREA(ACRES) =     0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.22    10.55        3.419          3.99
      2        3.36    10.78        3.371          1.88
      3        1.45     9.18        3.738          0.78

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.47     9.18       3.738
      2       12.84    10.55       3.419
      3       12.77    10.78       3.371

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.84   Tc(MIN.) =   10.55
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    238.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    237.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   173.83  DOWNSTREAM(FEET) =   163.70
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.01
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.84
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.70
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    237.00 =     905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    220.10 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.70  DOWNSTREAM(FEET) =    160.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.0049
  CHANNEL FLOW THRU SUBAREA(CFS) =      12.84
  FLOW VELOCITY(FEET/SEC) =   1.87 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.68   Tc(MIN.) =   17.38
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    220.10 =    1655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

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```
  TIME OF CONCENTRATION(MIN.) =   17.38
  RAINFALL INTENSITY(INCH/HR) =   2.48
  TOTAL STREAM AREA(ACRES) =     6.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.84

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    236.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    163.70
  DOWNSTREAM ELEVATION(FEET) =    163.44
  ELEVATION DIFFERENCE(FEET) =      0.26
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   14.245
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.816
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.32   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    236.80 TO NODE    220.10 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.44  DOWNSTREAM(FEET) =    160.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0049
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.18
  FLOW VELOCITY(FEET/SEC) =   1.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  11.09   Tc(MIN.) =   25.34
  LONGEST FLOWPATH FROM NODE    237.00 TO NODE    220.10 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.80 TO NODE    220.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.942
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       0.44
  TC(MIN.) =   25.34

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.34
  RAINFALL INTENSITY(INCH/HR) =   1.94
  TOTAL STREAM AREA(ACRES) =     1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.44
```

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```
** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       12.84    17.38        2.477          6.65
    2        0.44    25.34        1.942          1.12

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       13.13    17.38       2.477
    2       10.50    25.34       1.942

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      13.13   Tc(MIN.) =   17.38
TOTAL AREA(ACRES) =        7.8
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    220.10 =    1655.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =  11
----------------------------------------------------------------------------
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

** MAIN STREAM CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY     AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       13.13    17.38       2.477        7.77
LONGEST FLOWPATH FROM NODE    295.00 TO NODE    220.10 =    1655.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY     AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       22.29     7.32       4.328        7.67
LONGEST FLOWPATH FROM NODE    223.00 TO NODE    220.10 =    1145.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF       Tc      INTENSITY
NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      27.82       7.32        4.328
    2      25.89      17.38        2.477

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      27.82   Tc(MIN.) =    7.32
TOTAL AREA(ACRES) =       15.4

****************************************************************************
FLOW PROCESS FROM NODE    220.10 TO NODE    220.10 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE    220.10 TO NODE    212.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    160.00  DOWNSTREAM(FEET) =    158.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0050
CHANNEL FLOW THRU SUBAREA(CFS) =      27.82
```

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```
  FLOW VELOCITY(FEET/SEC) =   2.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.88   Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    212.00 =    2055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   3.49
  TOTAL STREAM AREA(ACRES) =    15.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.82

****************************************************************************
  FLOW PROCESS FROM NODE    220.10 TO NODE    212.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    160.00
  DOWNSTREAM ELEVATION(FEET) =    159.74
  ELEVATION DIFFERENCE(FEET) =      0.26
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   14.245
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.816
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE    212.80 TO NODE    212.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    159.74  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00   CHANNEL SLOPE =  0.0050
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.10
  FLOW VELOCITY(FEET/SEC) =   1.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.52   Tc(MIN.) =   19.76
  LONGEST FLOWPATH FROM NODE    220.10 TO NODE    212.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.80 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.280
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       0.35
  TC(MIN.) =   19.76

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =   1
```

10 YEAR STORM


```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.76
  RAINFALL INTENSITY(INCH/HR) =   2.28
  TOTAL STREAM AREA(ACRES) =     0.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.35

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       27.82    10.19        3.495         15.44
      2        0.35    19.76        2.280          0.77

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.00    10.19       3.495
      2       18.50    19.76       2.280

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.00   Tc(MIN.) =   10.19
  TOTAL AREA(ACRES) =       16.2
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    212.00 =    2055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    263.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    197.00
  DOWNSTREAM ELEVATION(FEET) =    196.15
  ELEVATION DIFFERENCE(FEET) =      0.85
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.716
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    262.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    196.15  DOWNSTREAM(FEET) =    190.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0118
```

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```
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.41
  FLOW VELOCITY(FEET/SEC) =   1.63 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.31   Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    262.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    2.68   SUBAREA RUNOFF(CFS) =    8.31
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       8.58
  TC(MIN.) =    9.03

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   186.00  DOWNSTREAM(FEET) =   161.25
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.58
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    215.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.15
  RAINFALL INTENSITY(INCH/HR) =   3.75
  TOTAL STREAM AREA(ACRES) =     2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.58

****************************************************************************
  FLOW PROCESS FROM NODE    215.20 TO NODE    215.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    175.10
  DOWNSTREAM ELEVATION(FEET) =    173.75
  ELEVATION DIFFERENCE(FEET) =      1.35
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.413
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.713
  SUBAREA RUNOFF(CFS) =      0.67
```

10 YEAR STORM


```
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    215.10 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  173.25  DOWNSTREAM ELEVATION(FEET) =  165.85
  STREET LENGTH(FEET) =   590.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   4.03   Tc(MIN.) =   10.44
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.441
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.561
  SUBAREA AREA(ACRES) =    1.87      SUBAREA RUNOFF(CFS) =    3.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.77
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
  LONGEST FLOWPATH FROM NODE    215.20 TO NODE    219.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.35  DOWNSTREAM(FEET) =   161.05
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.09
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    215.20 TO NODE    215.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
```

10 YEAR STORM


```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   3.44
  TOTAL STREAM AREA(ACRES) =     2.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.09

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    217.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    175.00
  DOWNSTREAM ELEVATION(FEET) =    173.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.671
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.198
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    216.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  173.00  DOWNSTREAM ELEVATION(FEET) =  165.85
  STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.96   Tc(MIN.) =   11.64
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.209
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.517
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    3.14
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       3.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.73
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    216.00 =     625.00 FEET.

****************************************************************************
```

10 YEAR STORM


```
  FLOW PROCESS FROM NODE    216.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.35  DOWNSTREAM(FEET) =   161.05
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.35
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.73
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    215.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.73
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     2.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.35

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.58     9.15        3.746          2.77
      2        4.09    10.46        3.437          2.12
      3        3.35    11.73        3.192          2.02

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       14.78     9.15       3.746
      2       14.96    10.46       3.437
      3       14.47    11.73       3.192

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.96   Tc(MIN.) =   10.46
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    215.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.05  DOWNSTREAM(FEET) =   160.35
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.96
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.61
```

10 YEAR STORM


```
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    214.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    258.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    196.00
  DOWNSTREAM ELEVATION(FEET) =    195.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.520
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    257.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.00  DOWNSTREAM(FEET) =    187.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   630.00   CHANNEL SLOPE =  0.0127
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.45
  FLOW VELOCITY(FEET/SEC) =   1.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.21   Tc(MIN.) =    9.73
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    257.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    257.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.601
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    3.31   SUBAREA RUNOFF(CFS) =    9.77
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      10.07
  TC(MIN.) =    9.73

****************************************************************************
  FLOW PROCESS FROM NODE    257.00 TO NODE    215.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   183.00  DOWNSTREAM(FEET) =   158.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

10 YEAR STORM


```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.07
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    215.30 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    215.30 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    233.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    45.00
  UPSTREAM ELEVATION(FEET) =    166.70
  DOWNSTREAM ELEVATION(FEET) =    166.50
  ELEVATION DIFFERENCE(FEET) =      0.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.519
  WARNING: THE MINIMUM OVERLAND FLOW SLOPE, 0.5%, IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.924
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    232.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  166.60  DOWNSTREAM ELEVATION(FEET) =  163.70
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.25
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.482
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.75
```

10 YEAR STORM


```
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       0.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.47
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    232.00 =     245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    215.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   160.00  DOWNSTREAM(FEET) =   159.90
  FLOW LENGTH(FEET) =     6.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.87
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.27
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    215.40 =     251.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.40 TO NODE    215.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   3.48
  TOTAL STREAM AREA(ACRES) =     0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.87

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    167.00
  DOWNSTREAM ELEVATION(FEET) =    166.30
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.417
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.290
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    224.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  166.30  DOWNSTREAM ELEVATION(FEET) =  163.70
  STREET LENGTH(FEET) =   215.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
```

10 YEAR STORM


```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.32
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    9.14
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.748
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   3.71
  FLOW VELOCITY(FEET/SEC.) =  1.74   DEPTH*VELOCITY(FT*FT/SEC.) =   0.35
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    224.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    215.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   160.10  DOWNSTREAM(FEET) =   160.00
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.40 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.40 TO NODE    215.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.87    10.27        3.477          0.46
      2        0.45     9.36        3.693          0.22
```

10 YEAR STORM


```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        1.23     9.36       3.693
      2        1.28    10.27       3.477

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.28   Tc(MIN.) =   10.27
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.40 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.40 TO NODE    215.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   159.90  DOWNSTREAM(FEET) =   158.50
  FLOW LENGTH(FEET) =   274.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.28
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =   11.77
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.30 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    215.30 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.28    11.77       3.185        0.68
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    215.30 =     575.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.07     9.78       3.590        3.41
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    215.30 =     765.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      11.14       9.78        3.590
      2      10.22      11.77        3.185

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.14   Tc(MIN.) =    9.78
  TOTAL AREA(ACRES) =        4.1

****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    215.30 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    215.30 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   158.40  DOWNSTREAM(FEET) =   157.90
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.08
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.14
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.14
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    214.00 =     875.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.14    10.14       3.507        4.09
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    214.00 =     875.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.96    10.61       3.406        6.91
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    214.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      25.44      10.14        3.507
      2      25.78      10.61        3.406

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.78   Tc(MIN.) =   10.61
  TOTAL AREA(ACRES) =       11.0

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   157.80  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.78
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.99
```

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```
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    213.00 =    1025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    212.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    159.00  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    45.00   CHANNEL SLOPE =  0.0222
  CHANNEL FLOW THRU SUBAREA(CFS) =      25.78
  FLOW VELOCITY(FEET/SEC) =   4.79 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    212.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       25.78    11.15       3.299       11.00
  LONGEST FLOWPATH FROM NODE    259.00 TO NODE    212.00 =    1070.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       28.00    10.19       3.495       16.21
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    212.00 =    2055.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      51.57      10.19        3.495
      2      52.21      11.15        3.299

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.21   Tc(MIN.) =   11.15
  TOTAL AREA(ACRES) =       27.2

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    211.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   158.00  DOWNSTREAM(FEET) =   157.10
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.21
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   11.54
  LONGEST FLOWPATH FROM NODE    295.00 TO NODE    211.00 =    2235.00 FEET.
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.54
  RAINFALL INTENSITY(INCH/HR) =   3.23
  TOTAL STREAM AREA(ACRES) =    27.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.21

****************************************************************************
  FLOW PROCESS FROM NODE    297.10 TO NODE    297.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    180.00
  DOWNSTREAM ELEVATION(FEET) =    163.80
  ELEVATION DIFFERENCE(FEET) =     16.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.622
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    297.00 TO NODE    296.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    163.80  DOWNSTREAM(FEET) =    158.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1265.00   CHANNEL SLOPE =  0.0046
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.91
  FLOW VELOCITY(FEET/SEC) =   1.02 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  20.76   Tc(MIN.) =   25.38
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    296.00 =    1350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    296.00 TO NODE    211.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    158.00  DOWNSTREAM(FEET) =    157.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00   CHANNEL SLOPE =  0.0008
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .001 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.91
  FLOW VELOCITY(FEET/SEC) =   0.47 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  38.65   Tc(MIN.) =   64.03
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    211.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
```

10 YEAR STORM


```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   64.03
  RAINFALL INTENSITY(INCH/HR) =   1.07
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.91

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       52.21    11.54        3.226         27.21
      2        0.91    64.03        1.068          0.33

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       52.37    11.54       3.226
      2       18.20    64.03       1.068

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.37   Tc(MIN.) =   11.54
  TOTAL AREA(ACRES) =       27.5
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    211.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    246.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    157.10  DOWNSTREAM(FEET) =    154.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   578.00   CHANNEL SLOPE =  0.0054
  CHANNEL FLOW THRU SUBAREA(CFS) =      52.37
  FLOW VELOCITY(FEET/SEC) =   2.87 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.35   Tc(MIN.) =   14.89
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    246.00 =    3028.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    246.10 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.737
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6203
  SUBAREA AREA(ACRES) =    0.85   SUBAREA RUNOFF(CFS) =    0.63
  TOTAL AREA(ACRES) =       28.4   TOTAL RUNOFF(CFS) =      52.37
  TC(MIN.) =   14.89
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    236.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```

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```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    152.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   390.00   CHANNEL SLOPE =  0.0051
  CHANNEL FLOW THRU SUBAREA(CFS) =      52.37
  FLOW VELOCITY(FEET/SEC) =   2.81 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.31   Tc(MIN.) =   17.21
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    236.00 =    3418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.21
  RAINFALL INTENSITY(INCH/HR) =   2.49
  TOTAL STREAM AREA(ACRES) =    28.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.37

****************************************************************************
  FLOW PROCESS FROM NODE    236.80 TO NODE    236.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    157.00
  DOWNSTREAM ELEVATION(FEET) =    156.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.564
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.415
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    236.60 TO NODE    236.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    156.50  DOWNSTREAM(FEET) =    152.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   120.00   CHANNEL SLOPE =  0.0375
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.17
  FLOW VELOCITY(FEET/SEC) =   2.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.69   Tc(MIN.) =   11.25
  LONGEST FLOWPATH FROM NODE    236.80 TO NODE    236.00 =     170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.60 TO NODE    236.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.279
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2700
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.53
```

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```
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       0.69
  TC(MIN.) =   11.25

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.25
  RAINFALL INTENSITY(INCH/HR) =   3.28
  TOTAL STREAM AREA(ACRES) =     0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       52.37    17.21        2.493         28.39
      2        0.69    11.25        3.279          0.78

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       40.51    11.25       3.279
      2       52.90    17.21       2.493

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.90   Tc(MIN.) =   17.21
  TOTAL AREA(ACRES) =       29.2
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE    236.00 =    3418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    152.00  DOWNSTREAM(FEET) =    151.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0100
  CHANNEL FLOW THRU SUBAREA(CFS) =      52.90
  FLOW VELOCITY(FEET/SEC) =   3.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =   17.63
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE      2.00 =    3518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    243.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
```

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```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    175.60
  DOWNSTREAM ELEVATION(FEET) =    174.80
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.927
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.09
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.09

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    242.00 IS CODE =  62
----------------------------------------------------------------------------
  ** WARNING: Computed Flowrate is less than 0.1 cfs,
                Routing Algorithm is UNAVAILABLE.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    241.50 IS CODE =  31
----------------------------------------------------------------------------
  ** WARNING: Computed Flowrate is less than 0.1 cfs,
                Routing Algorithm is UNAVAILABLE.

****************************************************************************
  FLOW PROCESS FROM NODE    241.50 TO NODE    241.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.93
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.09

****************************************************************************
  FLOW PROCESS FROM NODE    248.00 TO NODE    247.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    193.30
  DOWNSTREAM ELEVATION(FEET) =    189.00
  ELEVATION DIFFERENCE(FEET) =      4.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.385
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    245.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    189.00  DOWNSTREAM(FEET) =    165.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.0338
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC) =   2.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

10 YEAR STORM


```
  TRAVEL TIME(MIN.) =   4.29   Tc(MIN.) =    6.68
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    245.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    245.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.592
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    2.00   SUBAREA RUNOFF(CFS) =    7.44
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       7.62
  TC(MIN.) =    6.68

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    241.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   161.00  DOWNSTREAM(FEET) =   158.10
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.62
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.50 =     806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.50 TO NODE    241.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   4.58
  TOTAL STREAM AREA(ACRES) =     2.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.09     3.93        5.533          0.02
      2        7.62     6.70        4.579          2.05

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.56     3.93       5.533
      2        7.70     6.70       4.579

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.70   Tc(MIN.) =    6.70
```

10 YEAR STORM


```
  TOTAL AREA(ACRES) =        2.1
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.50 =     806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.50 TO NODE    241.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   158.10  DOWNSTREAM(FEET) =   157.70
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.70
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.84
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    241.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.84
  RAINFALL INTENSITY(INCH/HR) =   4.52
  TOTAL STREAM AREA(ACRES) =     2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.70

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    250.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    166.50
  DOWNSTREAM ELEVATION(FEET) =    165.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.892
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.498
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    241.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  164.50  DOWNSTREAM ELEVATION(FEET) =  162.15
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

10 YEAR STORM


```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   4.87   Tc(MIN.) =   11.76
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.187
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.502
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    1.43
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       1.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.61
  FLOW VELOCITY(FEET/SEC.) =  1.64   DEPTH*VELOCITY(FT*FT/SEC.) =   0.52
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    241.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    241.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.76
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     1.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.71

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.70     6.84        4.519          2.07
      2        1.71    11.76        3.187          1.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.69     6.84       4.519
      2        7.14    11.76       3.187

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.69   Tc(MIN.) =    6.84
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    241.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    236.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   157.70  DOWNSTREAM(FEET) =   157.25
```

10 YEAR STORM


```
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.69
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    7.10
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    236.20 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.20 TO NODE    236.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   4.41
  TOTAL STREAM AREA(ACRES) =     3.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.69

****************************************************************************
  FLOW PROCESS FROM NODE    293.00 TO NODE    276.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    167.70
  DOWNSTREAM ELEVATION(FEET) =    165.50
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.125
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.403
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    236.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  165.00  DOWNSTREAM ELEVATION(FEET) =  161.75
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   4.22   Tc(MIN.) =   11.34
```

10 YEAR STORM


```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.262
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .4800
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
SUBAREA AREA(ACRES) =    1.48      SUBAREA RUNOFF(CFS) =    2.32
TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       2.62

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.92
FLOW VELOCITY(FEET/SEC.) =  1.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
LONGEST FLOWPATH FROM NODE    293.00 TO NODE    236.20 =     530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    236.20 TO NODE    236.20 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   11.34
RAINFALL INTENSITY(INCH/HR) =   3.26
TOTAL STREAM AREA(ACRES) =     1.67
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.62

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        8.69     7.10        4.413          3.14
    2        2.62    11.34        3.262          1.67

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       10.33     7.10       4.413
    2        9.04    11.34       3.262

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      10.33   Tc(MIN.) =    7.10
TOTAL AREA(ACRES) =        4.8
LONGEST FLOWPATH FROM NODE    248.00 TO NODE    236.20 =     934.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    236.20 TO NODE    236.10 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   157.25  DOWNSTREAM(FEET) =   156.00
FLOW LENGTH(FEET) =   279.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      10.33
PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    8.03
LONGEST FLOWPATH FROM NODE    248.00 TO NODE    236.10 =    1213.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    236.10 TO NODE    235.00 IS CODE =  52
```

10 YEAR STORM


```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    156.00  DOWNSTREAM(FEET) =    155.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   115.00   CHANNEL SLOPE =  0.0052
  CHANNEL FLOW THRU SUBAREA(CFS) =      10.33
  FLOW VELOCITY(FEET/SEC) =   1.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    9.09
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    235.00 =    1328.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    230.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    200.00
  DOWNSTREAM ELEVATION(FEET) =    195.50
  ELEVATION DIFFERENCE(FEET) =      4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.268
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    227.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    195.50  DOWNSTREAM(FEET) =    171.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   730.00   CHANNEL SLOPE =  0.0336
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.32
  FLOW VELOCITY(FEET/SEC) =   2.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.43   Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    227.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.583
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8103
  SUBAREA AREA(ACRES) =    2.06   SUBAREA RUNOFF(CFS) =    7.65
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       7.91
  TC(MIN.) =    6.70
```

10 YEAR STORM


```
****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   4.58
  TOTAL STREAM AREA(ACRES) =     2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.91

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    228.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    189.00
  DOWNSTREAM ELEVATION(FEET) =    188.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.878
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    188.00  DOWNSTREAM(FEET) =    171.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00   CHANNEL SLOPE =  0.0500
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.40
  FLOW VELOCITY(FEET/SEC) =   3.35 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    5.57
  LONGEST FLOWPATH FROM NODE    229.00 TO NODE    227.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.162
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8100
  SUBAREA AREA(ACRES) =    1.09   SUBAREA RUNOFF(CFS) =    4.56
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       4.93
  TC(MIN.) =    5.57

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

10 YEAR STORM


```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.57
  RAINFALL INTENSITY(INCH/HR) =   5.16
  TOTAL STREAM AREA(ACRES) =     1.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.93

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.91     6.70        4.583          2.13
      2        4.93     5.57        5.162          1.18

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.51     5.57       5.162
      2       12.29     6.70       4.583

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.29   Tc(MIN.) =    6.70
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    227.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.00  DOWNSTREAM(FEET) =   168.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.29
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    208.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.73
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.29

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
```

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```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    175.60
  DOWNSTREAM ELEVATION(FEET) =    175.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.594
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    208.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  175.40  DOWNSTREAM ELEVATION(FEET) =  172.90
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.19
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   2.84   Tc(MIN.) =    5.43
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.245
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.551
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.93
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.89
  FLOW VELOCITY(FEET/SEC.) =  1.80   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    208.00 =     330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.43
  RAINFALL INTENSITY(INCH/HR) =   5.25
  TOTAL STREAM AREA(ACRES) =     0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.07
```

10 YEAR STORM


```
** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       12.29     6.73        4.566         3.31
    2        1.07     5.43        5.245         0.37

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       11.77     5.43       5.245
    2       13.22     6.73       4.566

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      13.22   Tc(MIN.) =    6.73
TOTAL AREA(ACRES) =        3.7
LONGEST FLOWPATH FROM NODE    231.00 TO NODE    208.00 =     835.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    208.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   168.40  DOWNSTREAM(FEET) =   160.00
FLOW LENGTH(FEET) =   745.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.42
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      13.22
PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =    8.41
LONGEST FLOWPATH FROM NODE    231.00 TO NODE    203.00 =    1580.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    8.41
RAINFALL INTENSITY(INCH/HR) =   3.96
TOTAL STREAM AREA(ACRES) =     3.68
PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.22

****************************************************************************
FLOW PROCESS FROM NODE    207.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .4800
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
UPSTREAM ELEVATION(FEET) =    173.10
DOWNSTREAM ELEVATION(FEET) =    170.70
ELEVATION DIFFERENCE(FEET) =      2.40
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.635
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.211
SUBAREA RUNOFF(CFS) =      0.40
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  170.20  DOWNSTREAM ELEVATION(FEET) =  164.60
  STREET LENGTH(FEET) =   665.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   5.11   Tc(MIN.) =   12.75
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.025
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  SUBAREA AREA(ACRES) =    3.42      SUBAREA RUNOFF(CFS) =    4.97
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =       5.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.11
  FLOW VELOCITY(FEET/SEC.) =  2.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    207.00 TO NODE    203.00 =     755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.75
  RAINFALL INTENSITY(INCH/HR) =   3.03
  TOTAL STREAM AREA(ACRES) =     3.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.26

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    204.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    173.20
  DOWNSTREAM ELEVATION(FEET) =    170.80
```

10 YEAR STORM


```
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.280
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.342
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  170.30  DOWNSTREAM ELEVATION(FEET) =  164.60
  STREET LENGTH(FEET) =   590.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   4.65   Tc(MIN.) =   11.93
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.157
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  SUBAREA AREA(ACRES) =    2.12      SUBAREA RUNOFF(CFS) =    3.21
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.67
  FLOW VELOCITY(FEET/SEC.) =  2.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    203.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.93
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.55

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.22     8.41        3.957          3.68
      2        5.26    12.75        3.025          3.62
```

10 YEAR STORM


```
    3        3.55    11.93        3.157          2.34

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       19.19     8.41       3.957
      2       19.02    11.93       3.157
      3       18.76    12.75       3.025

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.19   Tc(MIN.) =    8.41
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    203.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   160.00  DOWNSTREAM(FEET) =   159.40
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.19
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.67
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    202.00 =    1680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    201.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    158.40  DOWNSTREAM(FEET) =    157.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   345.00   CHANNEL SLOPE =  0.0026
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.169
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.80
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   3.20
  Tc(MIN.) =   11.86
  SUBAREA AREA(ACRES) =     1.11       SUBAREA RUNOFF(CFS) =    0.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.555
  TOTAL AREA(ACRES) =       10.8         PEAK FLOW RATE(CFS) =      19.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    201.00 =    2025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

10 YEAR STORM


```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.86
  RAINFALL INTENSITY(INCH/HR) =   3.17
  TOTAL STREAM AREA(ACRES) =    10.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.19

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    172.00
  DOWNSTREAM ELEVATION(FEET) =    165.40
  ELEVATION DIFFERENCE(FEET) =      6.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.462
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.75
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      0.75

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    201.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    165.40  DOWNSTREAM(FEET) =    157.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00   CHANNEL SLOPE =  0.0130
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.75
  FLOW VELOCITY(FEET/SEC) =   1.71 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.96   Tc(MIN.) =   10.42
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    201.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.446
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2814
  SUBAREA AREA(ACRES) =    2.06   SUBAREA RUNOFF(CFS) =    1.77
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       2.24
  TC(MIN.) =   10.42

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.42
  RAINFALL INTENSITY(INCH/HR) =   3.45
```

10 YEAR STORM


```
  TOTAL STREAM AREA(ACRES) =     2.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.24

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       19.19    11.86        3.169         10.75
      2        2.24    10.42        3.446          2.31

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       19.88    10.42       3.446
      2       21.25    11.86       3.169

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.25   Tc(MIN.) =   11.86
  TOTAL AREA(ACRES) =       13.1
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    201.00 =    2025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    235.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    157.50  DOWNSTREAM(FEET) =    155.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   296.00   CHANNEL SLOPE =  0.0071
  CHANNEL FLOW THRU SUBAREA(CFS) =      21.25
  FLOW VELOCITY(FEET/SEC) =   2.57 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   13.79
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    235.00 =    2321.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.25    13.79       2.876       13.06
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    235.00 =    2321.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.33     9.09       3.763        4.81
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    235.00 =    1328.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      24.34       9.09        3.763
      2      29.14      13.79        2.876

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.14   Tc(MIN.) =   13.79
  TOTAL AREA(ACRES) =       17.9
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    155.40  DOWNSTREAM(FEET) =    151.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   285.00   CHANNEL SLOPE =  0.0154
  CHANNEL FLOW THRU SUBAREA(CFS) =      29.14
  FLOW VELOCITY(FEET/SEC) =   4.13 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.15   Tc(MIN.) =   14.94
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE      2.00 =    2606.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.731
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5149
  SUBAREA AREA(ACRES) =    2.47   SUBAREA RUNOFF(CFS) =    2.29
  TOTAL AREA(ACRES) =       20.3   TOTAL RUNOFF(CFS) =      29.14
  TC(MIN.) =   14.94
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       29.14    14.94       2.731       20.34
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE      2.00 =    2606.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       52.90    17.63       2.454       29.17
  LONGEST FLOWPATH FROM NODE    297.10 TO NODE      2.00 =    3518.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      73.96      14.94        2.731
      2      79.08      17.63        2.454

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.08   Tc(MIN.) =   17.63
  TOTAL AREA(ACRES) =       49.5
============================================================================
```

10 YEAR STORM


```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       49.5  TC(MIN.) =     17.63
  PEAK FLOW RATE(CFS)   =      79.08
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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Job Name: Golf Green Estates RPL3 Date: Dec 2010

Job #: 2518.02a Run Name: GG-3-P.dat

Page: 1

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (ac.)	Comments
307	306	2	175.0	169.0	70.0	0.30	0.06	
306	303	5	169.0	155.2	745.0			
306	303	8				0.21	2.68	
303	303	1						1 of 2
305	304	2	160.0	158.5	70.0	0.2	0.09	
304	303	5	158.5	155.2	255.0			
304	303	8				0.2	0.98	
303	303	1						2 of 2
303	3	5	155.2	154.8	365.0			
3	3	1						1 of 2
302	301	2	160.0	157.5	75.0	0.2	0.09	
301	3	5			170.0			
301	3	8				0.2	1.31	
3	3	1						2 of 2

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2007 Advanced Engineering Software (aes)
             Ver. 3.0 Release Date: 06/01/2007  License ID 1355

                           Analysis prepared by:

                    FUSCOE ENGINEERING - SAN DIEGO, INC.
                      6390 GREENWICH DRIVE, SUITE 170
                        SAN DIEGO, CALIFORNIA 92122
                               (858) 554-1500

 ************************** DESCRIPTION OF STUDY **************************
* Golf Green Estates RPL 3                                                 *
* Proposed Hydrology - Basin 3                                             *
* November 2010                                                            *
 ***************************************************************************

  FILE NAME: GG-P-3.DAT
  TIME/DATE OF STUDY: 14:33 11/04/2010
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    306.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    175.00
  DOWNSTREAM ELEVATION(FEET) =    169.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.887
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
```

```
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    303.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    169.00  DOWNSTREAM(FEET) =    155.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   745.00   CHANNEL SLOPE =  0.0185
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.13
  FLOW VELOCITY(FEET/SEC) =   2.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.08   Tc(MIN.) =   11.97
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    303.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.501
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2120
  SUBAREA AREA(ACRES) =    2.68   SUBAREA RUNOFF(CFS) =    2.53
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =       2.61
  TC(MIN.) =   11.97

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.97
  RAINFALL INTENSITY(INCH/HR) =   4.50
  TOTAL STREAM AREA(ACRES) =     2.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.61

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    160.00
  DOWNSTREAM ELEVATION(FEET) =    158.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.513
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.894
  SUBAREA RUNOFF(CFS) =      0.09
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.09

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.894
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    0.98   SUBAREA RUNOFF(CFS) =    0.96
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       1.05
  TC(MIN.) =   10.51

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.89
  TOTAL STREAM AREA(ACRES) =     1.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.61    11.97        4.501          2.74
      2        1.05    10.51        4.894          1.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.34    10.51       4.894
      2        3.58    11.97       4.501

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.58   Tc(MIN.) =   11.97
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    303.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    155.20  DOWNSTREAM(FEET) =    154.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   365.00   CHANNEL SLOPE =  0.0011
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.58
  FLOW VELOCITY(FEET/SEC) =   0.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   9.41   Tc(MIN.) =   21.38
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE      3.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.38
  RAINFALL INTENSITY(INCH/HR) =   3.10
  TOTAL STREAM AREA(ACRES) =     3.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.58

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    160.00
  DOWNSTREAM ELEVATION(FEET) =    157.50
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.392
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.263
  SUBAREA RUNOFF(CFS) =      0.09
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.09

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.263
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2000
  SUBAREA AREA(ACRES) =    1.31   SUBAREA RUNOFF(CFS) =    1.38
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       1.47
  TC(MIN.) =    9.39

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.39
  RAINFALL INTENSITY(INCH/HR) =   5.26
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.58    21.38        3.096         3.81
      2        1.47     9.39        5.263         1.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.58     9.39       5.263
```

```
     2        4.44    21.38       3.096

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.44   Tc(MIN.) =   21.38
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE      3.00 =    1180.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.2  TC(MIN.) =     21.38
  PEAK FLOW RATE(CFS)   =       4.44
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

APPENDIX E

Hec 4.1 Analysis

San Luis Rey River -100 Year Storm Analysis
Results for Existing Conditions
Results for Proposed Conditions
Existing and Proposed Cross Sections

Moosa Canyon Creek – 100 Year Storm Analysis
Results for Existing Conditions
Results for Proposed Conditions
Existing and Proposed Cross Sections

10 Year Storm Analysis – Proposed Conditions
San Luis Rey River Results
Moosa Canyon Creek Results

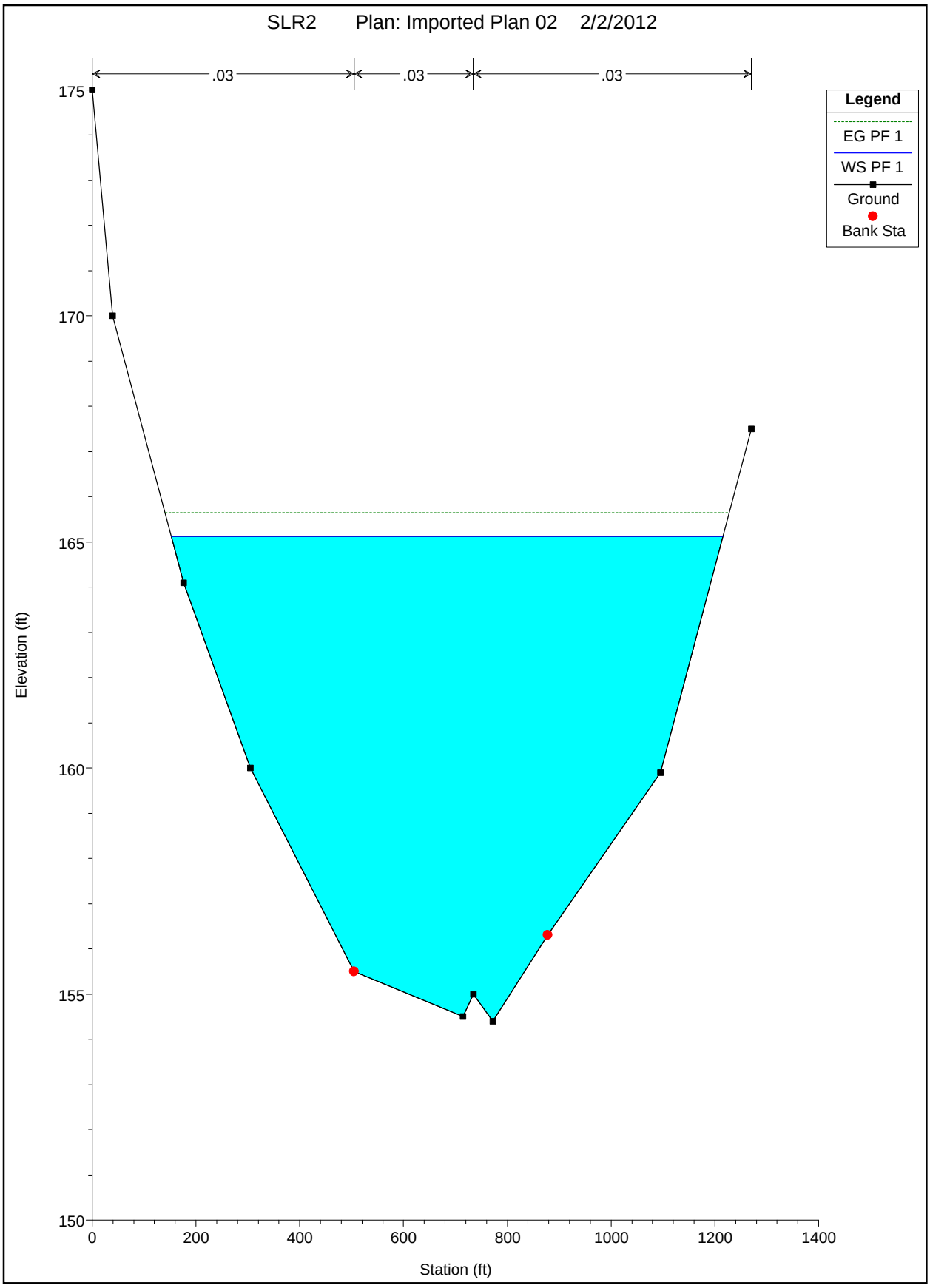
San Luis Rey River - Existing
100 Year Storm

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	17464	PF 1	41000	238.8	245.81	245.08	248.28	0.005062	12.6	3254.24	478.05	0.85
Reach-1	17425	PF 1	41000	236.6	245.92		247.36	0.002053	9.63	4255.58	473.56	0.57
Reach-1	17388	PF 1	41000	236.3	245.52		246.95	0.001972	9.67	4304.33	483.53	0.56
Reach-1	17350	PF 1	41000	235.7	245.21		246.55	0.001773	9.36	4451.04	485.88	0.53
Reach-1	17309	PF 1	41000	233.9	244.55		246.07	0.003089	9.99	4174.4	401	0.54
Reach-1	17241	PF 1	41000	240.5	243.18		243.88	0.005461	6.92	6157.28	2527.81	0.76
Reach-1	17194	PF 1	41000	239.3	242.31		242.93	0.004394	6.67	6551.89	2502.17	0.69
Reach-1	17086	PF 1	41000	236.8	240.39		240.93	0.003147	6.37	7131.26	2473.92	0.6
Reach-1	16930	PF 1	41000	230	236.09	235.82	237.41	0.005296	9.85	4748.06	1520.58	0.82
Reach-1	16724	PF 1	41000	222.8	231.8		232.84	0.003498	8.99	5345.79	1697.14	0.68
Reach-1	16531	PF 1	41000	223.9	228.7		229.4	0.003255	7.43	6242.2	1958.79	0.63
Reach-1	16359	PF 1	41000	222	225.26		225.91	0.003788	6.46	6359.58	2068.78	0.65
Reach-1	16206	PF 1	41000	216.2	221.73		222.76	0.004685	9.08	5117.03	1437.71	0.76
Reach-1	16032	PF 1	41000	211.9	219.54		219.82	0.00193	4.68	9909.95	2149.29	0.34
Reach-1	15858	PF 1	41000	209.5	216.04		216.62	0.006587	7.54	7261.52	2734.82	0.61
Reach-1	15669	PF 1	41000	206.7	212.67		213	0.002136	4.73	9308.78	2898.28	0.39
Reach-1	15455	PF 1	41000	202.6	209.19		209.6	0.00444	6.73	8410.17	2711.59	0.56
Reach-1	15256	PF 1	41000	199.3	206.22		206.45	0.002187	5.28	12079.41	3259.41	0.4
Reach-1	15086	PF 1	41000	196.5	203.74		204.02	0.00289	6.22	13394.3	3308.99	0.47
Reach-1	14891	PF 1	41000	193.5	200.45		200.77	0.003039	5.97	10722.45	2894.33	0.45
Reach-1	14707	PF 1	41000	190.9	197.25		197.55	0.003228	3.81	10497.85	2548.05	0.29
Reach-1	14516	PF 1	41000	185.8	193.5		193.85	0.003846	5.15	9154.72	2648.58	0.37
Reach-1	14311	PF 1	41000	181.7	189.12		189.49	0.003763	3.4	8554.43	2506.28	0.26
Reach-1	14171	PF 1	41000	179.1	186.2		186.56	0.003391	3.51	8607.19	2385.19	0.26
Reach-1	13946	PF 1	41000	176.1	181.7		182.16	0.004087	2.69	7845.62	2174.49	0.25
Reach-1	13827	PF 1	41000	173.6	179.64		179.97	0.001876	1.49	9698.92	2077.02	0.15
Reach-1	13738	PF 1	41000	171.4	178.34		178.69	0.002088	1.83	9242.04	1914.34	0.15
Reach-1	13617	PF 1	41000	166.6	177.1		177.38	0.001349	2.49	10216.54	1905.51	0.17
Reach-1	13516	PF 1	41000	165.5	176.24		176.53	0.001807	3.58	9613.91	1608.08	0.21
Reach-1	13402	PF 1	41000	161.2	174.3		174.84	0.00305	3.75	7695.97	1512.63	0.22
Reach-1	13285	PF 1	41000	161	171.47		172.2	0.005997	5.54	6177.4	1640.37	0.41
Reach-1	13158	PF 1	41000	159.8	168.75		169.16	0.002997	5.19	8066.23	2198.27	0.38
Reach-1	13048	PF 1	41000	156.8	166.94		167.33	0.00289	3.69	8542.28	2231.28	0.26
Reach-1	12938	PF 1	41000	153.3	166.23		166.41	0.000711	2.02	13886.18	2050.26	0.11
Reach-1	12843	PF 1	41000	151.1	165.82		166.04	0.000606	3.08	11723.29	1505.99	0.16
Reach-1	12805	PF 1	41000	150.6	165.47		165.81	0.001008	5.11	9072.34	1411.41	0.28
Reach-1	12798	PF 1	41000	150.3	165.36		165.75	0.000585	5.19	8544.97	1110.89	0.29
Reach-1	12795	PF 1	41000	154.4	165.12		165.65	0.000816	6.6	7480.25	1063.1	0.37
Reach-1	12793	PF 1	41000	150.4	165.13		165.58	0.000696	5.74	8045.34	1077.07	0.32
Reach-1	12785	PF 1	41000	150.1	164.43		165.28	0.003273	7.7	5708.22	956.8	0.45
Reach-1	12679	PF 1	41000	149.8	162.86		163.59	0.001981	5.62	6186.82	843.21	0.33
Reach-1	12543	PF 1	41000	148	161.4		161.97	0.002611	6.71	6836.33	1590.99	0.38
Reach-1	12469	PF 1	48000	148.3	160.94		161.35	0.00166	5.16	9377.74	2026.33	0.42
Reach-1	12429	PF 1	48000	146.4	160.79	155.33	160.97	0.000366	3.46	14030.47	1733.14	0.21
Reach-1	12308	PF 1	48000	144.7	160.29		160.6	0.000758	4.52	10906.3	1532.97	0.29
Reach-1	12155	PF 1	48000	144.9	159.5		159.86	0.00071	5.19	10662.66	1429.08	0.3
Reach-1	12060	PF 1	48000	143.7	158.66		159.16	0.001175	7.05	9159.7	1247.32	0.37
Reach-1	12020	PF 1	48000	141.4	158.49		158.85	0.000771	5.41	10517.42	1216.07	0.27
Reach-1	11965	PF 1	48000	142.6	155.61	155.2	157.5	0.003866	12.5	5312.79	1038.7	0.69
Reach-1	11872	PF 1	48000	141.4	154.61		155.39	0.001606	7.56	7608.91	1280.87	0.44
Reach-1	11762	PF 1	48000	140.6	153.8		154.45	0.001594	6.98	8161.44	1352.68	0.41
Reach-1	11667	PF 1	48000	140.8	153.23		153.74	0.000977	6.11	9247.95	1433.28	0.35
Reach-1	11591	PF 1	48000	140.8	152.68		153.3	0.001095	7.06	9178.54	1506.45	0.39
Reach-1	11477	PF 1	48000	139.4	152.19		152.6	0.001442	5.44	9665.64	1324.82	0.31
Reach-1	11371	PF 1	48000	136.8	151.28		151.76	0.001611	5.65	8649.33	870.98	0.3
Reach-1	11312	PF 1	48000	136.2	150.47		151.02	0.002025	6.1	8179.32	828.65	0.32
Reach-1	11191	PF 1	48000	134	149.73		150.09	0.000852	4.95	10074.83	948.59	0.25
Reach-1	11093	PF 1	48000	132.3	149.11		149.44	0.001644	2.95	13138.97	1020.06	0.14
Reach-1	11051	PF 1	48000	131	148.95		149.2	0.001168	3.21	13047.58	1038.13	0.15
Reach-1	11002	PF 1	48000	129.8	148.73		148.87	0.000776	2.81	15729.99	1594.77	0.13
Reach-1	10939	PF 1	48000	129.6	148.4		148.56	0.001183	3.16	14937.13	1118.35	0.14
Reach-1	10854	PF 1	48000	130.3	147.67		147.89	0.001811	3.62	12971.13	1002.51	0.17
Reach-1	10778	PF 1	48000	130	146.71		147	0.002335	3.66	11854.22	904.03	0.17
Reach-1	10742	PF 1	48000	129.9	146.18		146.5	0.003813	4.41	10738.16	821.85	0.21
Reach-1	10640	PF 1	48000	128.8	144.59		145.19	0.00114	2.44	10857.59	797.39	0.11
Reach-1	10541	PF 1	48000	125.9	143.53		143.94	0.004505	5.17	9391.45	711.77	0.23
Reach-1	10482	PF 1	48000	125	142.48		142.89	0.003025	5.21	9371.84	633.1	0.22
Reach-1	10474	PF 1	48000	125	142.29	131.5	142.75	0.001476	5.45	8864.48	517.51	0.23
Reach-1	10470		Bridge									
Reach-1	10466	PF 1	48000	125	142.26		142.72	0.003035	5.46	8849.16	517.49	0.23
Reach-1	10457	PF 1	48000	123.7	142.08		142.54	0.003363	5.56	8854.86	574.98	0.23
Reach-1	10409	PF 1	48000	120.2	140.94		141.49	0.004452	5.98	8146.41	532.85	0.26
Reach-1	10359	PF 1	48000	120.4	138.02		139.13	0.016636	9.17	5902.45	544.75	0.43
Reach-1	10243	PF 1	48000	119.6	133.91		134.72	0.003451	7.3	6659.79	724.67	0.39
Reach-1	10120	PF 1	48000	119	132.26		132.91	0.002029	6.89	7676.93	826.54	0.36
Reach-1	10020	PF 1	48000	117.1	130.54		131.39	0.003372	7.88	6682.59	868.36	0.44
Reach-1	9920	PF 1	48000	115.6	129.28		129.74	0.0016	5.84	8984.64	1033.86	0.31
Reach-1	9820	PF 1	48000	113.7	128.63		129.07	0.00142	5.61	9407.02	1081.43	0.3
Reach-1	9720	PF 1	48000	112.5	126.61	124.17	127.75	0.004671	9.08	5848.97	779.86	0.52
Reach-1	9620	PF 1	48000	113.2	124.19	121.79	125.26	0.004895	8.61	5972.02	840.98	0.52

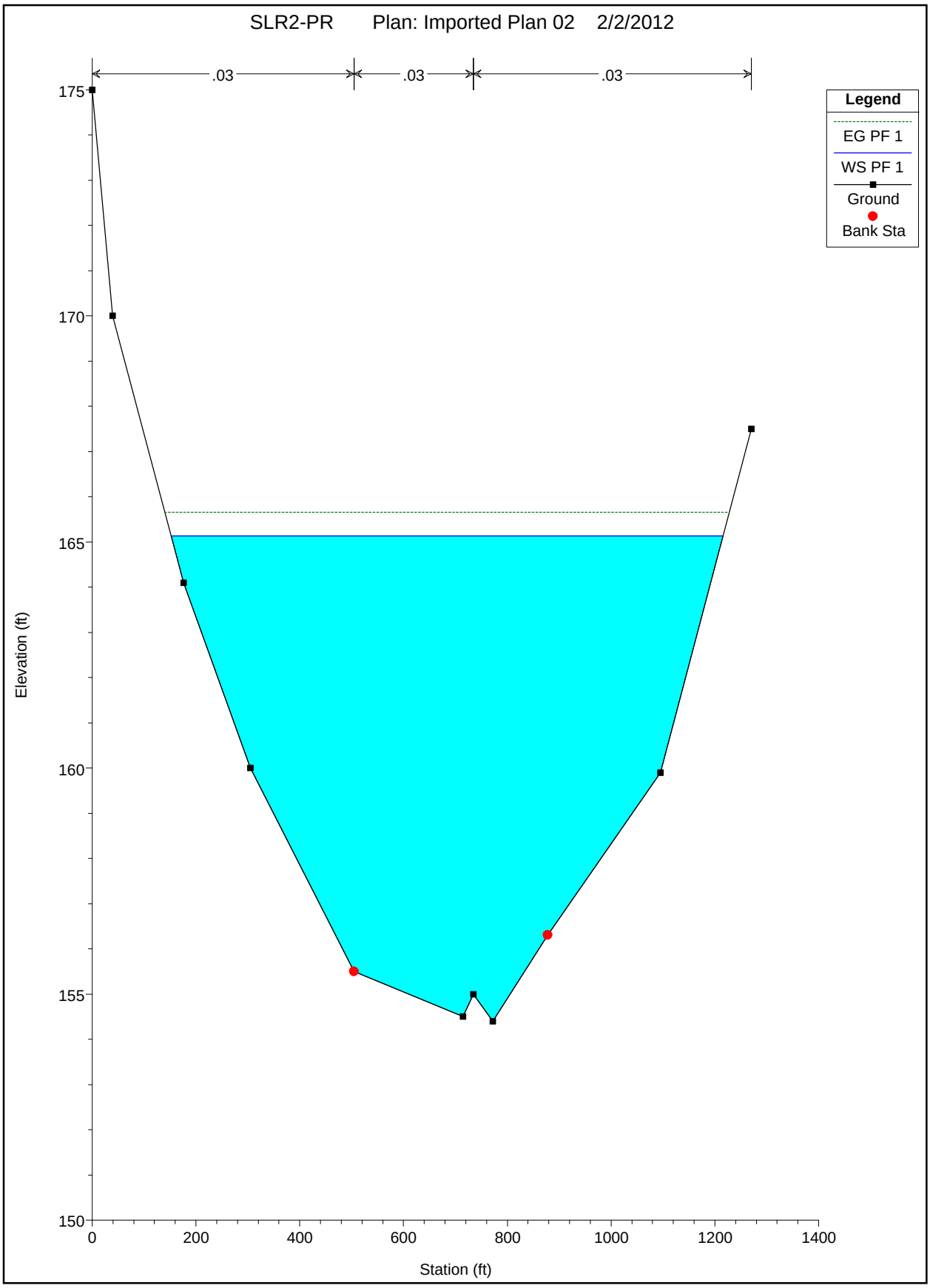
San Luis Rey River - Proposed
100 Year Storm

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	17464	PF 1	41000	238.8	245.81	245.08	248.28	0.005062	12.6	3254.24	478.05	0.85
Reach-1	17425	PF 1	41000	236.6	245.92		247.36	0.002053	9.63	4255.58	473.56	0.57
Reach-1	17388	PF 1	41000	236.3	245.52		246.95	0.001972	9.67	4304.33	483.53	0.56
Reach-1	17350	PF 1	41000	235.7	245.21		246.55	0.001773	9.36	4451.04	485.88	0.53
Reach-1	17309	PF 1	41000	233.9	244.55		246.07	0.003089	9.99	4174.4	401	0.54
Reach-1	17241	PF 1	41000	240.5	243.18		243.88	0.005461	6.92	6157.28	2527.81	0.76
Reach-1	17194	PF 1	41000	239.3	242.31		242.93	0.004394	6.67	6551.89	2502.17	0.69
Reach-1	17086	PF 1	41000	236.8	240.39		240.93	0.003147	6.37	7131.26	2473.92	0.6
Reach-1	16930	PF 1	41000	230	236.09	235.82	237.41	0.005296	9.85	4748.06	1520.58	0.82
Reach-1	16724	PF 1	41000	222.8	231.8		232.84	0.003498	8.99	5345.79	1697.14	0.68
Reach-1	16531	PF 1	41000	223.9	228.7		229.4	0.003255	7.43	6242.2	1958.79	0.63
Reach-1	16359	PF 1	41000	222	225.26		225.91	0.003788	6.46	6359.58	2068.78	0.65
Reach-1	16206	PF 1	41000	216.2	221.73		222.76	0.004685	9.08	5117.03	1437.71	0.76
Reach-1	16032	PF 1	41000	211.9	219.54		219.82	0.00193	4.68	9909.95	2149.29	0.34
Reach-1	15858	PF 1	41000	209.5	216.04		216.62	0.006587	7.54	7261.52	2734.82	0.61
Reach-1	15669	PF 1	41000	206.7	212.67		213	0.002136	4.73	9308.78	2898.28	0.39
Reach-1	15455	PF 1	41000	202.6	209.19		209.6	0.00444	6.73	8410.17	2711.59	0.56
Reach-1	15256	PF 1	41000	199.3	206.22		206.45	0.002187	5.28	12079.41	3259.41	0.4
Reach-1	15086	PF 1	41000	196.5	203.74		204.02	0.00289	6.22	13394.3	3308.99	0.47
Reach-1	14891	PF 1	41000	193.5	200.45		200.77	0.003039	5.97	10722.45	2894.33	0.45
Reach-1	14707	PF 1	41000	190.9	197.25		197.55	0.003228	3.81	10497.85	2548.05	0.29
Reach-1	14516	PF 1	41000	185.8	193.5		193.85	0.003846	5.15	9154.72	2648.58	0.37
Reach-1	14311	PF 1	41000	181.7	189.12		189.49	0.003763	3.4	8554.43	2506.28	0.26
Reach-1	14171	PF 1	41000	179.1	186.2		186.56	0.003391	3.51	8607.19	2385.19	0.26
Reach-1	13946	PF 1	41000	176.1	181.7		182.16	0.004087	2.69	7845.62	2174.49	0.25
Reach-1	13827	PF 1	41000	173.6	179.64		179.97	0.001876	1.49	9698.92	2077.02	0.15
Reach-1	13738	PF 1	41000	171.4	178.34		178.69	0.002088	1.83	9242.04	1914.34	0.15
Reach-1	13617	PF 1	41000	166.6	177.1		177.38	0.001349	2.49	10216.52	1905.51	0.17
Reach-1	13516	PF 1	41000	165.5	176.24		176.53	0.001807	3.58	9613.89	1608.08	0.21
Reach-1	13402	PF 1	41000	161.2	174.3		174.84	0.00305	3.75	7695.95	1512.63	0.22
Reach-1	13285	PF 1	41000	161	171.47		172.2	0.005997	5.54	6177.32	1640.37	0.41
Reach-1	13158	PF 1	41000	159.8	168.75		169.16	0.002996	5.19	8066.87	2198.3	0.38
Reach-1	13048	PF 1	41000	156.8	166.94		167.33	0.002886	3.69	8546.64	2231.52	0.26
Reach-1	12938	PF 1	41000	153.3	166.24		166.42	0.00071	2.02	13892.47	2050.41	0.11
Reach-1	12843	PF 1	41000	151.1	165.82		166.04	0.000606	3.08	11728.76	1506.39	0.16
Reach-1	12805	PF 1	41000	150.6	165.47		165.81	0.001006	5.1	9078.48	1411.83	0.28
Reach-1	12798	PF 1	41000	150.3	165.36		165.75	0.000584	5.19	8549.82	1111.1	0.29
Reach-1	12795	PF 1	41000	154.4	165.13		165.65	0.000815	6.59	7485.43	1063.32	0.37
Reach-1	12793	PF 1	41000	150.4	165.14		165.58	0.000695	5.74	8050.54	1077.33	0.32
Reach-1	12785	PF 1	41000	150.1	164.44		165.28	0.003261	7.69	5715.43	957.33	0.45
Reach-1	12679	PF 1	41000	149.8	162.87		163.61	0.001989	5.64	6158.52	834.16	0.34
Reach-1	12543	PF 1	41000	148	161.38		162.06	0.002619	6.71	6160.7	1140.16	0.38
Reach-1	12469	PF 1	48000	148.3	160.94		161.35	0.00166	5.16	9377.74	2026.33	0.42
Reach-1	12429	PF 1	48000	146.4	160.79	155.33	160.97	0.000366	3.46	14030.47	1733.14	0.21
Reach-1	12308	PF 1	48000	144.7	160.29		160.6	0.000758	4.52	10906.3	1532.97	0.29
Reach-1	12155	PF 1	48000	144.9	159.5		159.86	0.00071	5.19	10662.66	1429.08	0.3
Reach-1	12060	PF 1	48000	143.7	158.66		159.16	0.001175	7.05	9159.7	1247.32	0.37
Reach-1	12020	PF 1	48000	141.4	158.49		158.85	0.000771	5.41	10517.42	1216.07	0.27
Reach-1	11965	PF 1	48000	142.6	155.61	155.2	157.5	0.003866	12.5	5312.79	1038.7	0.69
Reach-1	11872	PF 1	48000	141.4	154.61		155.39	0.001606	7.56	7608.91	1280.87	0.44
Reach-1	11762	PF 1	48000	140.6	153.8		154.45	0.001594	6.98	8161.44	1352.68	0.41
Reach-1	11667	PF 1	48000	140.8	153.23		153.74	0.000977	6.11	9247.95	1433.28	0.35
Reach-1	11591	PF 1	48000	140.8	152.68		153.3	0.001095	7.06	9178.54	1506.45	0.39
Reach-1	11477	PF 1	48000	139.4	152.19		152.6	0.001442	5.44	9665.64	1324.82	0.31
Reach-1	11371	PF 1	48000	136.8	151.28		151.76	0.001611	5.65	8649.33	870.98	0.3
Reach-1	11312	PF 1	48000	136.2	150.47		151.02	0.002025	6.1	8179.32	828.65	0.32
Reach-1	11191	PF 1	48000	134	149.73		150.09	0.000852	4.95	10074.83	948.59	0.25
Reach-1	11093	PF 1	48000	132.3	149.11		149.44	0.001644	2.95	13138.97	1020.06	0.14
Reach-1	11051	PF 1	48000	131	148.95		149.2	0.001168	3.21	13047.58	1038.13	0.15
Reach-1	11002	PF 1	48000	129.8	148.73		148.87	0.000776	2.81	15729.99	1594.77	0.13
Reach-1	10939	PF 1	48000	129.6	148.4		148.56	0.001183	3.16	14937.13	1118.35	0.14
Reach-1	10854	PF 1	48000	130.3	147.67		147.89	0.001811	3.62	12971.13	1002.51	0.17
Reach-1	10778	PF 1	48000	130	146.71		147	0.002335	3.66	11854.22	904.03	0.17
Reach-1	10742	PF 1	48000	129.9	146.18		146.5	0.003813	4.41	10738.16	821.85	0.21
Reach-1	10640	PF 1	48000	128.8	144.59		145.19	0.00114	2.44	10857.59	797.39	0.11
Reach-1	10541	PF 1	48000	125.9	143.53		143.94	0.004505	5.17	9391.45	711.77	0.23
Reach-1	10482	PF 1	48000	125	142.48		142.89	0.003025	5.21	9371.84	633.1	0.22
Reach-1	10474	PF 1	48000	125	142.29	131.5	142.75	0.001476	5.45	8864.48	517.51	0.23
Reach-1	10470		Bridge									
Reach-1	10466	PF 1	48000	125	142.26		142.72	0.003035	5.46	8849.16	517.49	0.23
Reach-1	10457	PF 1	48000	123.7	142.08		142.54	0.003363	5.56	8854.86	574.98	0.23
Reach-1	10409	PF 1	48000	120.2	140.94		141.49	0.004452	5.98	8146.41	532.85	0.26
Reach-1	10359	PF 1	48000	120.4	138.02		139.13	0.016636	9.17	5902.45	544.75	0.43
Reach-1	10243	PF 1	48000	119.6	133.91		134.72	0.003451	7.3	6659.79	724.67	0.39
Reach-1	10120	PF 1	48000	119	132.26		132.91	0.002029	6.89	7676.93	826.54	0.36
Reach-1	10020	PF 1	48000	117.1	130.54		131.39	0.003372	7.88	6682.59	868.36	0.44
Reach-1	9920	PF 1	48000	115.6	129.28		129.74	0.0016	5.84	8984.64	1033.86	0.31
Reach-1	9820	PF 1	48000	113.7	128.63		129.07	0.00142	5.61	9407.02	1081.43	0.3
Reach-1	9720	PF 1	48000	112.5	126.61	124.17	127.75	0.004671	9.08	5848.97	779.86	0.52
Reach-1	9620	PF 1	48000	113.2	124.19	121.79	125.26	0.004895	8.61	5972.02	840.98	0.52

Section 12795 - Existing



Section 12795 - Proposed



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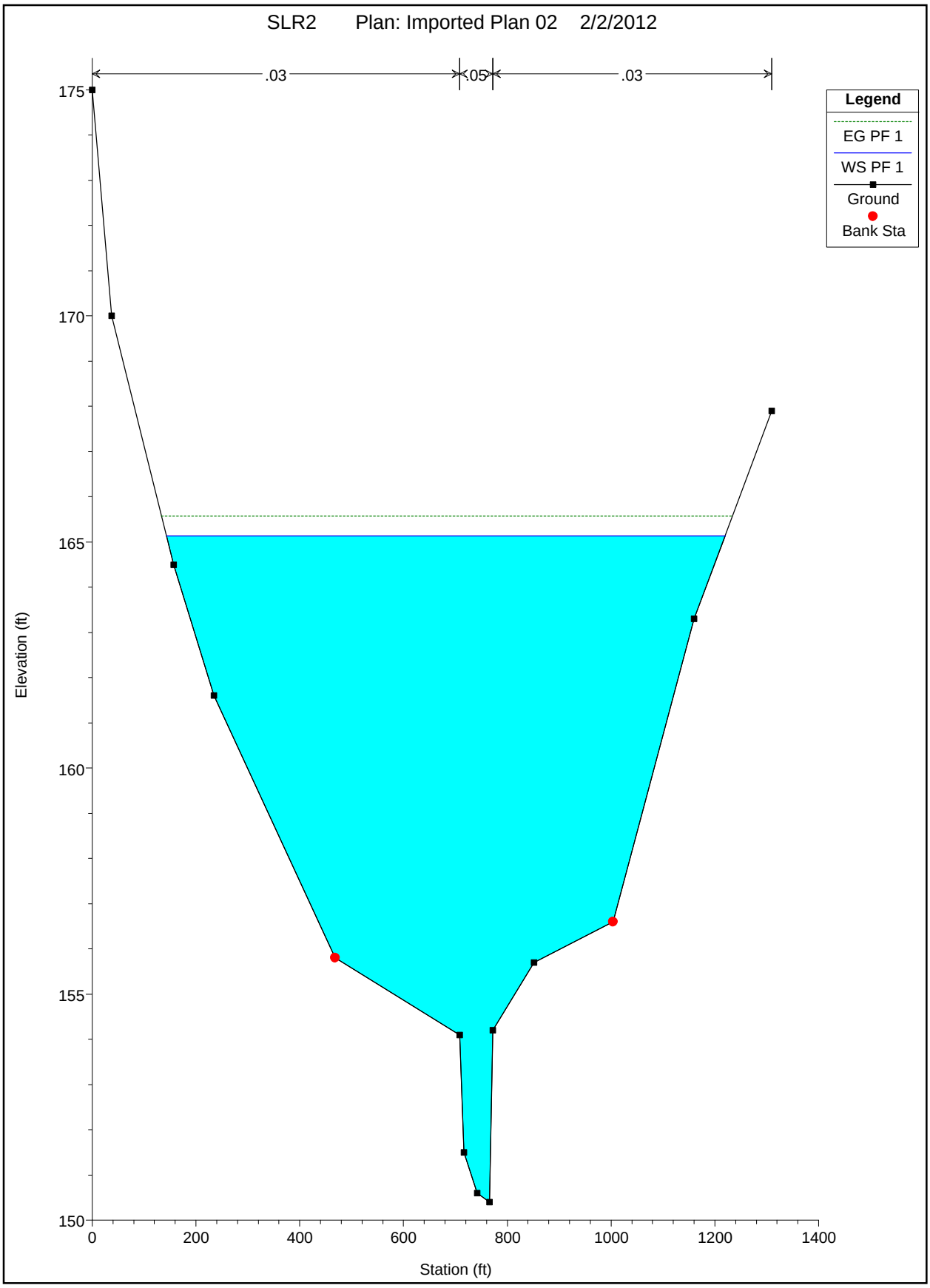
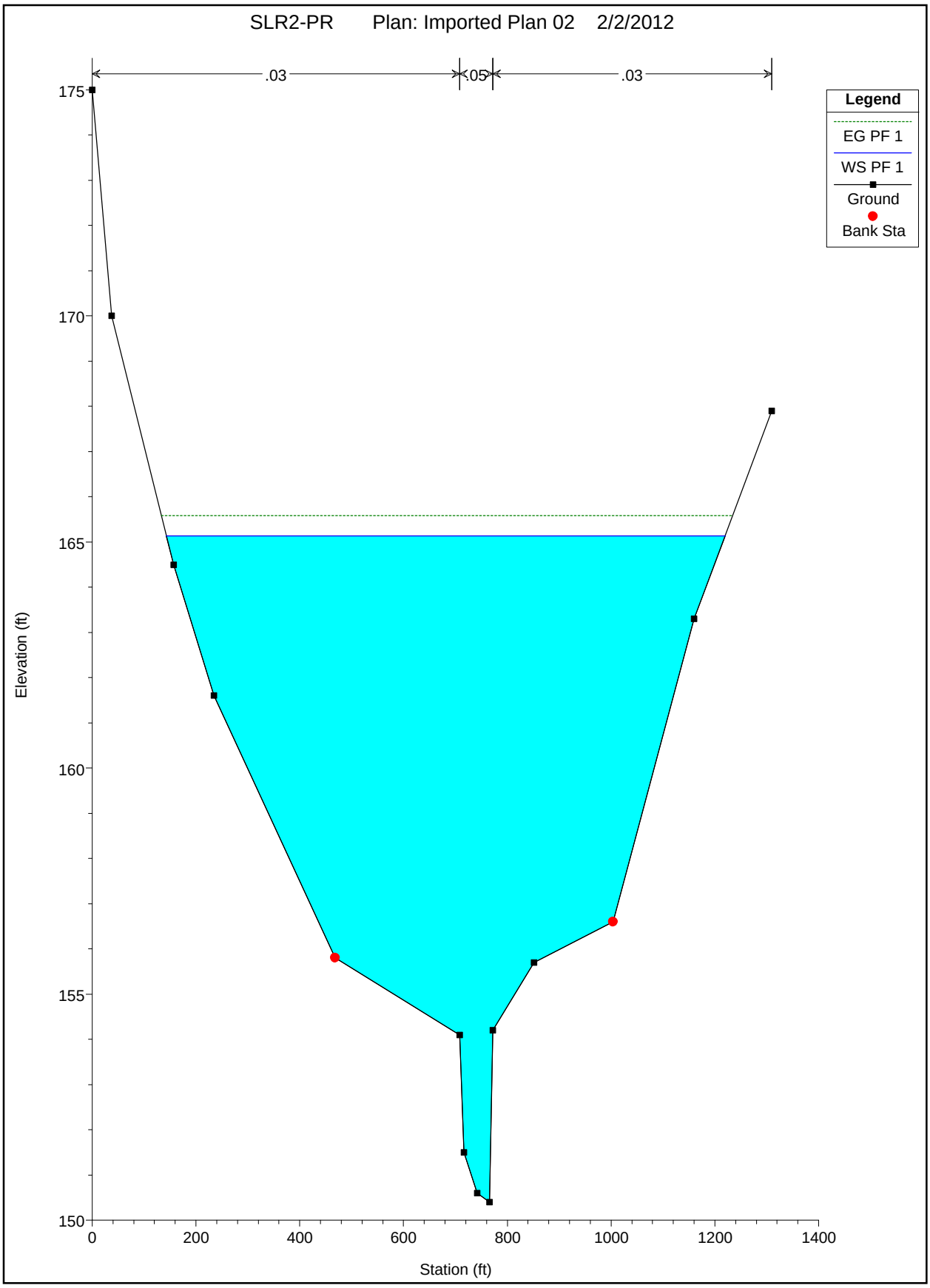


Section 12793 - Proposed



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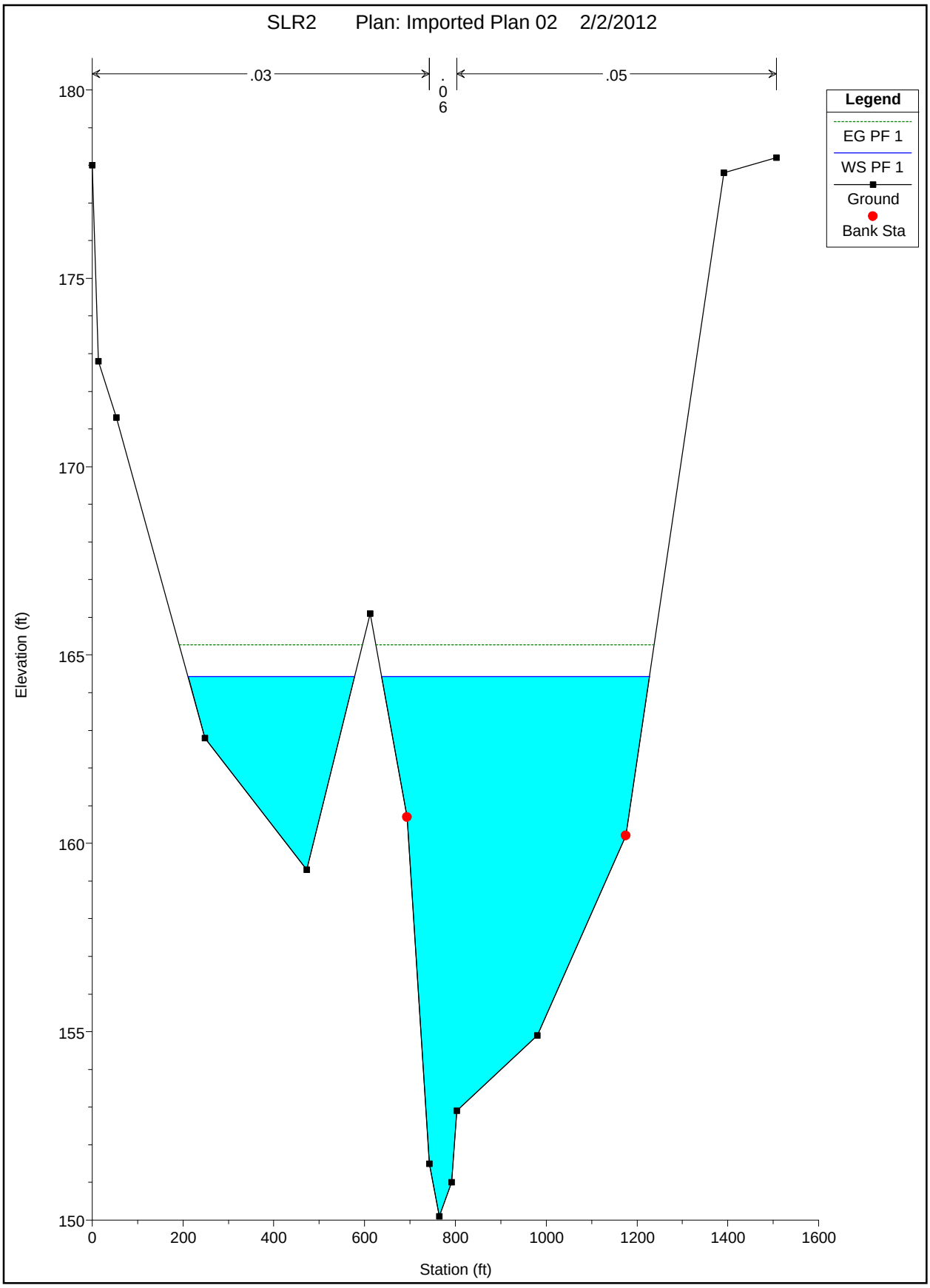
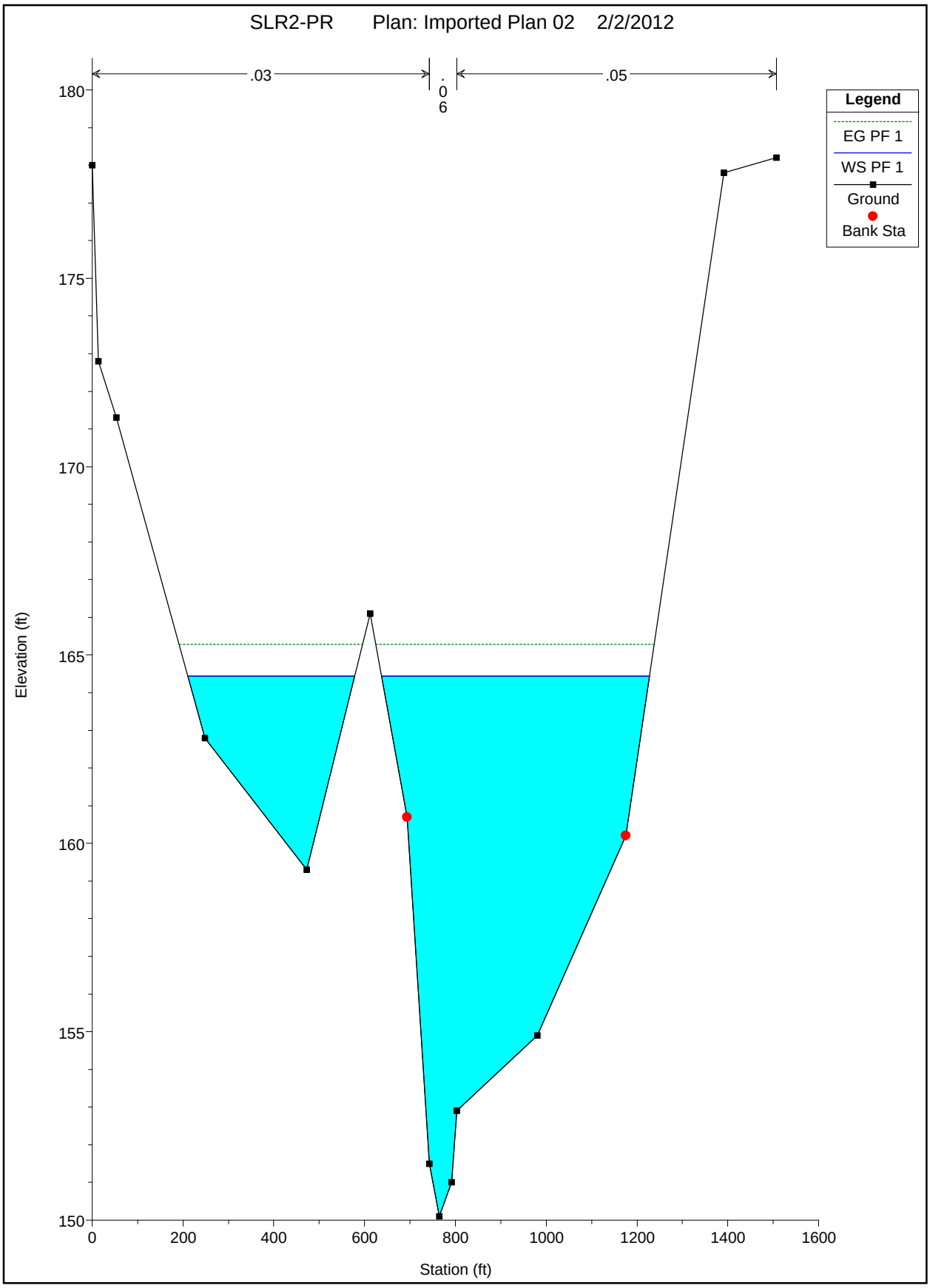


Section 12785 - Proposed



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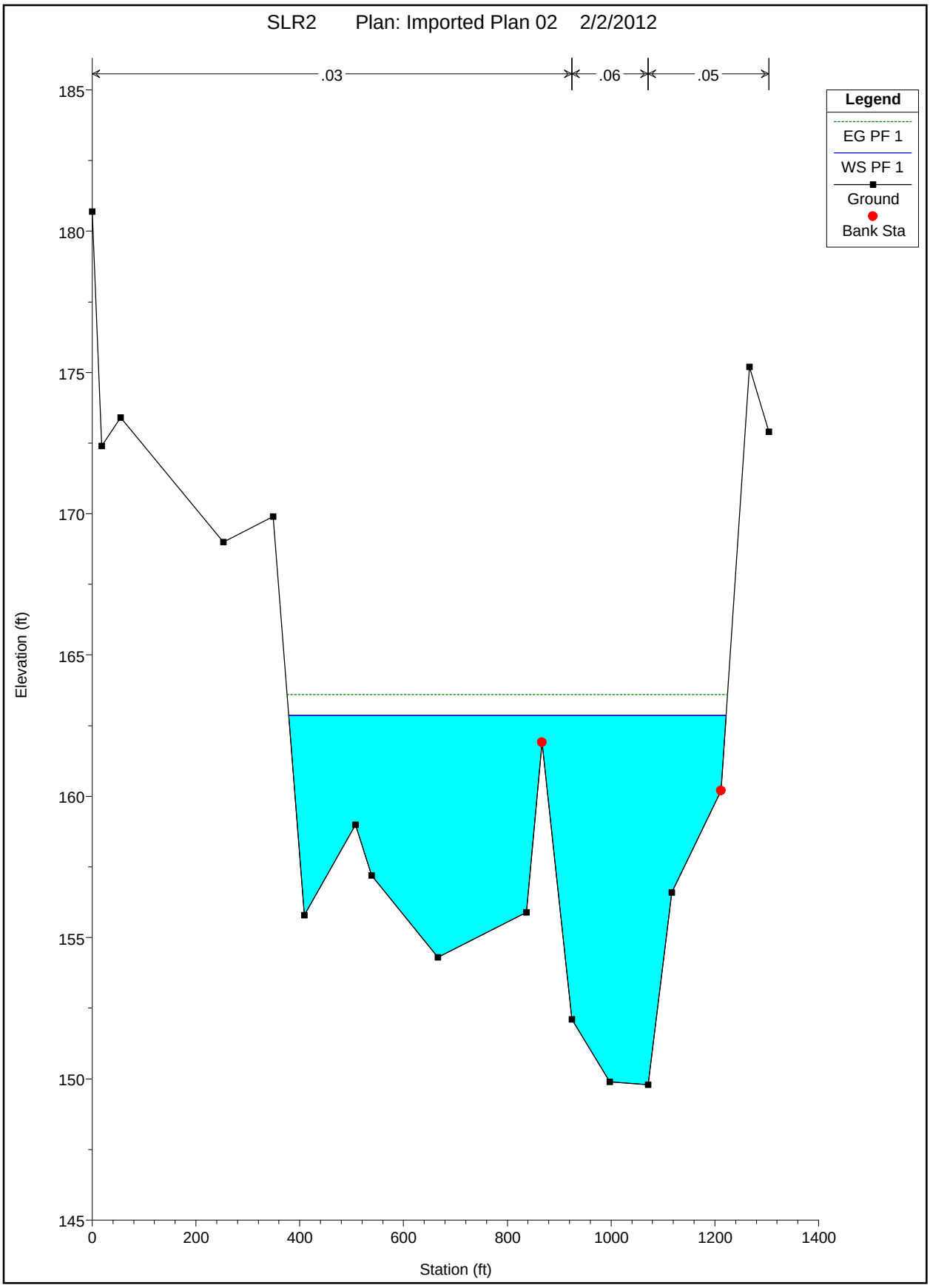
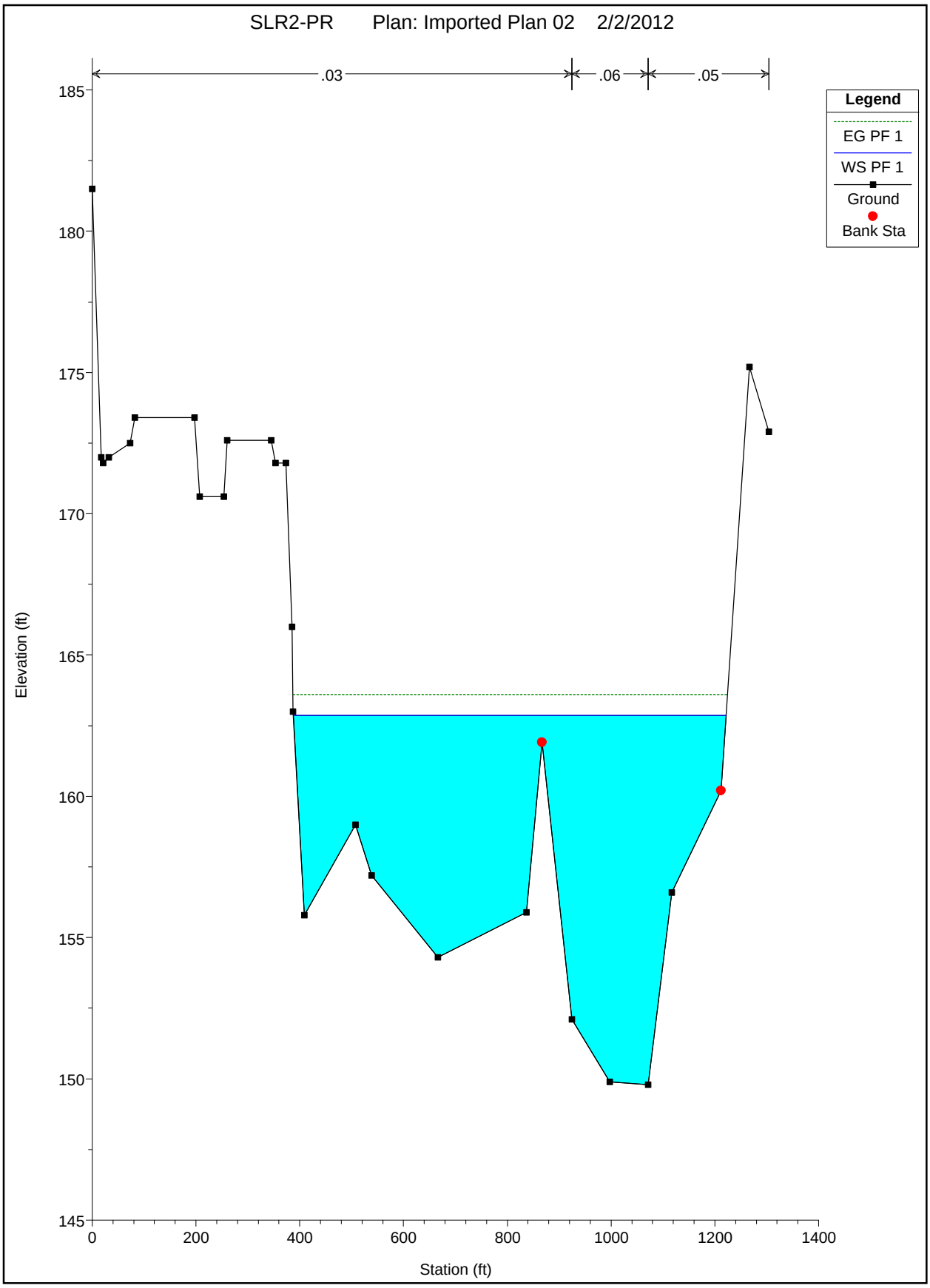
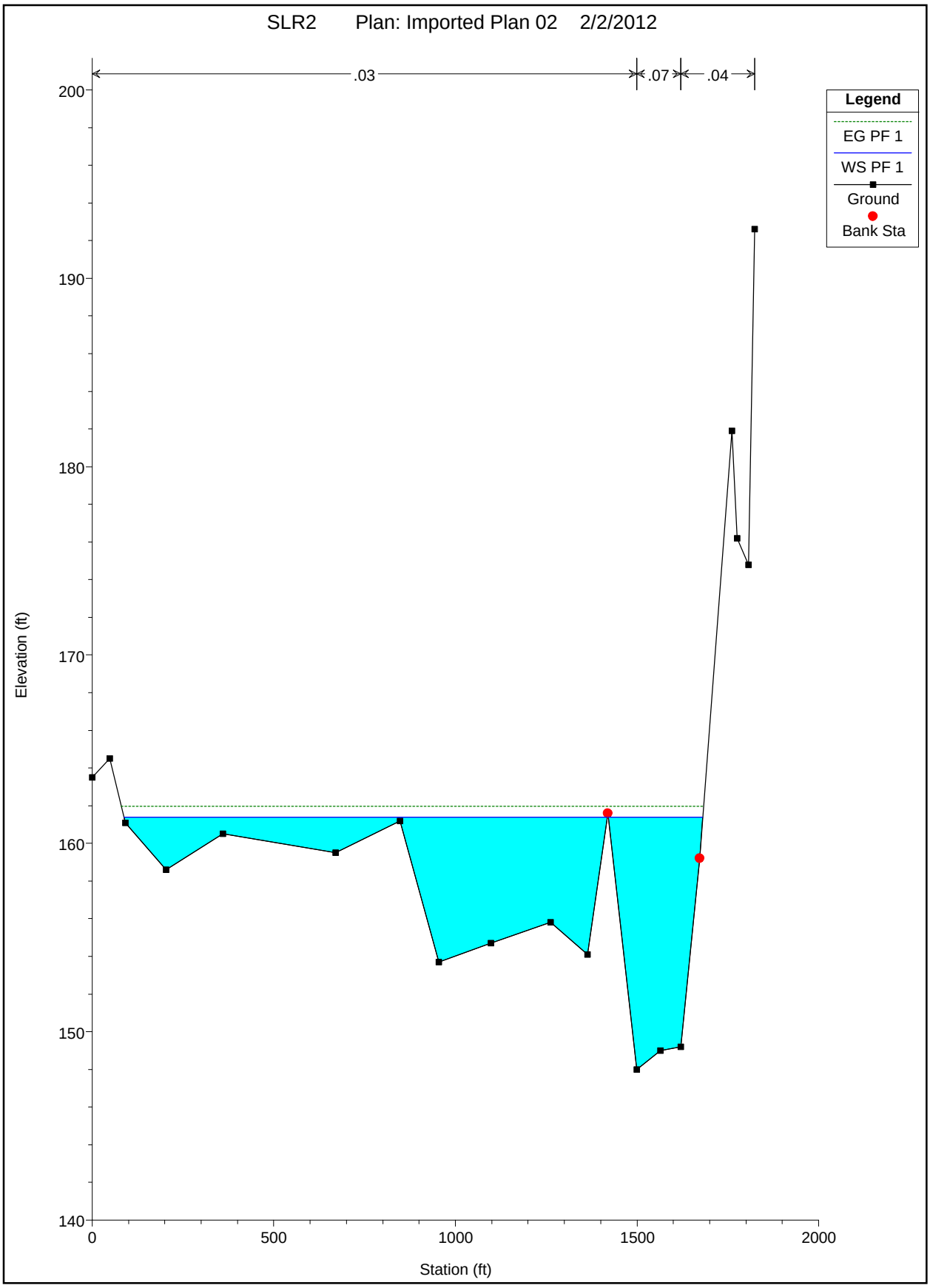


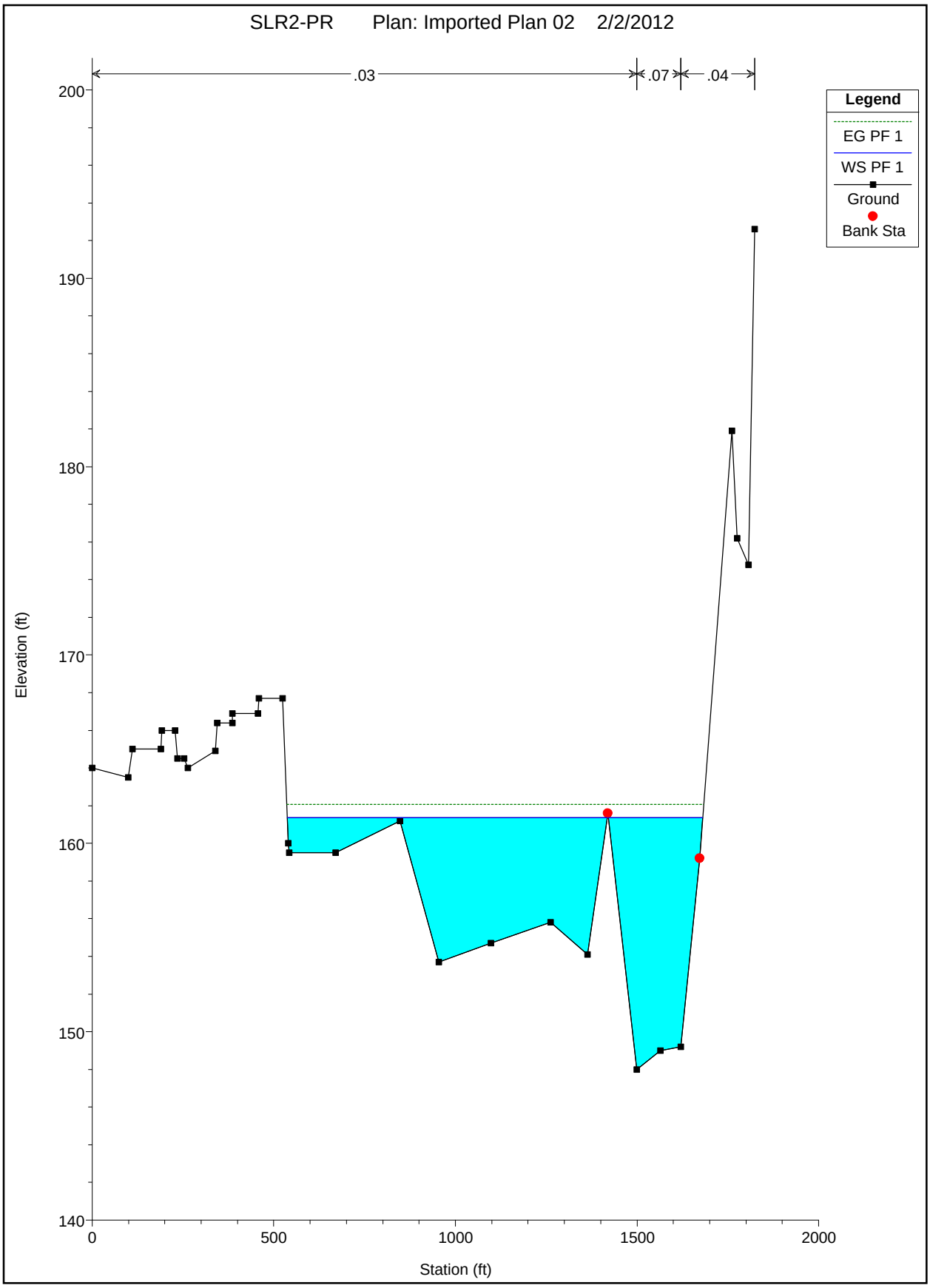
Section 12679 - Proposed



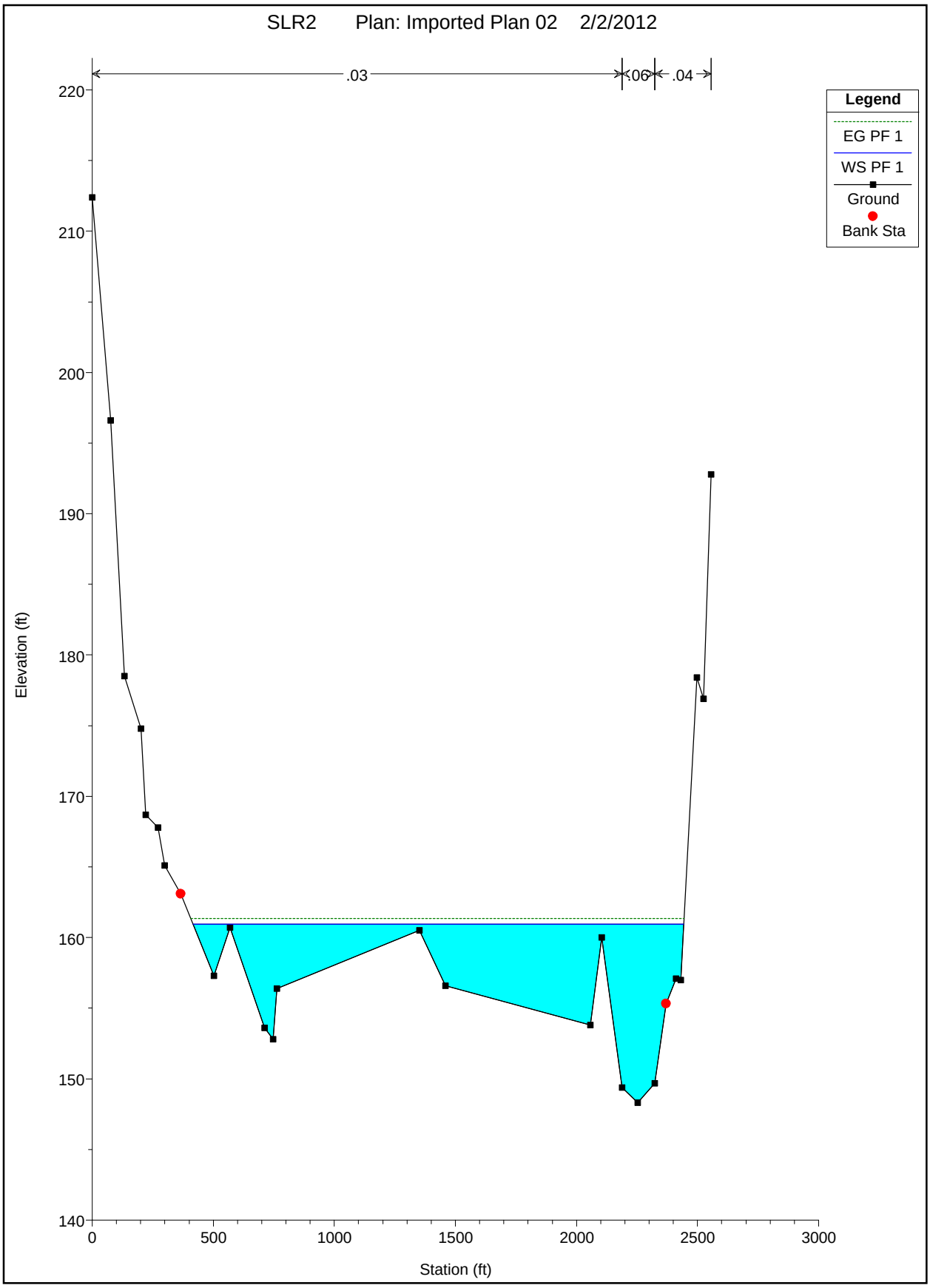
Section 12543 - Existing



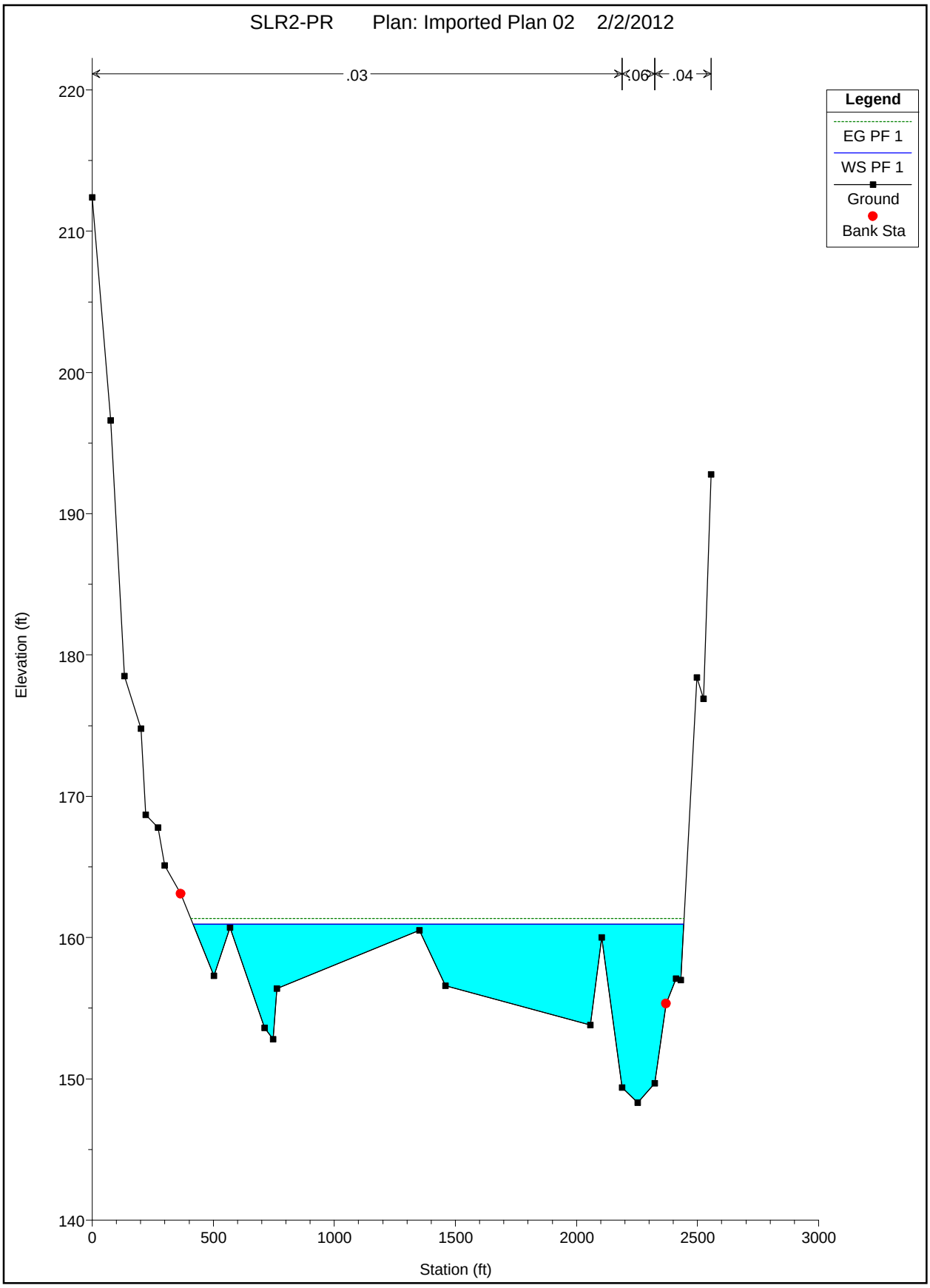
Section 12543 - Proposed



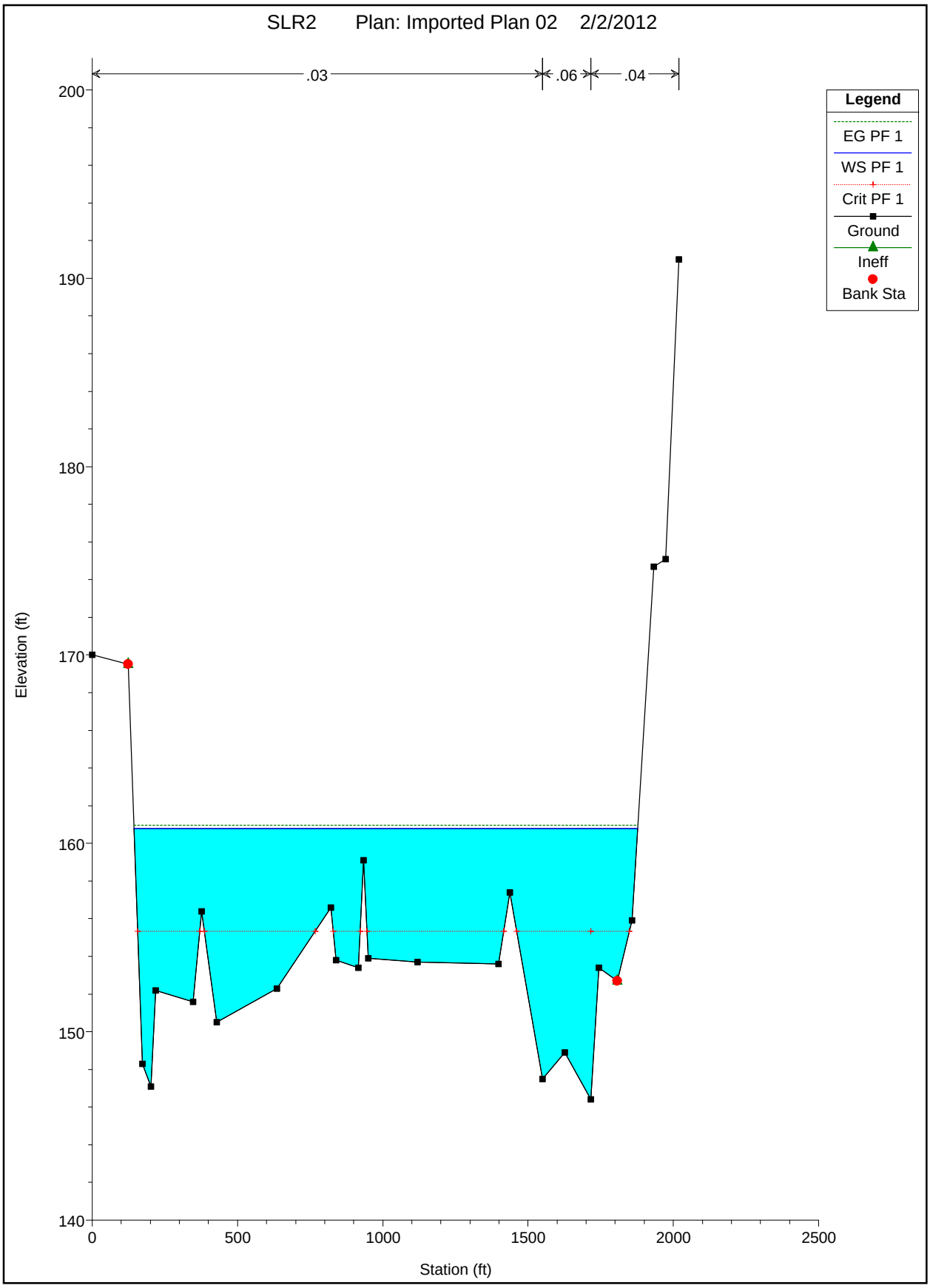
Section 12469 - Existing



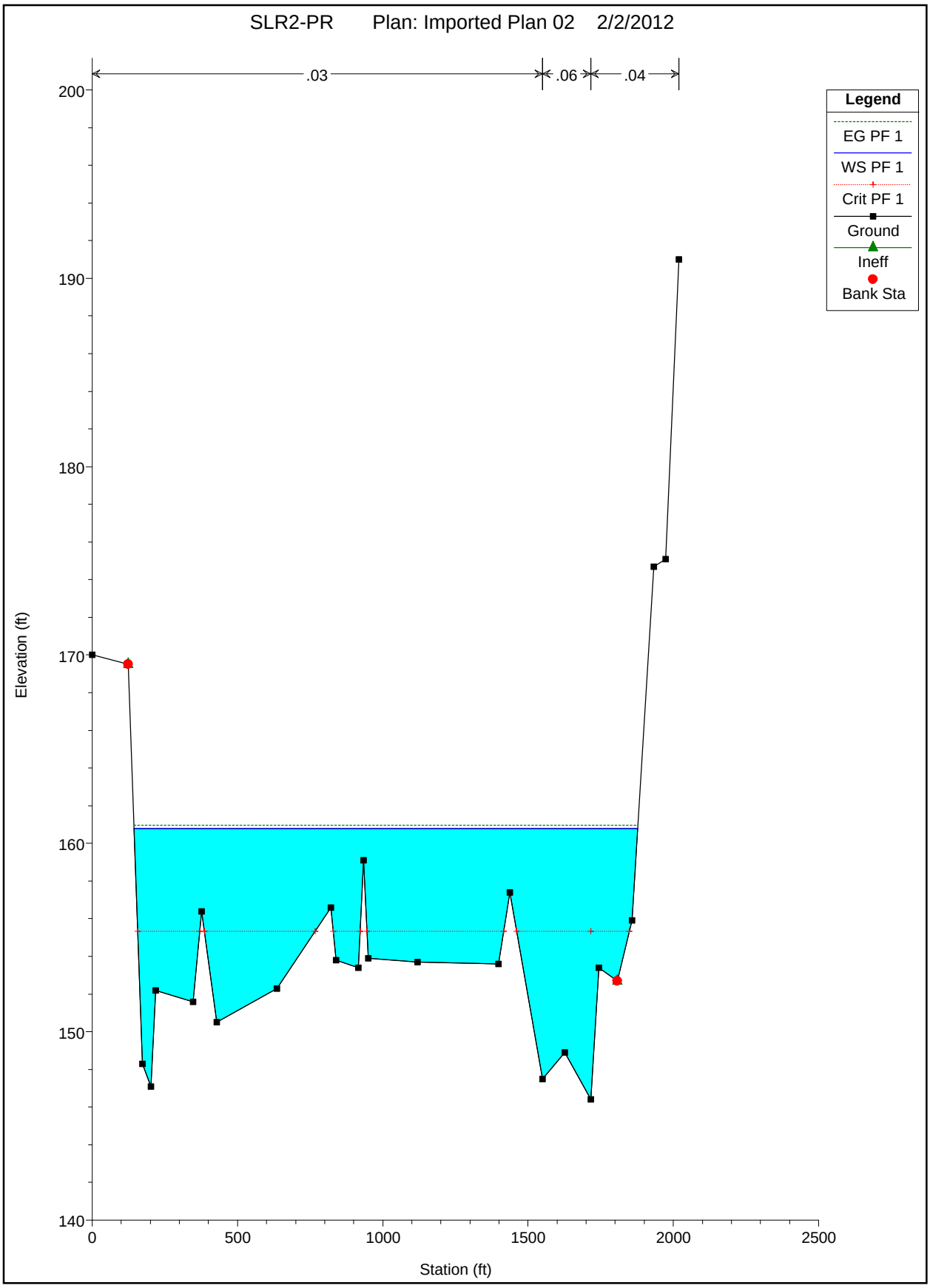
Section 12469 - Proposed



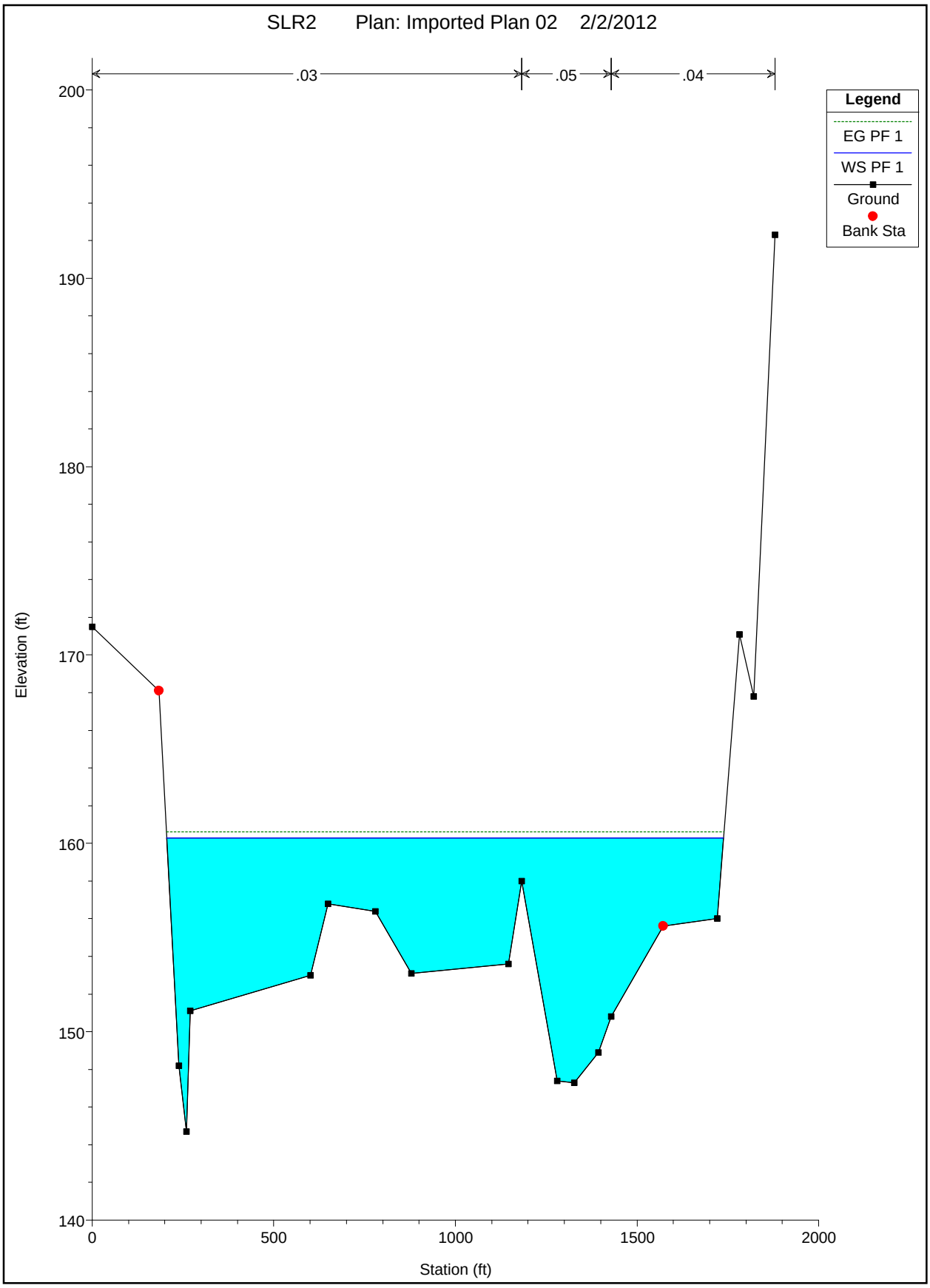
Section 12429 - Existing



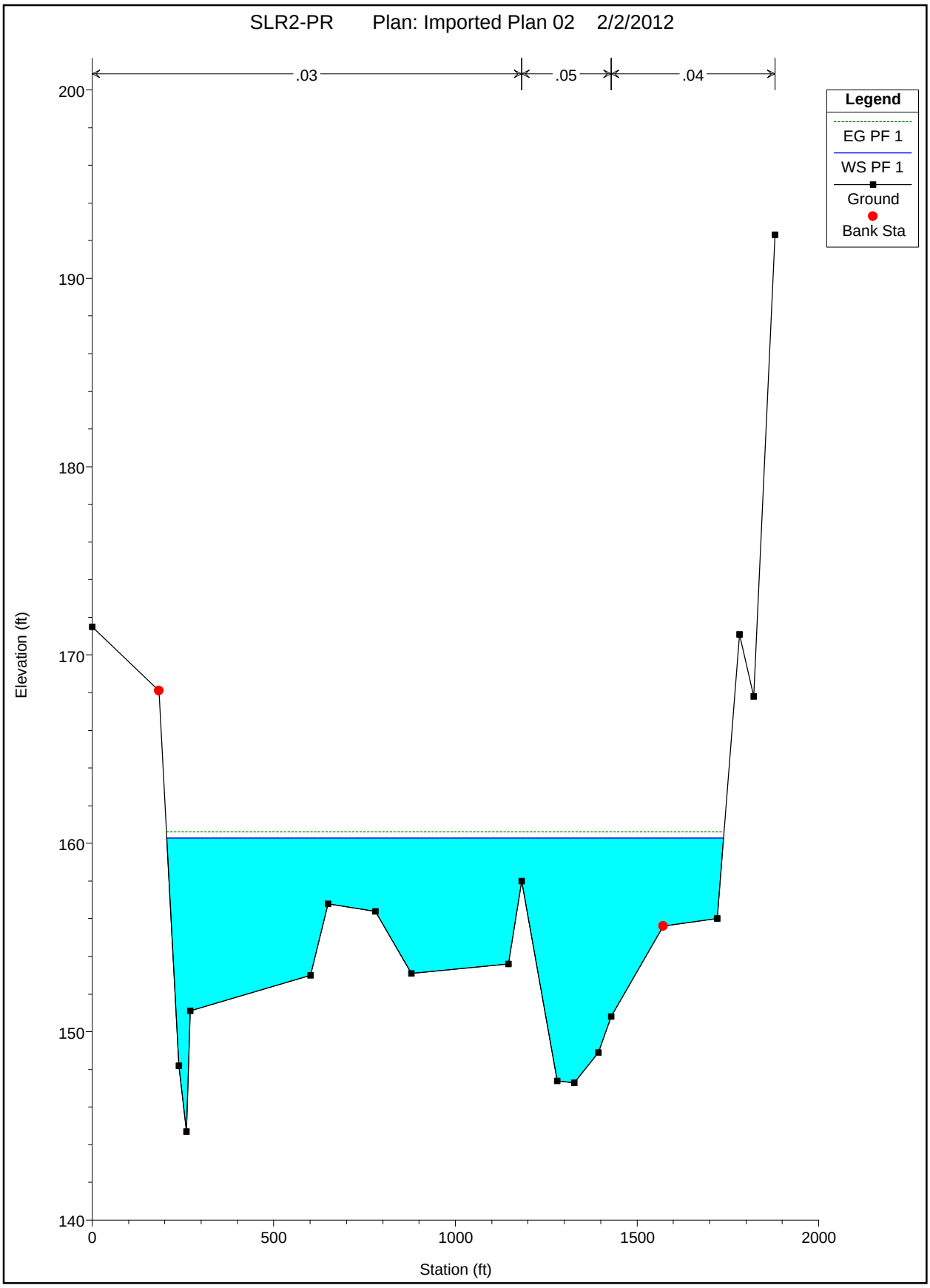
Section 12429 - Proposed



Section 12308 - Existing



Section 12308 - Proposed



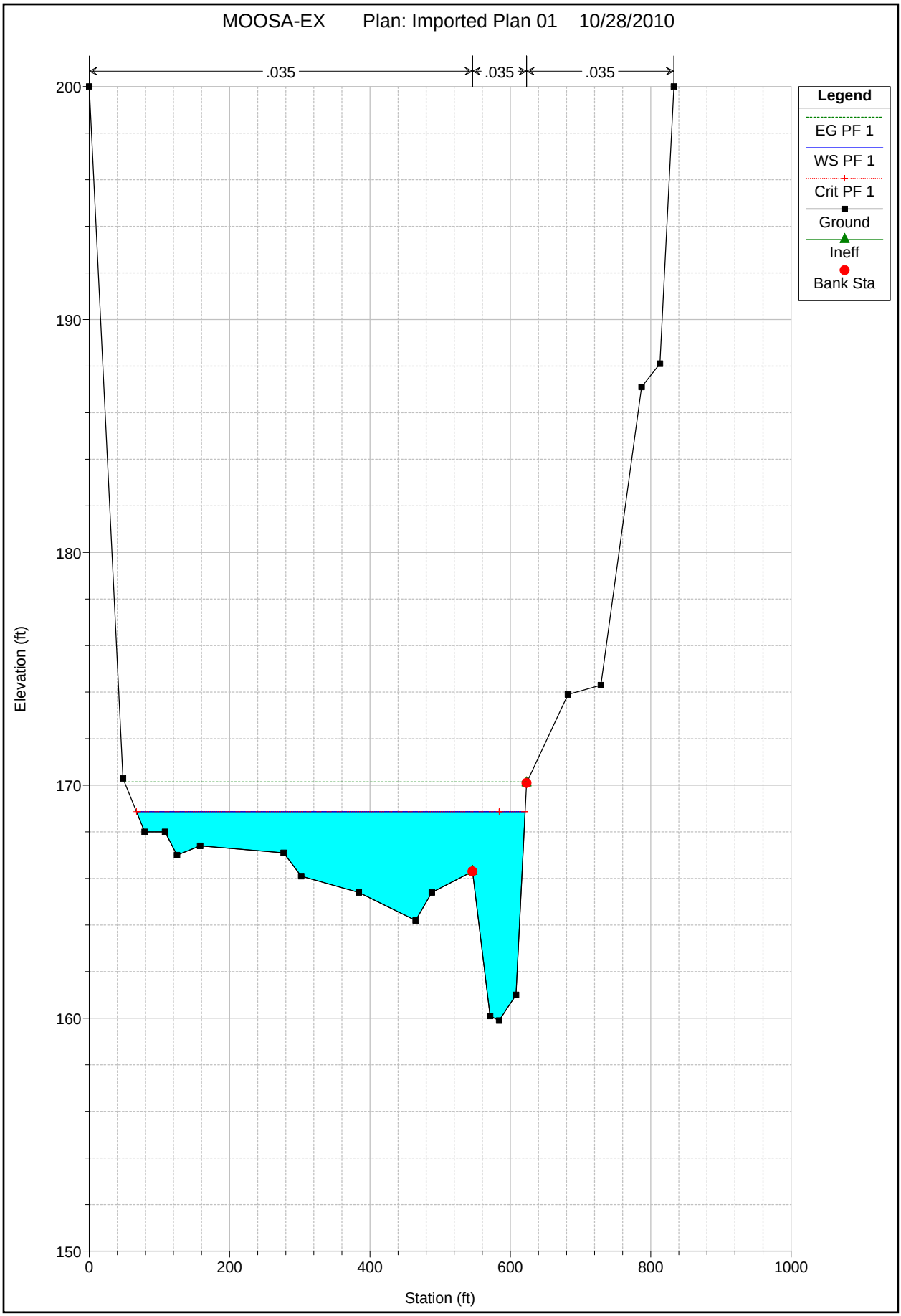
Moosa Canyon Creek - Existing
100 Year Storm

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # C
Reach-1	1.88	PF 1	13500	176.6	186.16	186.16	187.35	0.005551	11.76	1853.59	663.41	0.75
Reach-1	1.87	PF 1	13500	171.5	182.65	182.65	183.78	0.005775	11.62	1877.98	675.38	0.77
Reach-1	1.84	PF 1	13500	170	180.82	180.06	181.4	0.002772	8.59	2494.21	730.25	0.54
Reach-1	1.78	PF 1	13500	169.4	178.94	178.94	180.07	0.006214	11.95	1856.7	696.04	0.8
Reach-1	1.65	PF 1	13500	169	178.02	175.8	178.34	0.00122	5.6	3156.02	695.67	0.36
Reach-1	1.64	PF 1	13500	168.9	177.88	175.28	178.21	0.001293	5.51	3049.28	643.6	0.37
Reach-1	1.63	PF 1	13500	168	177.35	176.48	178.09	0.005409	6.95	1950.19	579.58	0.42
Reach-1	1.625		Bridge									
Reach-1	1.62	PF 1	13500	168	176.35	176.35	177.62	0.013274	10.36	1495.28	585.19	0.67
Reach-1	1.6	PF 1	13500	165.3	173.66	173.66	175.27	0.008613	12.09	1415.57	437.33	0.91
Reach-1	1.53	PF 1	13500	163.1	172.09	170.33	172.47	0.001519	6.63	2984.44	721.19	0.41
Reach-1	1.52	PF 1	13500	163.1	172.02	169.9	172.36	0.001243	6.08	3114.97	679.78	0.37
Reach-1	1.47	PF 1	13500	163.1	171.94	168.62	172.12	0.000574	4.26	4070.96	707.91	0.26
Reach-1	1.39	PF 1	13500	163.5	171.69	167.9	171.86	0.000543	3.89	4054.47	662.08	0.24
Reach-1	1.34	PF 1	13500	163.9	171.35	168.62	171.66	0.001164	5.21	3211.51	698.92	0.35
Reach-1	1.28	PF 1	13500	162.4	171.29	167.5	171.41	0.000354	3.35	5011.46	842.23	0.2
Reach-1	1.23	PF 1	13500	162.4	171.21		171.32	0.000251	2.86	5222.96	730.77	0.17
Reach-1	1.19	PF 1	13500	162.4	171.12		171.26	0.000325	3.21	4652.9	695.58	0.19
Reach-1	1.18	PF 1	13500	161	170.48	169.34	171.03	0.003906	6.42	2311.91	698.53	0.41
Reach-1	1.175		Bridge									
Reach-1	1.17	PF 1	13500	161	169.96	169.34	170.74	0.00661	7.98	1950.91	685.14	0.52
Reach-1	1.15	PF 1	13500	159.9	168.87	168.87	170.14	0.006202	11.7	1722.73	553.7	0.79
Reach-1	1.04	PF 1	13500	159	168.43	163.79	168.57	0.00035	3.42	4664.78	723.68	0.2
Reach-1	0.95	PF 1	13500	158.8	168.05	166.1	168.29	0.00104	5.37	3616.55	839.34	0.34
Reach-1	0.93	PF 1	13500	158.8	168.04	164.71	168.18	0.000534	3.81	4561.18	926.14	0.24
Reach-1	0.87	PF 1	13500	156.5	167.94	163.23	168.04	0.00029	3.23	5231.26	790.72	0.18
Reach-1	0.76	PF 1	13500	154.6	167.71	163.51	167.85	0.000343	3.62	4794.42	781.9	0.2
Reach-1	0.62	PF 1	13500	153.6	167.56	161.89	167.66	0.000191	2.95	5643.72	709.9	0.15
Reach-1	0.56	PF 1	13500	153.3	167.42		167.58	0.000279	3.74	4442.3	527.36	0.19
Reach-1	0.54	PF 1	13500	153.2	167.41	160.16	167.53	0.00022	3.19	4941.36	578.2	0.17
Reach-1	0.52	PF 1	13500	153.3	167.29	162.04	167.49	0.000426	3.96	3902.27	530.8	0.22
Reach-1	0.51	PF 1	13500	153.4	166.85	161.46	167.43	0.000923	6.27	2400.14	510.81	0.34
Reach-1	0.505		Bridge									
Reach-1	0.5	PF 1	13500	153.4	162.32	160.97	163.44	0.004043	9.13	1708.57	407.64	0.64
Reach-1	0.49	PF 1	13500	152.6	162.26	161.14	163.26	0.003094	8.9	1884.86	438.57	0.58
Reach-1	0.48	PF 1	13500	152.3	162.53	159.49	162.99	0.001461	6.31	2654.01	522.24	0.4
Reach-1	0.46	PF 1	13500	152.7	162.43		162.8	0.001419	5.73	2981.75	683.9	0.39
Reach-1	0.43	PF 1	13500	152.2	162.41		162.61	0.00059	4.17	4217.82	920.02	0.26
Reach-1	0.35	PF 1	13500	146.6	160.41	158.76	161.88	0.004003	9.92	1516.04	447.26	0.65

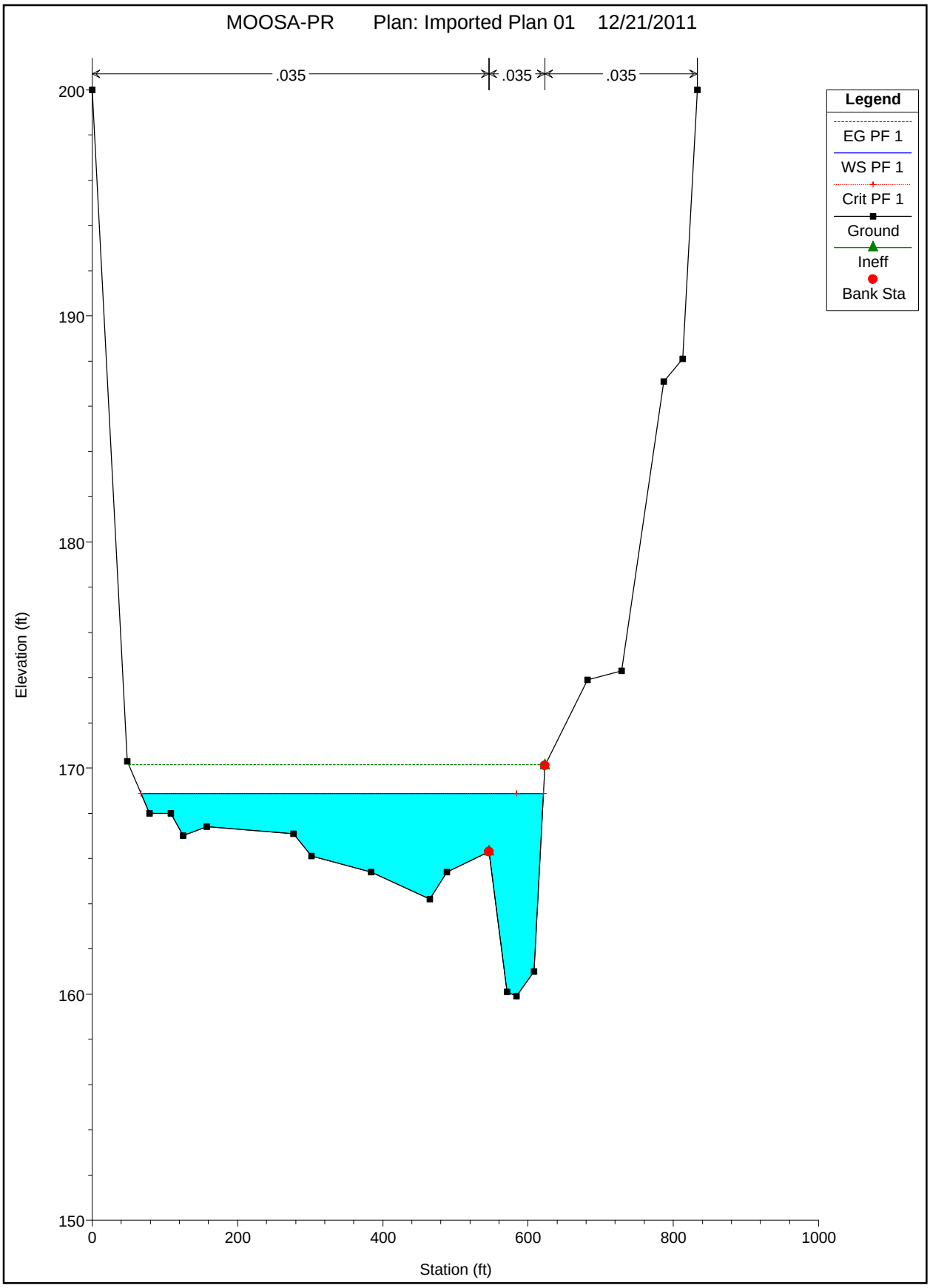
Moosa Canyon Creek - Proposed
100 Year Storm

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # C
Reach-1	1.88	PF 1	13500	176.6	186.16	186.16	187.35	0.005551	11.76	1853.59	663.41	0.75
Reach-1	1.87	PF 1	13500	171.5	182.65	182.65	183.78	0.005775	11.62	1877.98	675.38	0.77
Reach-1	1.84	PF 1	13500	170	180.82	180.06	181.4	0.002772	8.59	2494.21	730.25	0.54
Reach-1	1.78	PF 1	13500	169.4	178.94	178.94	180.07	0.006214	11.95	1856.7	696.04	0.8
Reach-1	1.65	PF 1	13500	169	178.02	175.8	178.34	0.00122	5.6	3156.02	695.67	0.36
Reach-1	1.64	PF 1	13500	168.9	177.88	175.28	178.21	0.001293	5.51	3049.28	643.6	0.37
Reach-1	1.63	PF 1	13500	168	177.35	176.48	178.09	0.005409	6.95	1950.19	579.58	0.42
Reach-1	1.625		Bridge									
Reach-1	1.62	PF 1	13500	168	176.35	176.35	177.62	0.013274	10.36	1495.28	585.19	0.67
Reach-1	1.6	PF 1	13500	165.3	173.66	173.66	175.27	0.008613	12.09	1415.57	437.33	0.91
Reach-1	1.53	PF 1	13500	163.1	172.09	170.33	172.47	0.001519	6.63	2984.44	721.19	0.41
Reach-1	1.52	PF 1	13500	163.1	172.02	169.9	172.36	0.001243	6.08	3114.97	679.78	0.37
Reach-1	1.47	PF 1	13500	163.1	171.94	168.62	172.12	0.000574	4.26	4070.96	707.91	0.26
Reach-1	1.39	PF 1	13500	163.5	171.69	167.9	171.86	0.000543	3.89	4054.47	662.08	0.24
Reach-1	1.34	PF 1	13500	163.9	171.35	168.62	171.66	0.001164	5.21	3211.51	698.92	0.35
Reach-1	1.28	PF 1	13500	162.4	171.29	167.5	171.41	0.000354	3.35	5011.46	842.23	0.2
Reach-1	1.23	PF 1	13500	162.4	171.21		171.32	0.000251	2.86	5222.96	730.77	0.17
Reach-1	1.19	PF 1	13500	162.4	171.12		171.26	0.000325	3.21	4652.9	695.58	0.19
Reach-1	1.18	PF 1	13500	161	170.48	169.34	171.03	0.003906	6.42	2311.91	698.53	0.41
Reach-1	1.175		Bridge									
Reach-1	1.17	PF 1	13500	161	169.96	169.34	170.74	0.00661	7.98	1950.91	685.14	0.52
Reach-1	1.15	PF 1	13500	159.9	168.87	168.87	170.14	0.006202	11.7	1722.73	553.7	0.79
Reach-1	1.04	PF 1	13500	159	168.51	163.79	168.65	0.000338	3.38	4719.08	724.36	0.2
Reach-1	0.95	PF 1	13500	158.8	168.15	166.1	168.38	0.00097	5.23	3697.81	840.44	0.33
Reach-1	0.93	PF 1	13500	158.8	168.14	164.71	168.28	0.000502	3.72	4652.36	927.58	0.23
Reach-1	0.87	PF 1	13500	156.5	168.02	163.25	168.14	0.000329	3.46	4891.13	736.32	0.2
Reach-1	0.76	PF 1	13500	154.6	167.73	163.58	167.9	0.000418	4.01	4335.58	722.98	0.22
Reach-1	0.62	PF 1	13500	153.6	167.53	161.3	167.66	0.000261	3.44	4715.58	571	0.18
Reach-1	0.56	PF 1	13500	153.3	167.42		167.58	0.000278	3.74	4601.09	614.34	0.19
Reach-1	0.54	PF 1	13500	153.2	167.41	160.15	167.53	0.000213	3.14	5100.06	626.43	0.16
Reach-1	0.52	PF 1	13500	153.3	167.3	162.05	167.49	0.000399	3.84	4119.16	590.32	0.22
Reach-1	0.51	PF 1	13500	153.4	166.85	161.46	167.43	0.000923	6.27	2400.14	510.81	0.34
Reach-1	0.505		Bridge									
Reach-1	0.5	PF 1	13500	153.4	162.6	160.97	163.59	0.003405	8.63	1825.4	429.29	0.59
Reach-1	0.49	PF 1	13500	152.6	162.35	161.19	163.44	0.003386	9.21	1755.52	368.14	0.6
Reach-1	0.48	PF 1	13500	152.3	162.65	159.41	163.15	0.001521	6.5	2488.98	439.62	0.41
Reach-1	0.46	PF 1	13500	152.7	162.35		162.94	0.002137	6.98	2319.16	519.98	0.47
Reach-1	0.43	PF 1	13500	152.2	162.42		162.65	0.000658	4.41	3764.15	696.06	0.27
Reach-1	0.35	PF 1	13500	146.6	160.41	158.76	161.88	0.004003	9.92	1516.04	447.26	0.65

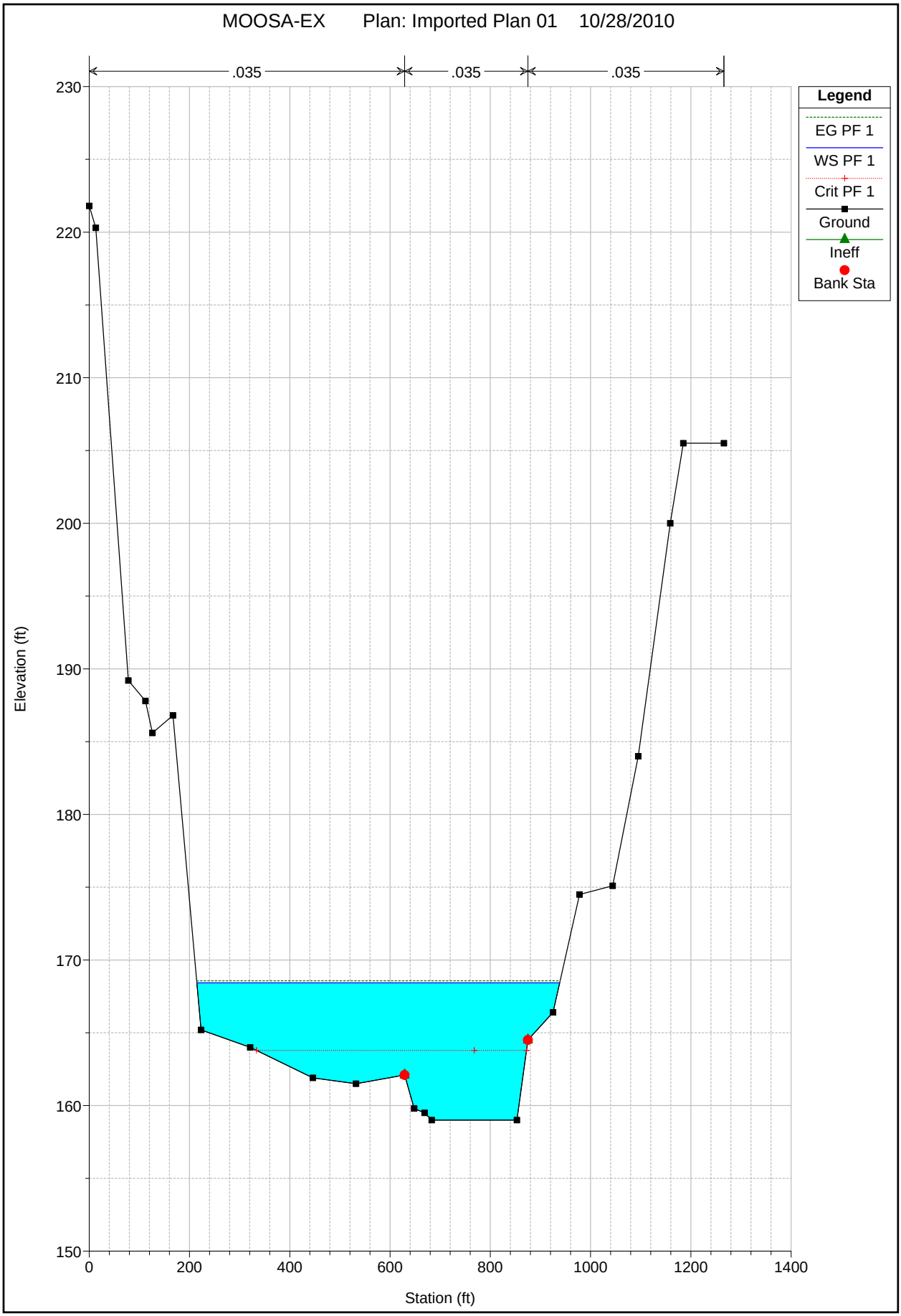
Section 1.15 - Existing



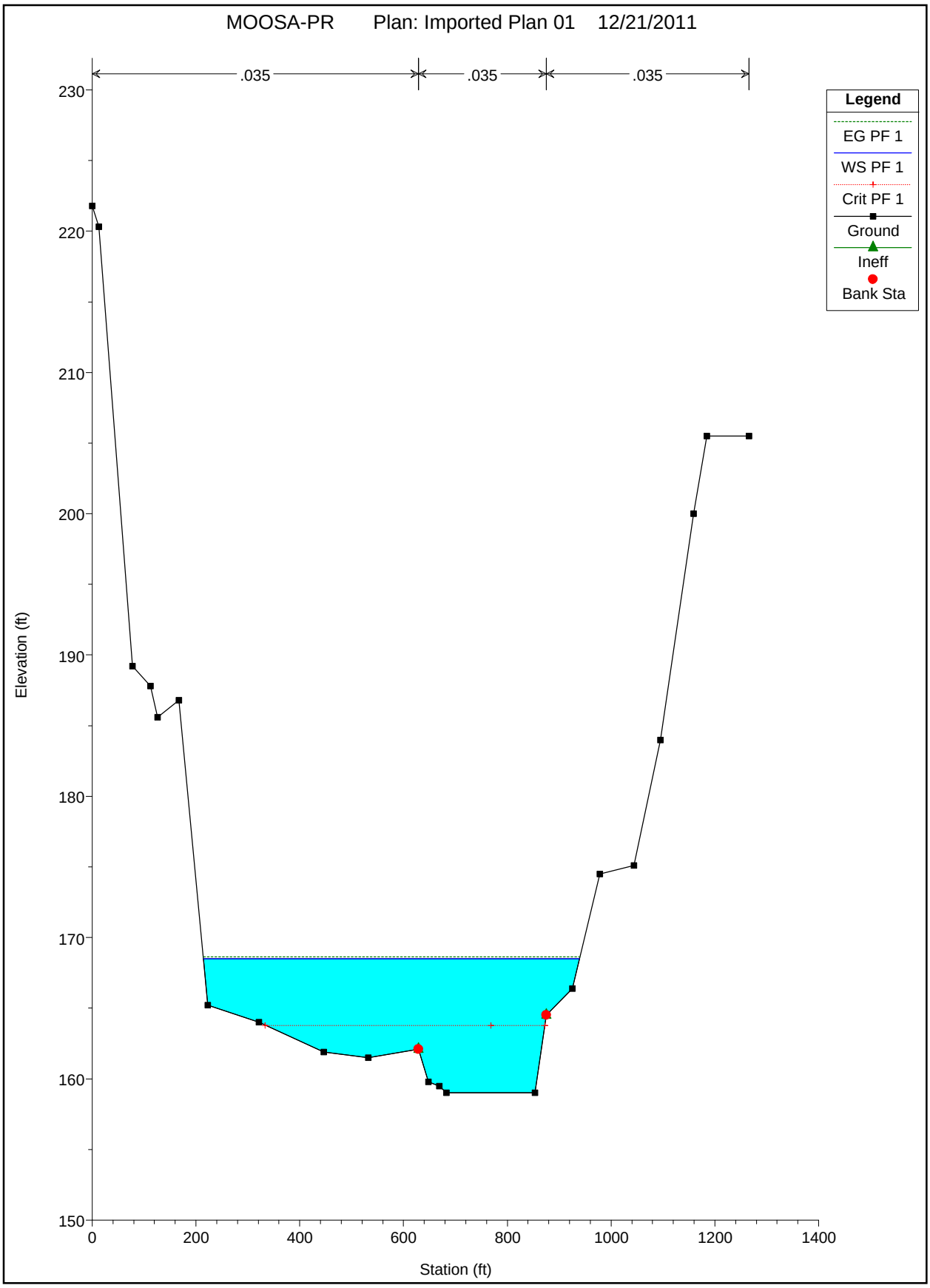
Section 1.15 - Proposed



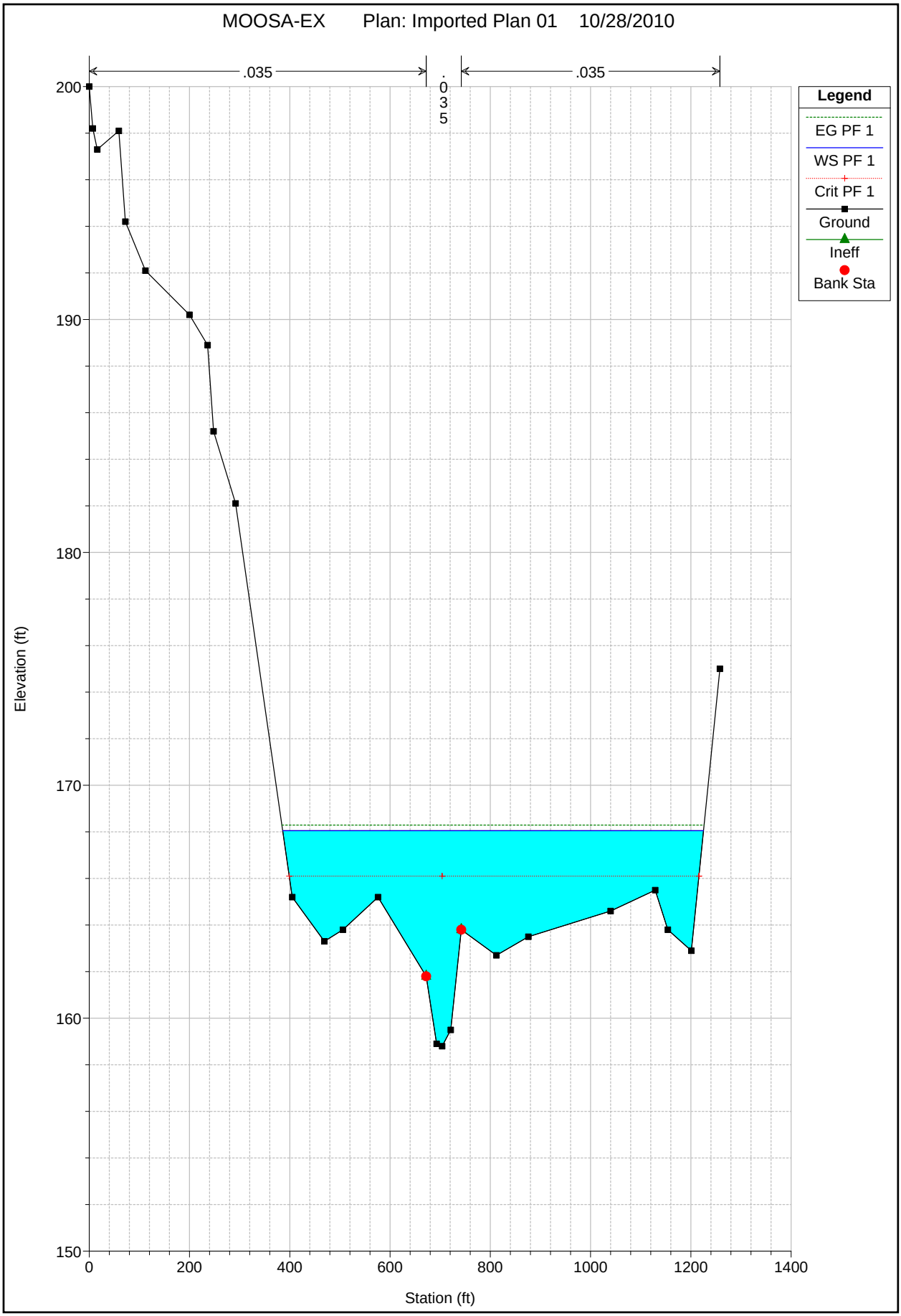
Section 1.04 - Existing



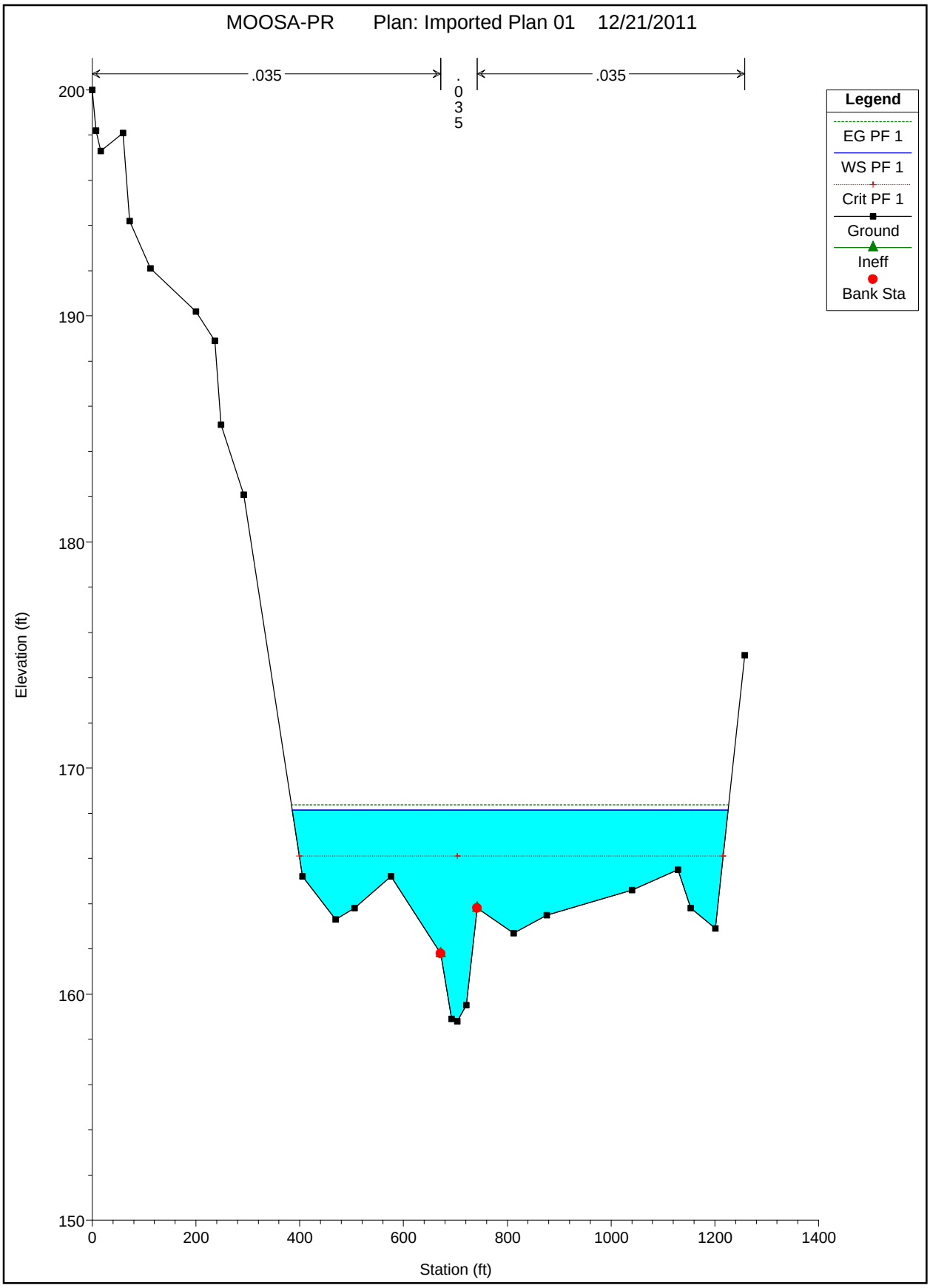
Section 1.04 - Proposed



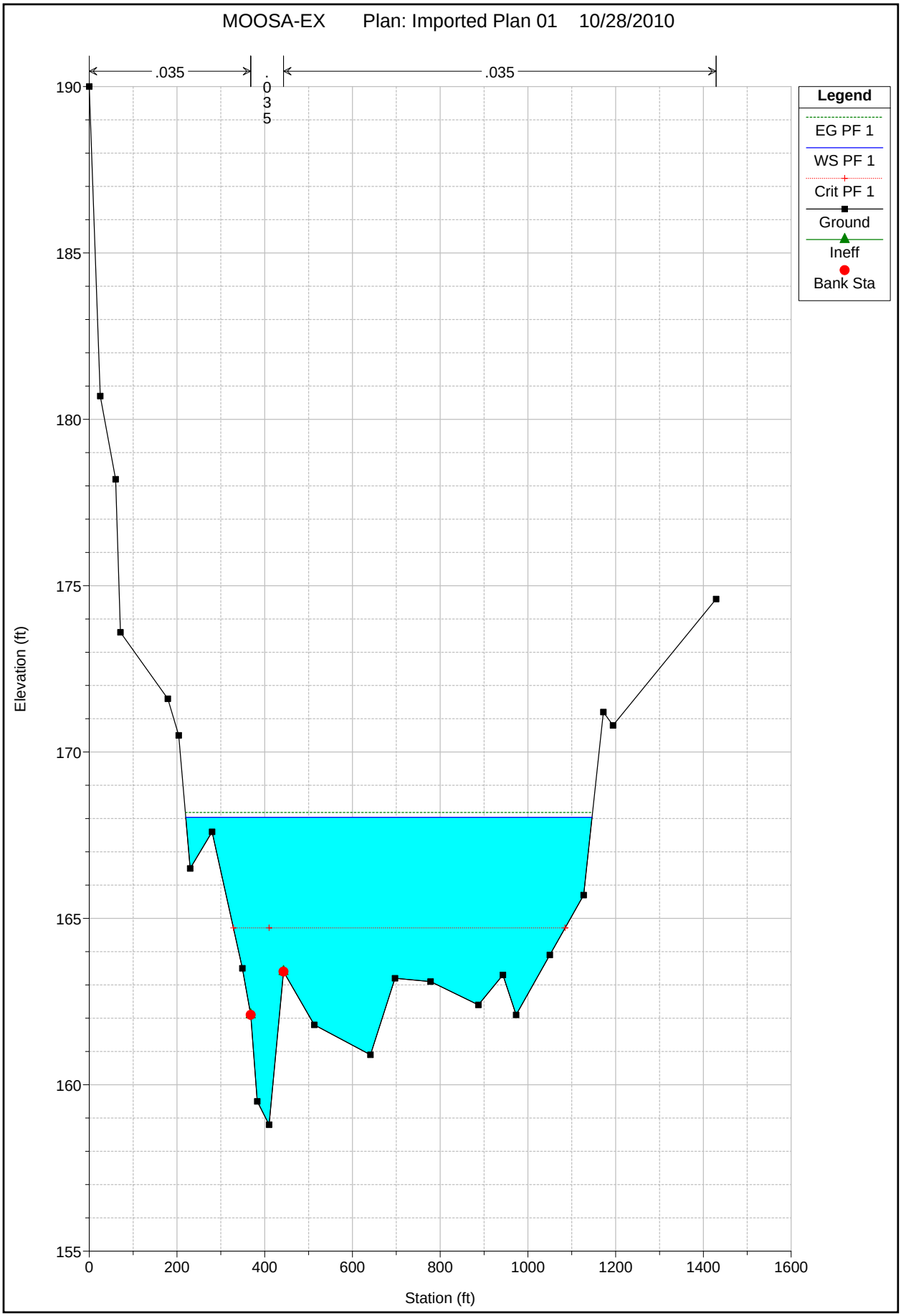
Section 0.95 - Existing



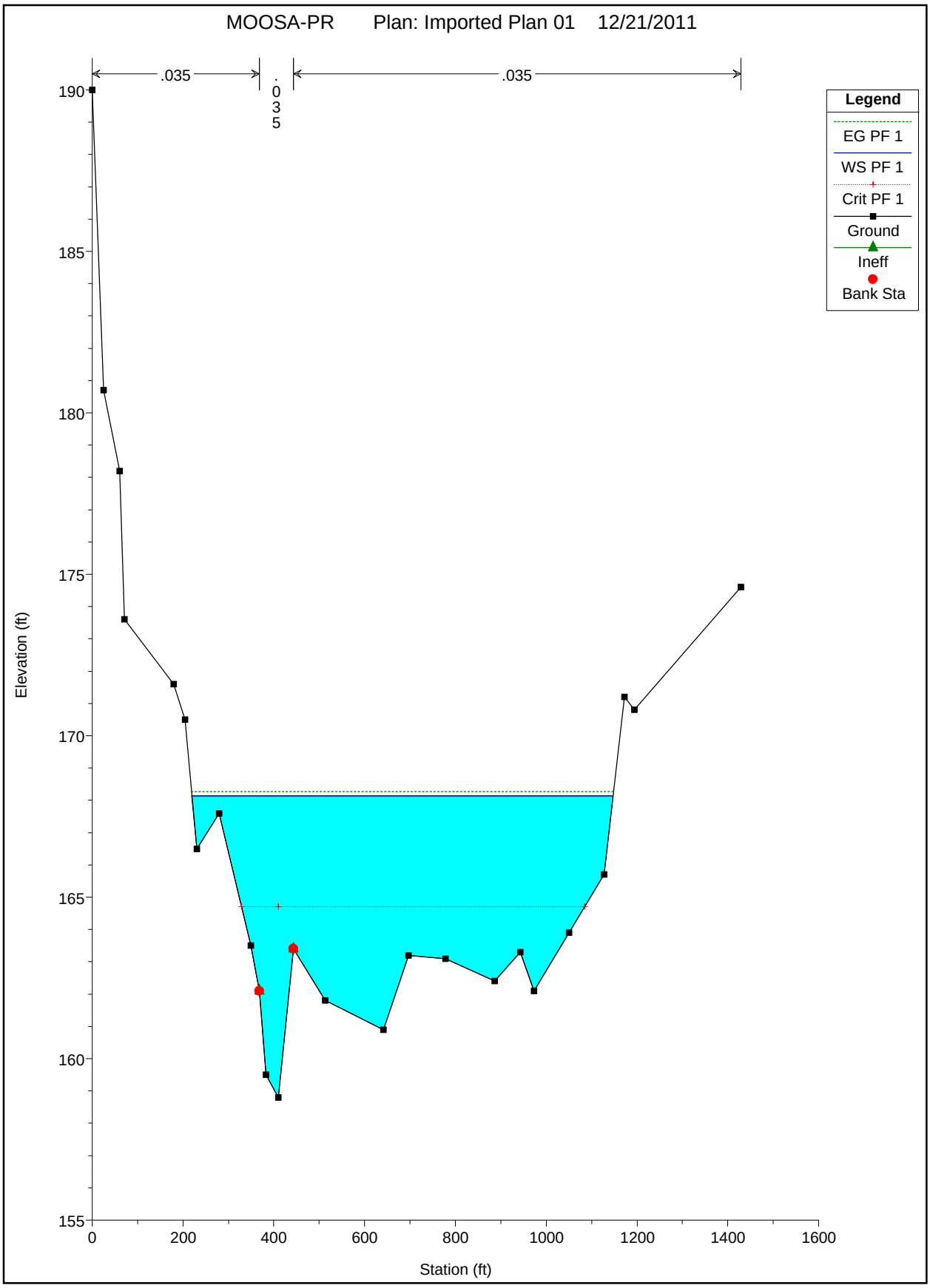
Section 0.95 - Proposed



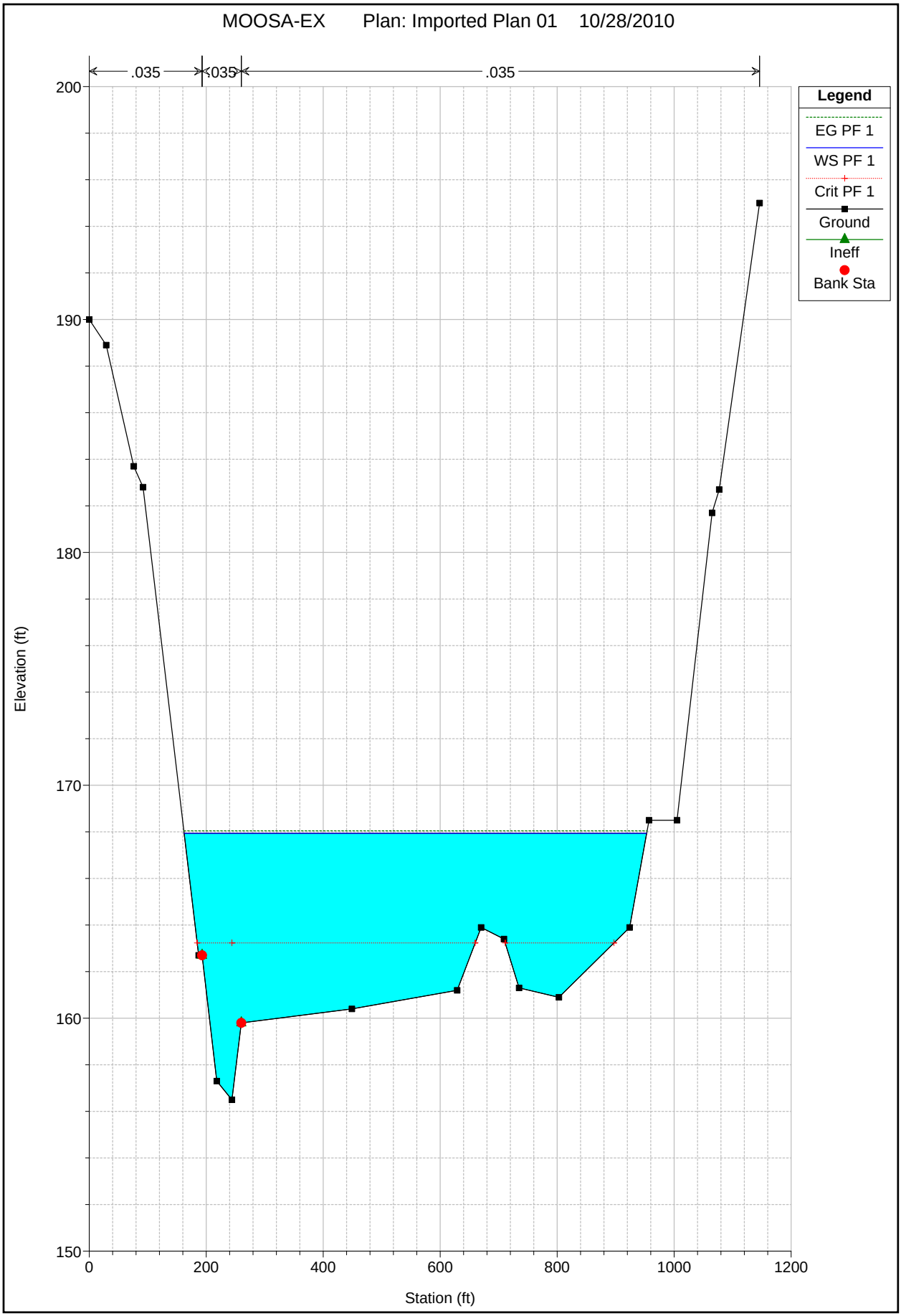
Section 0.93 - Existing



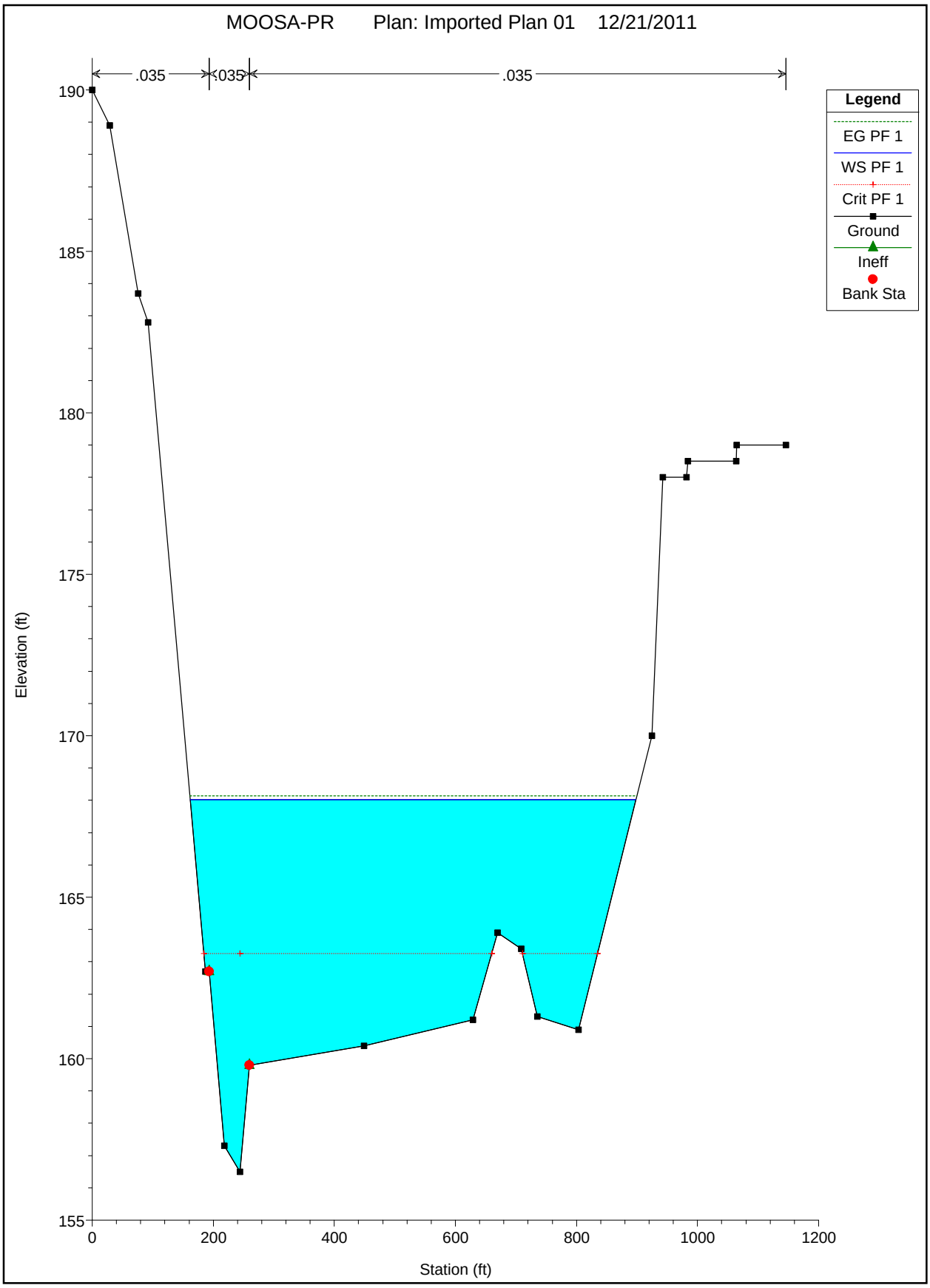
Section 0.93 - Proposed



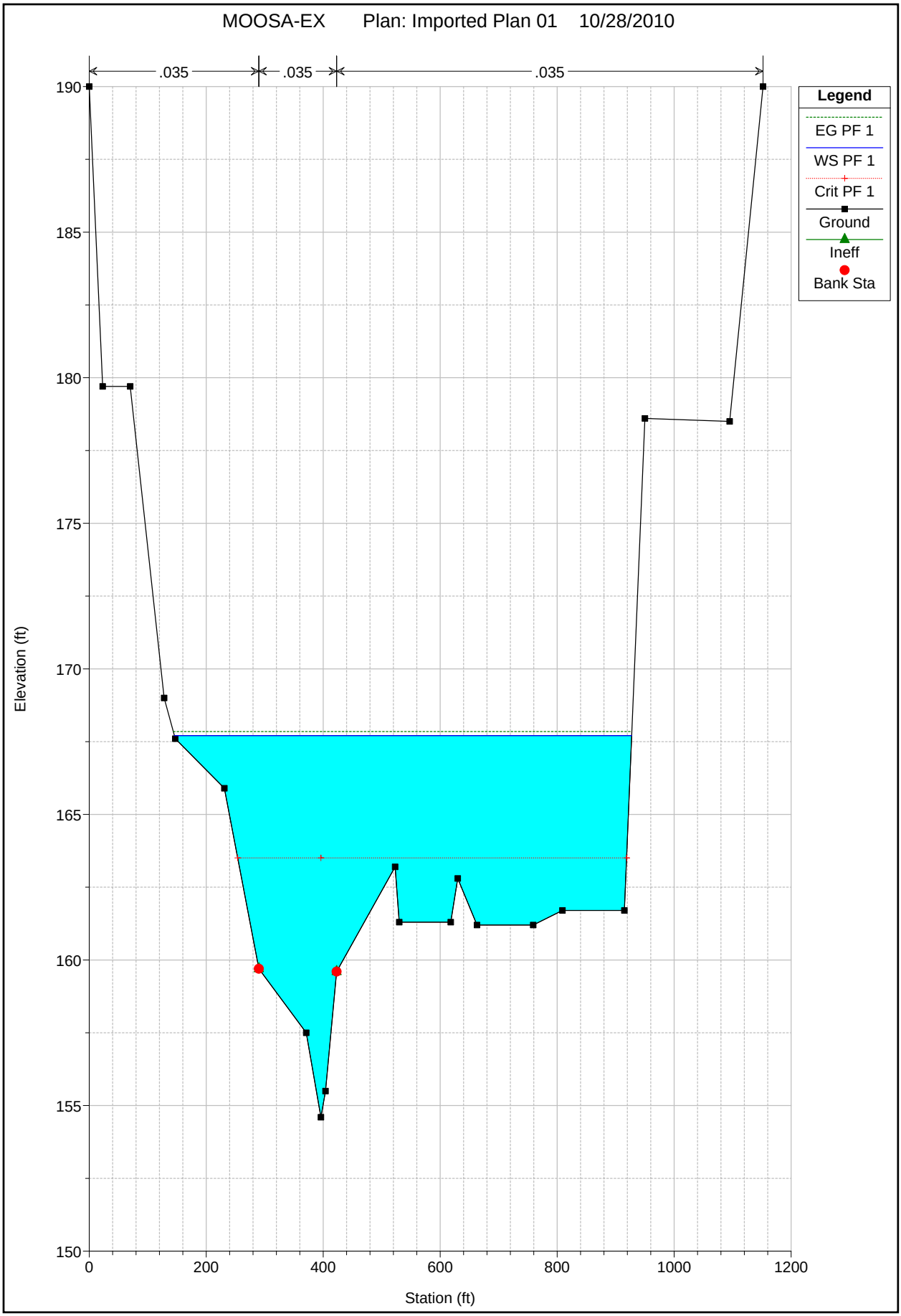
Section 0.87 - Existing



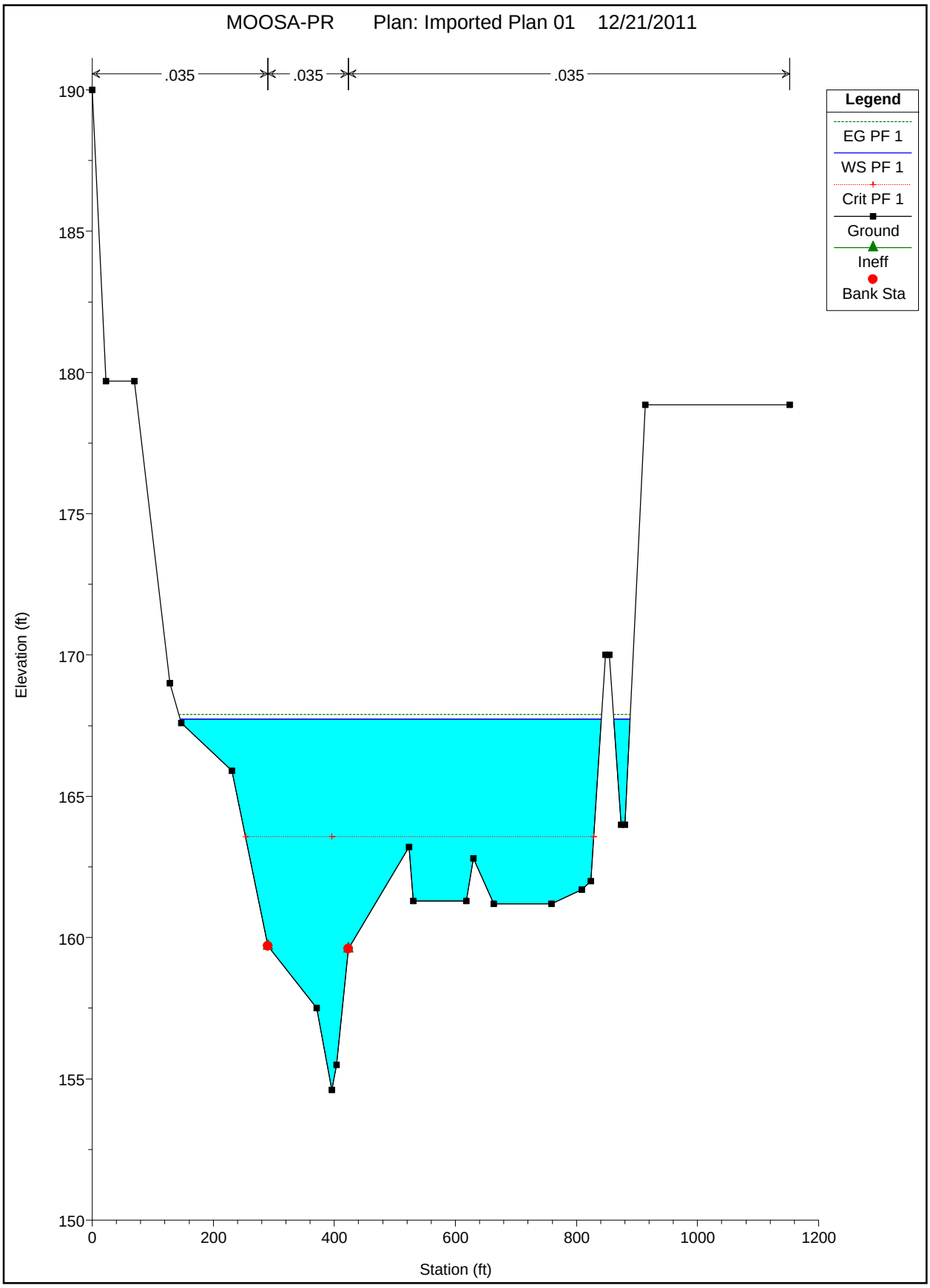
Section 0.87 - Proposed



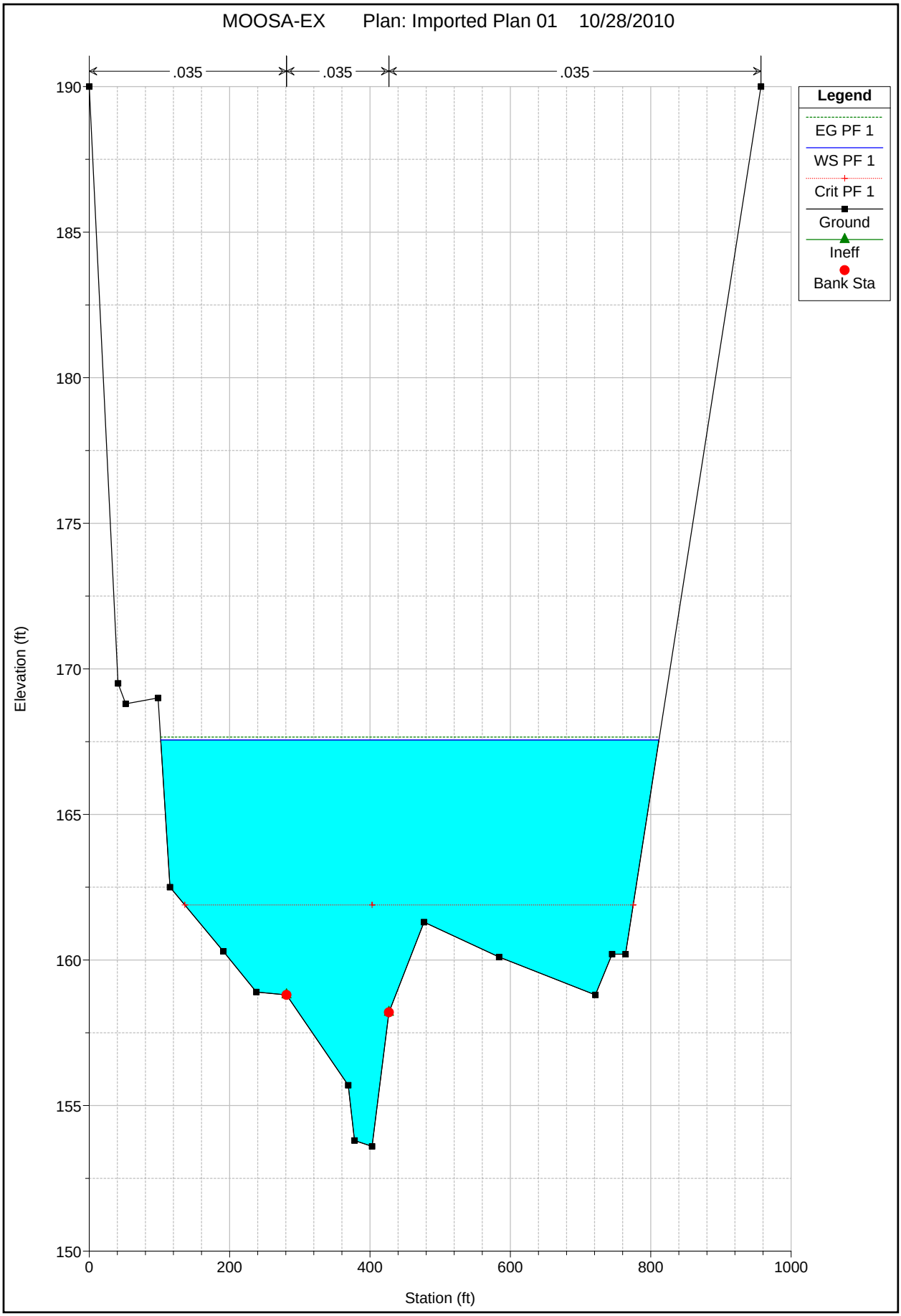
Section 0.76 - Existing



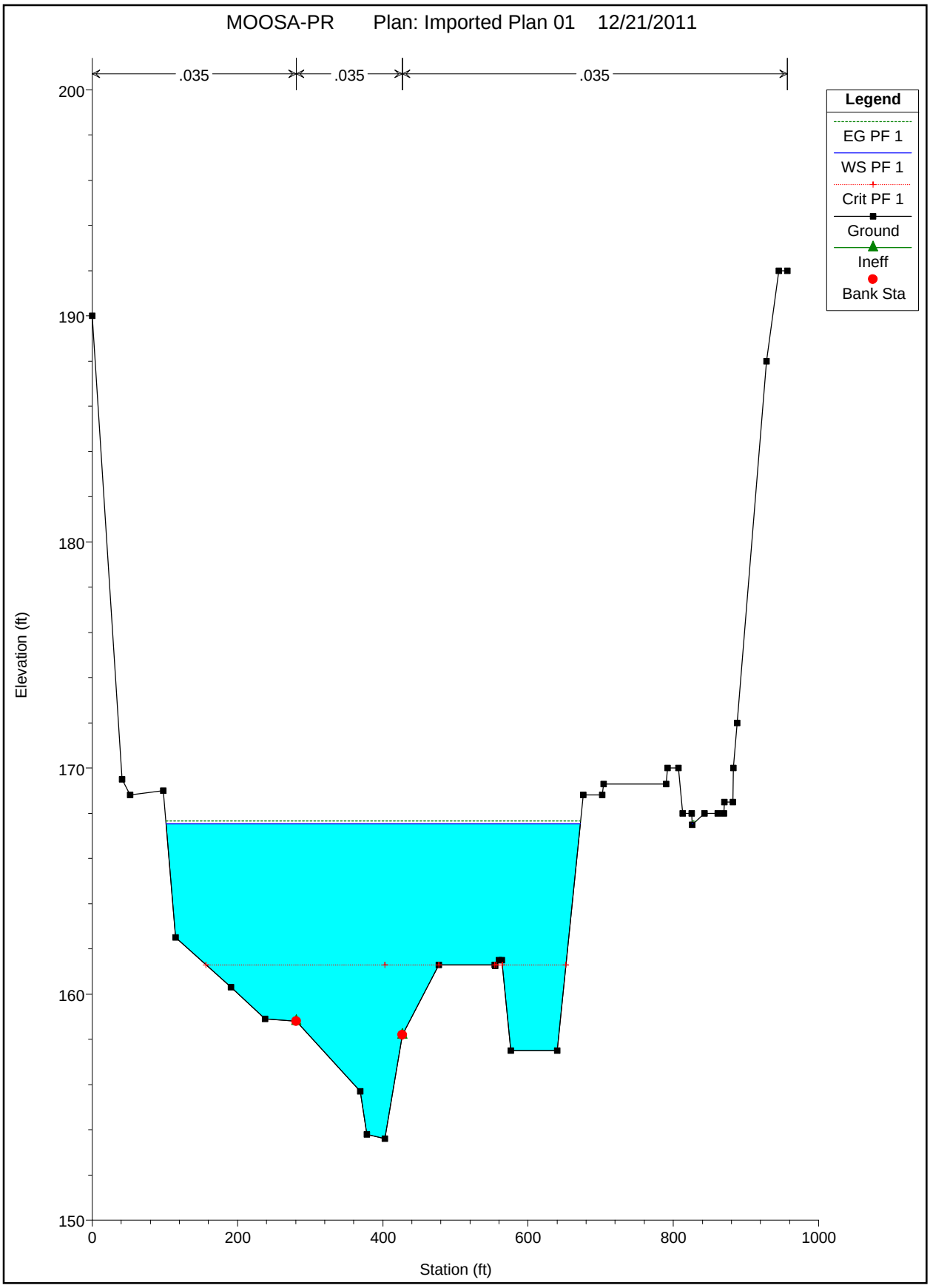
Section 0.76 - Proposed



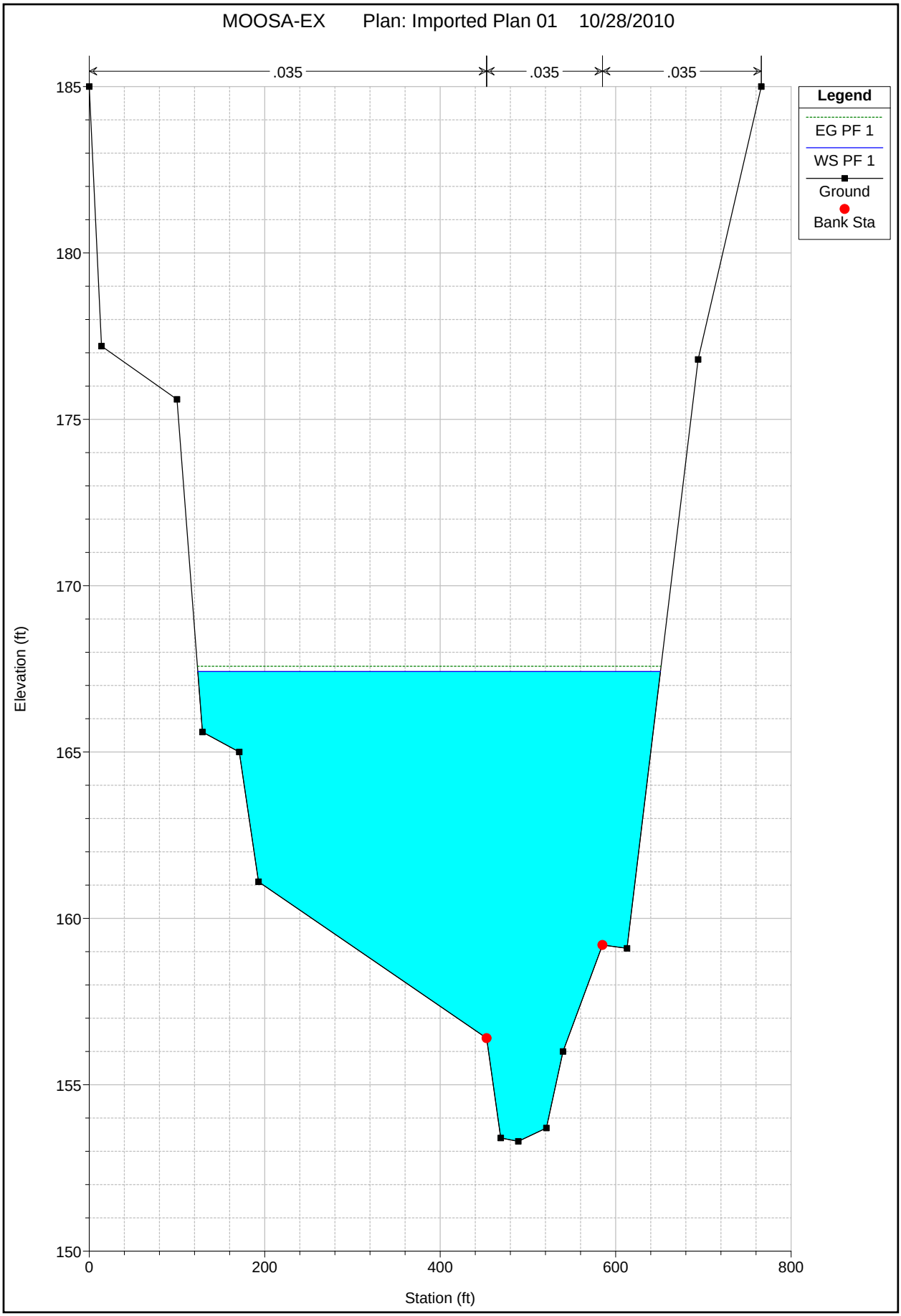
Section 0.62 - Existing



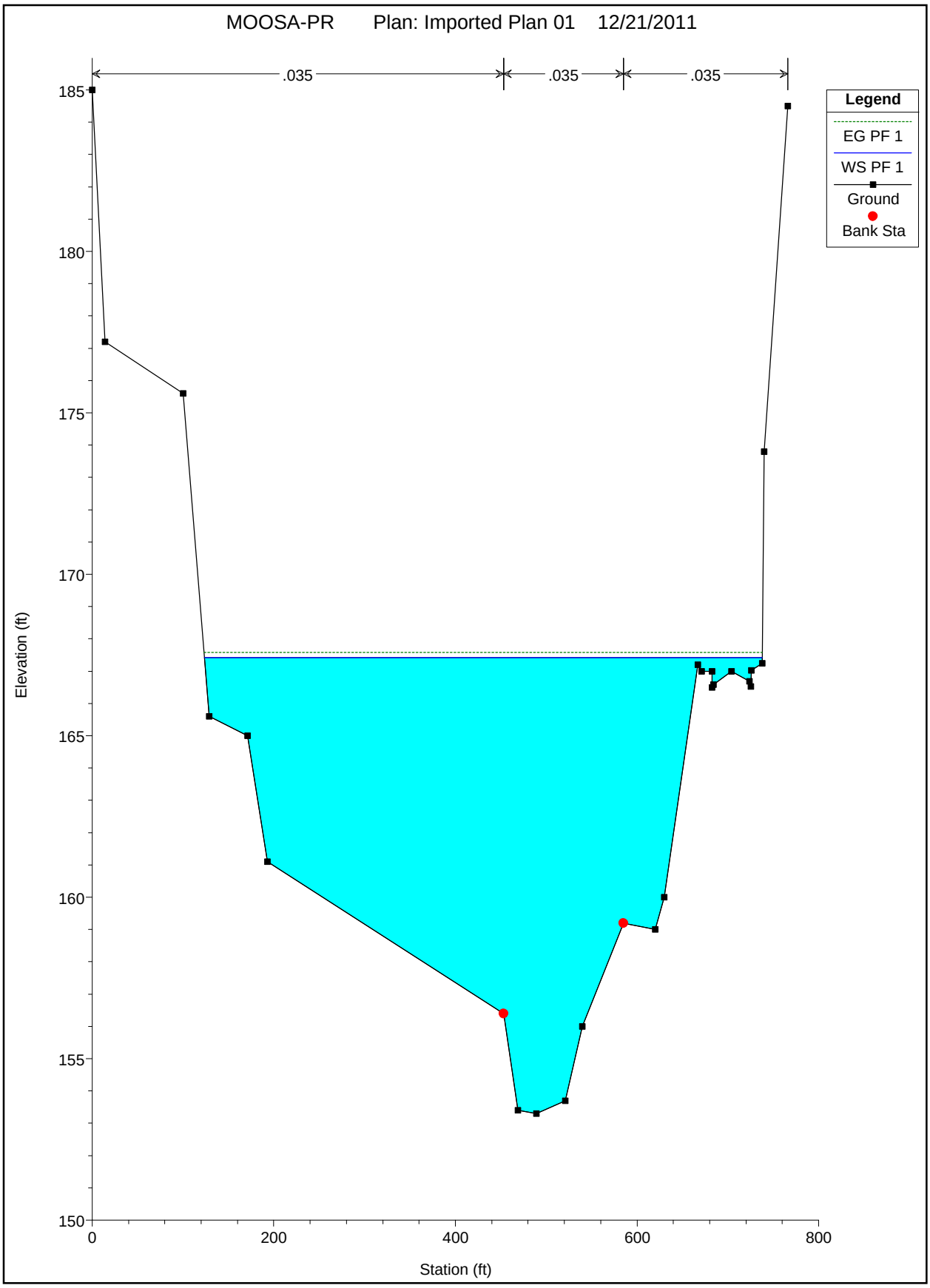
Section 0.62 - Proposed



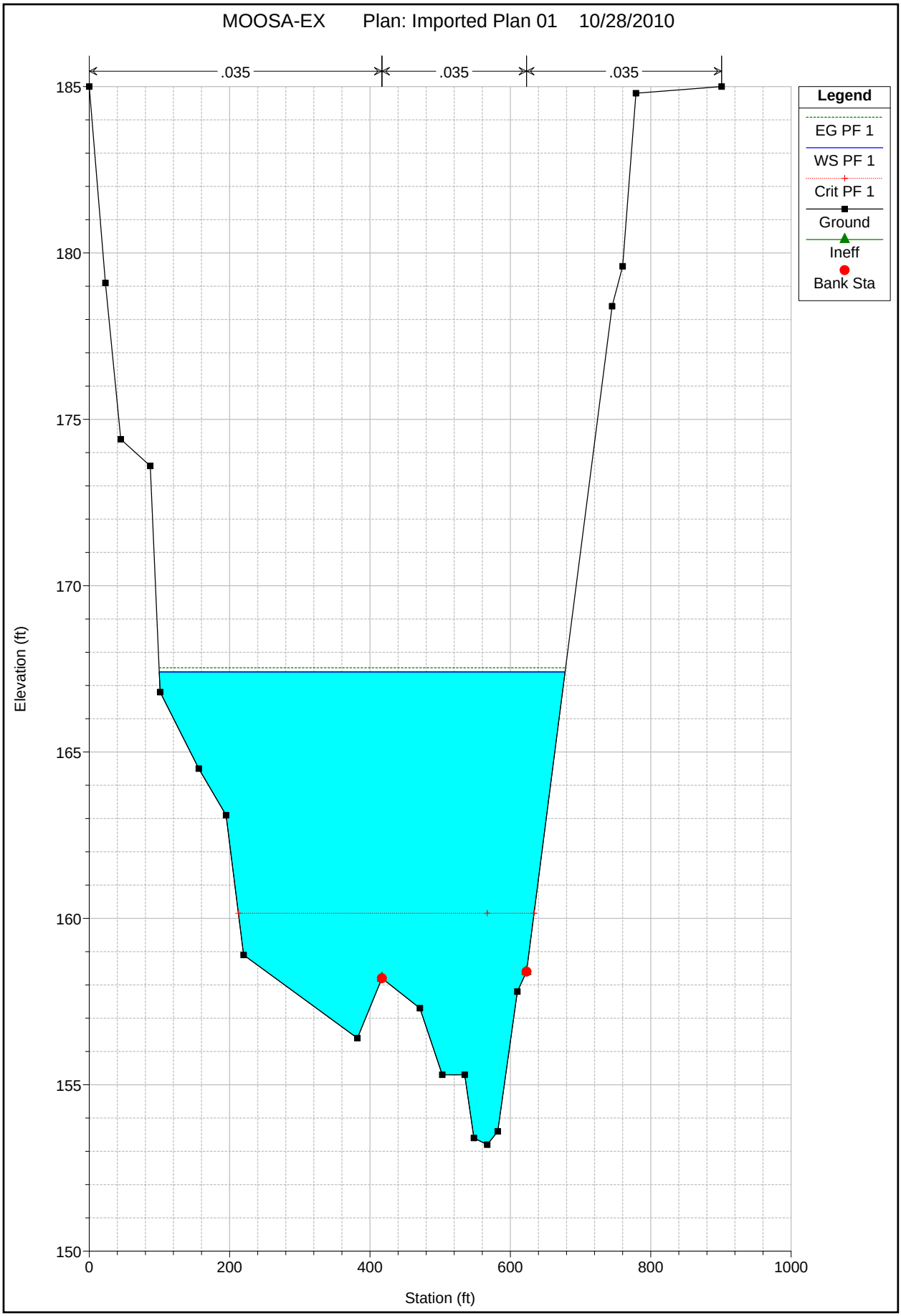
Section 0.56 - Existing



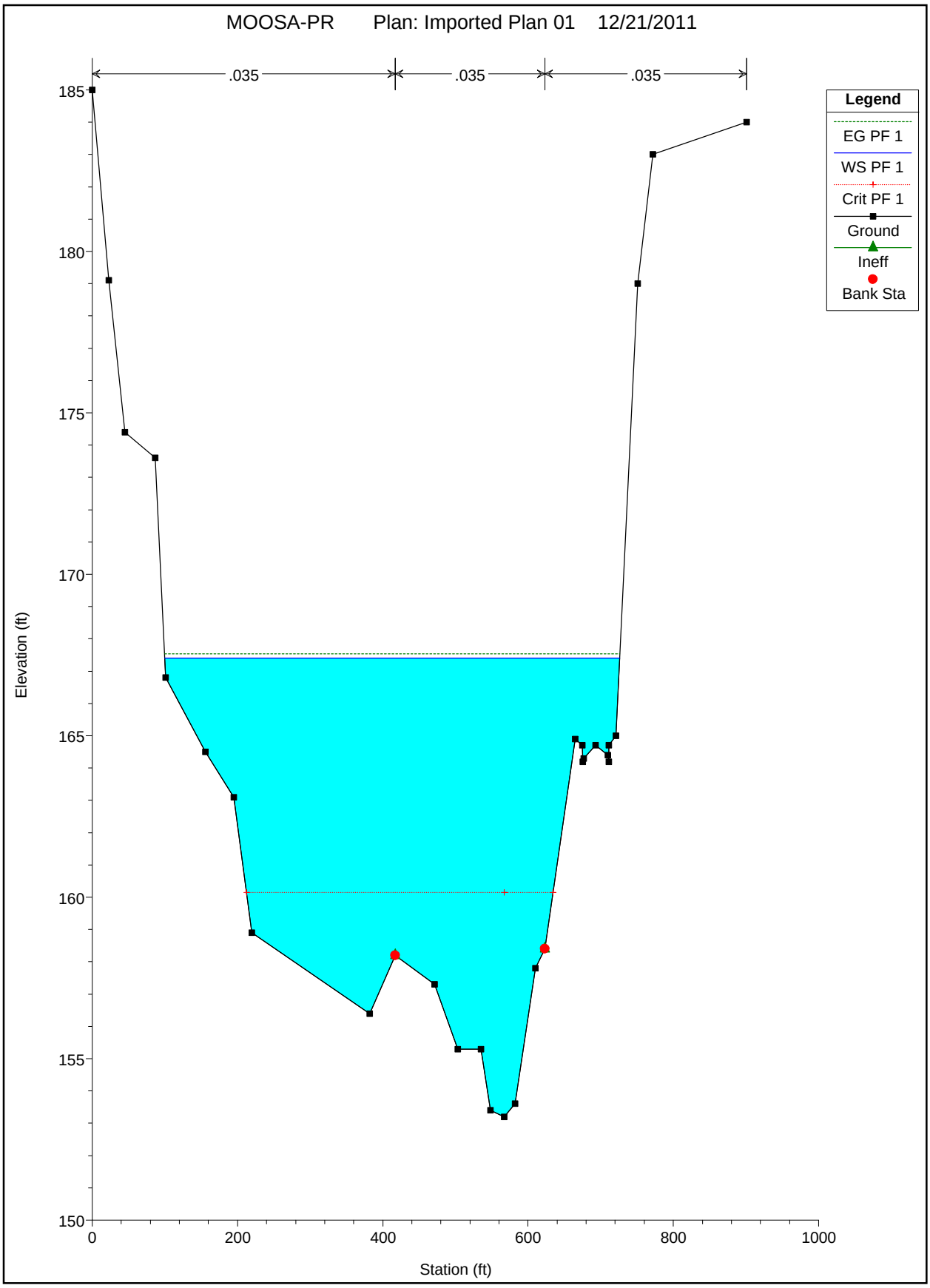
Section 0.56 - Proposed



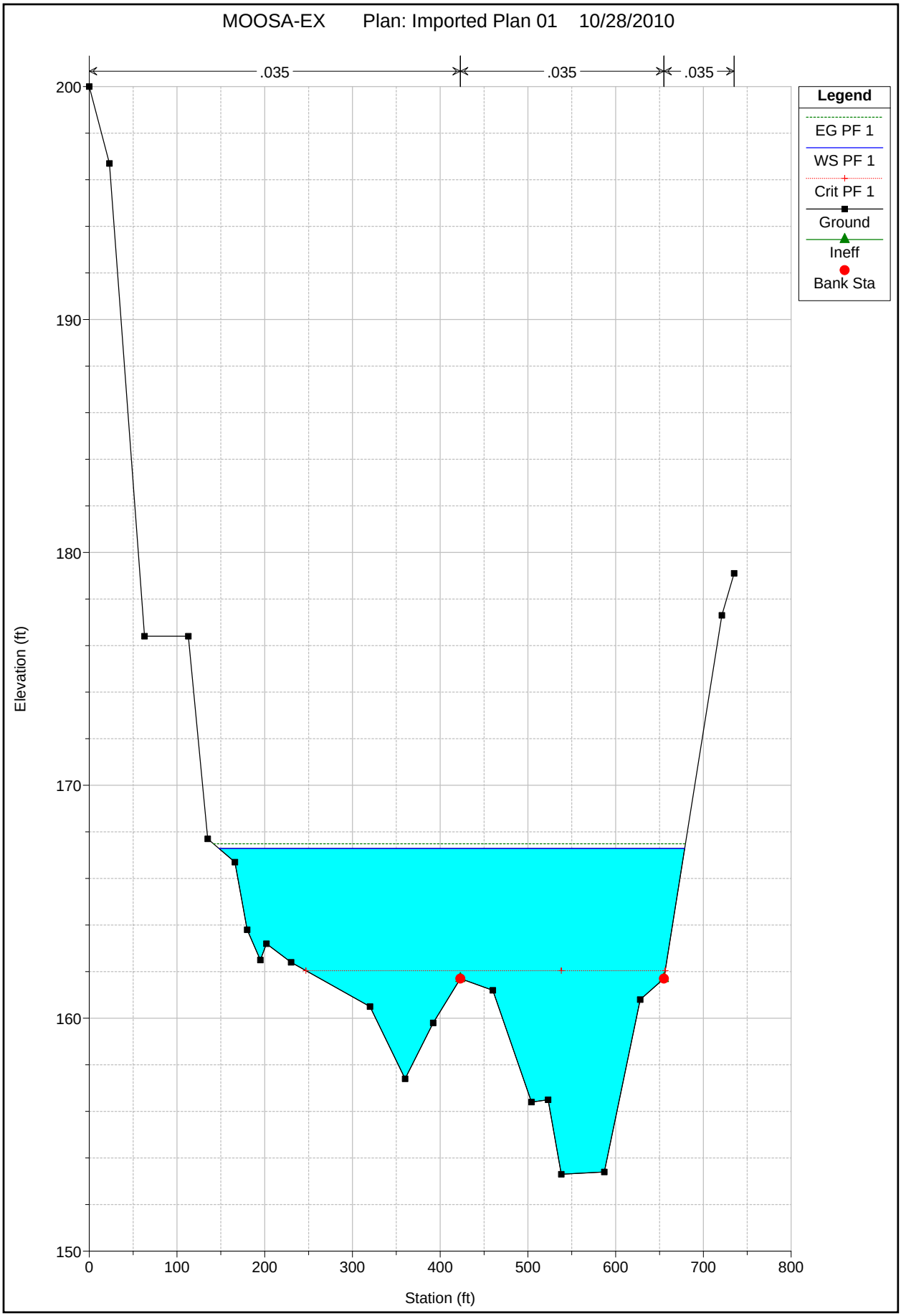
Section 0.54- Existing



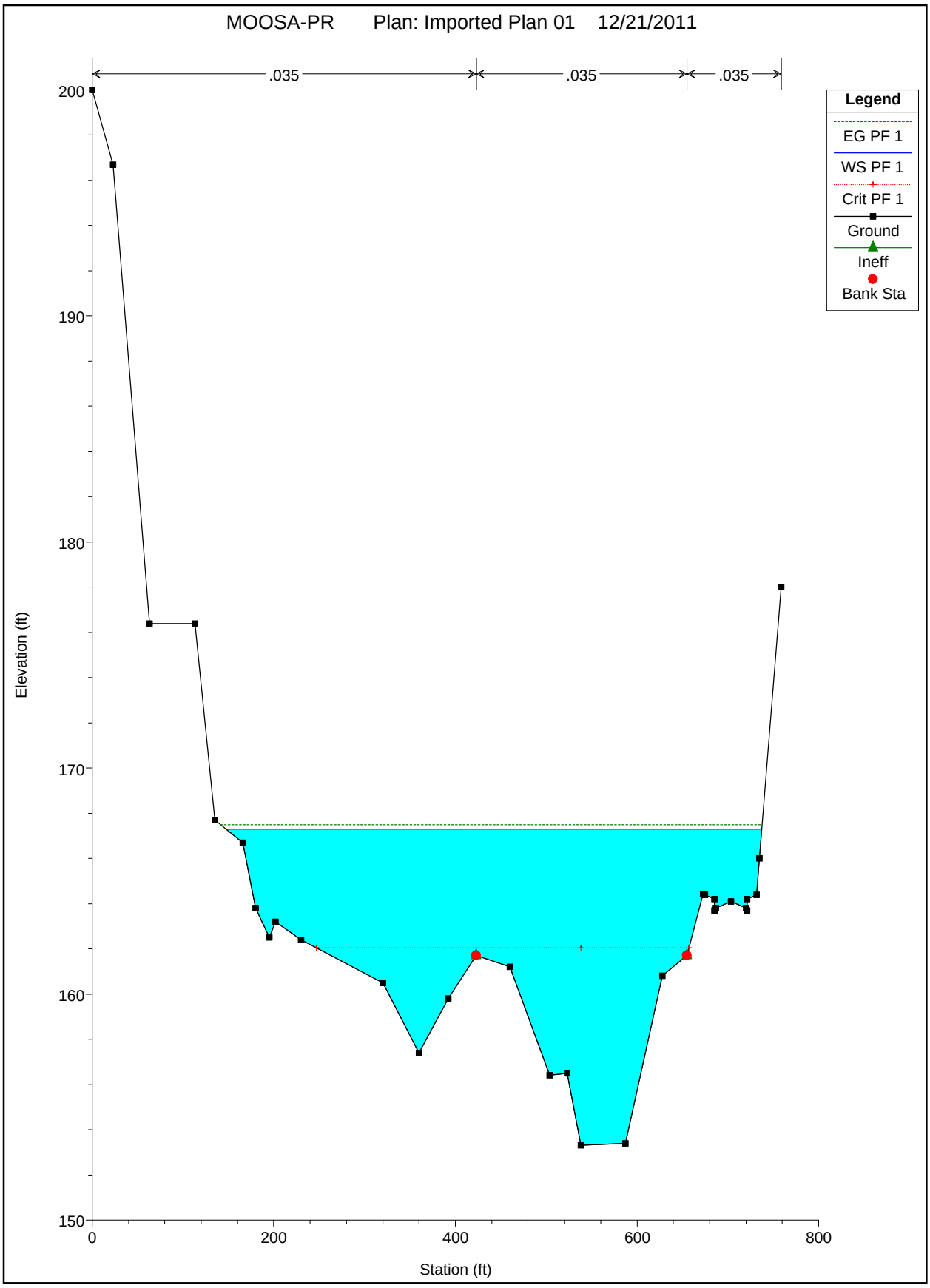
Section 0.54 - Proposed



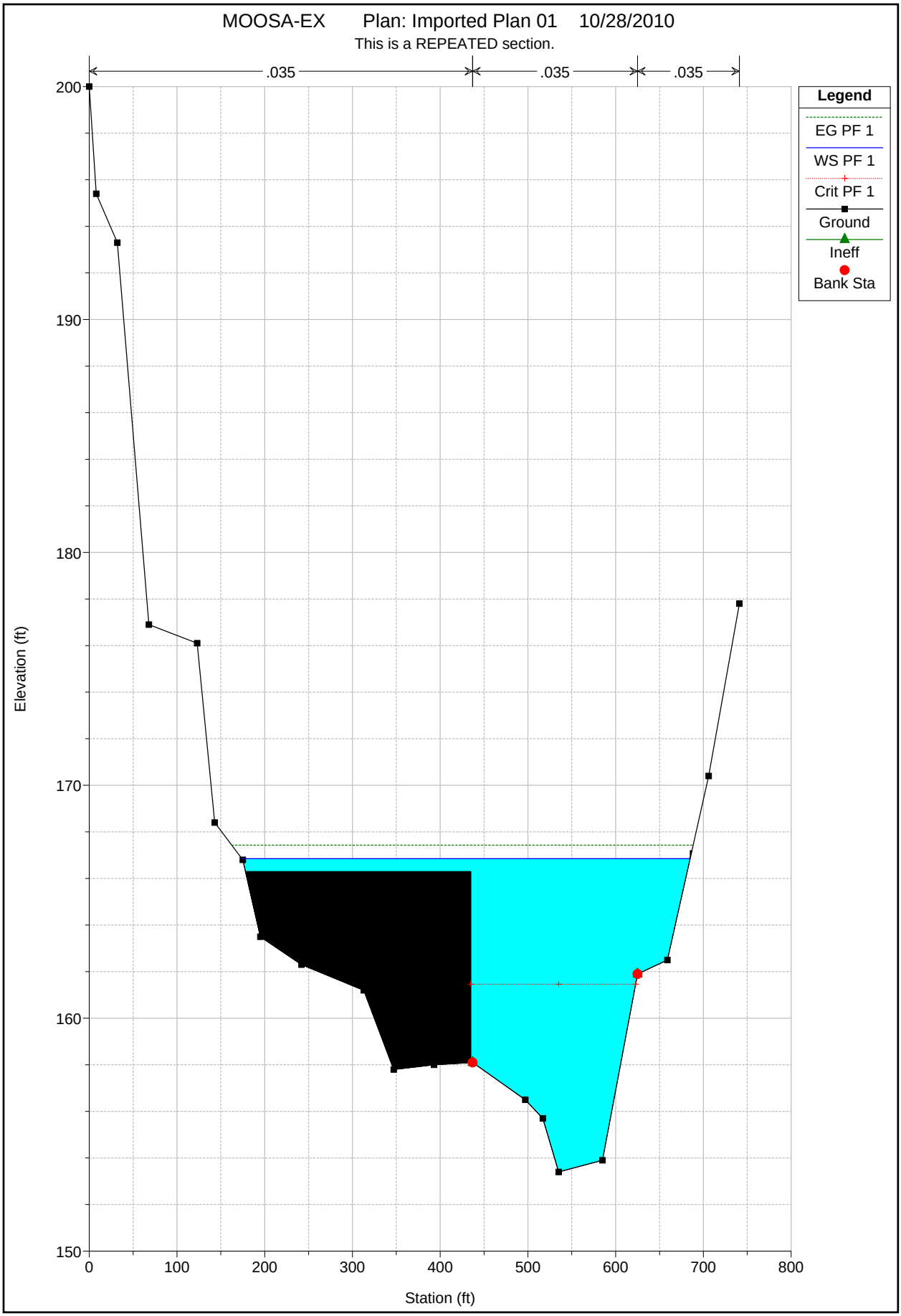
Section 0.52 - Existing



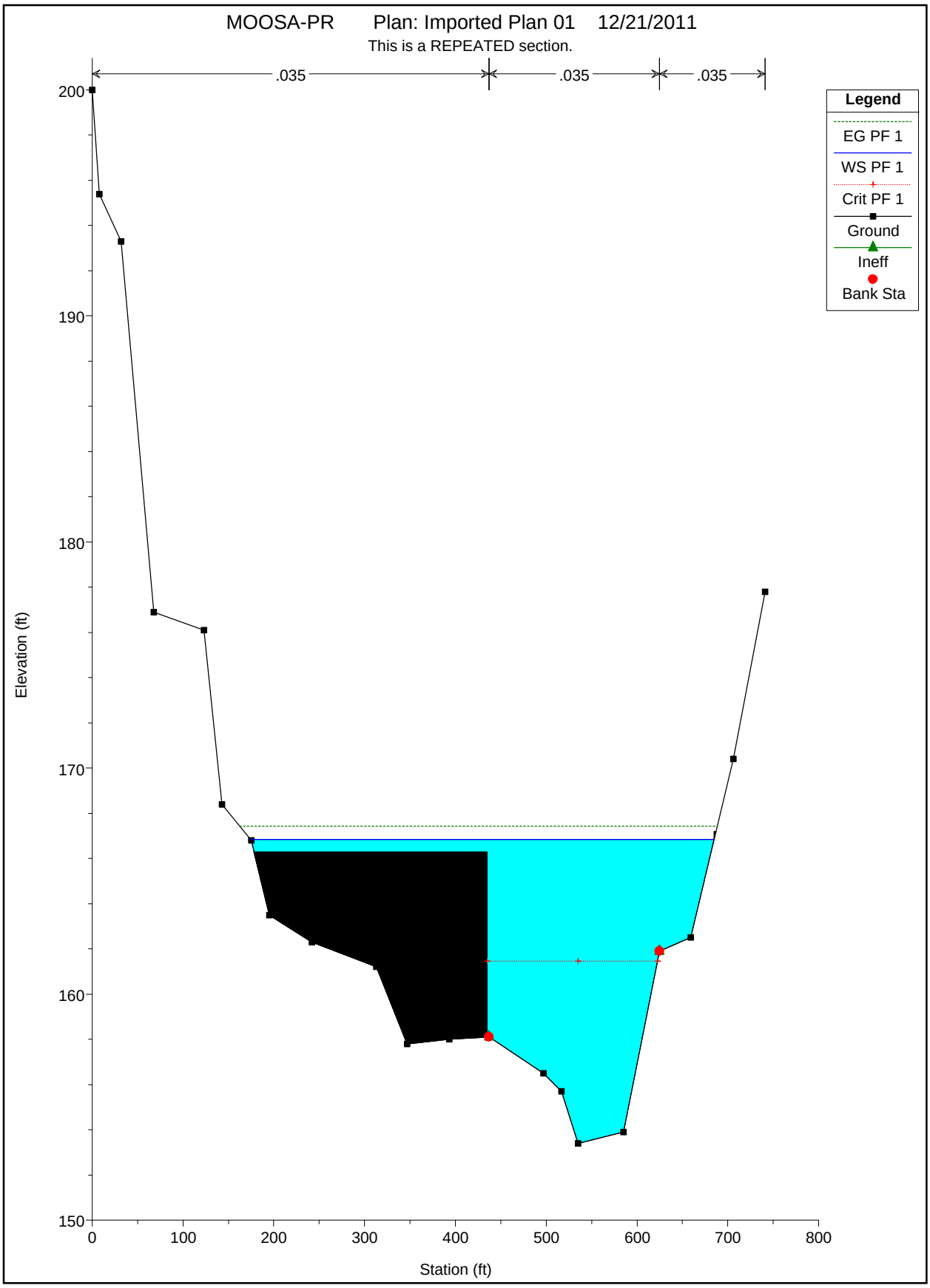
Section 0.52 - Proposed



Section 0.51 - Existing



Section 0.51 - Proposed



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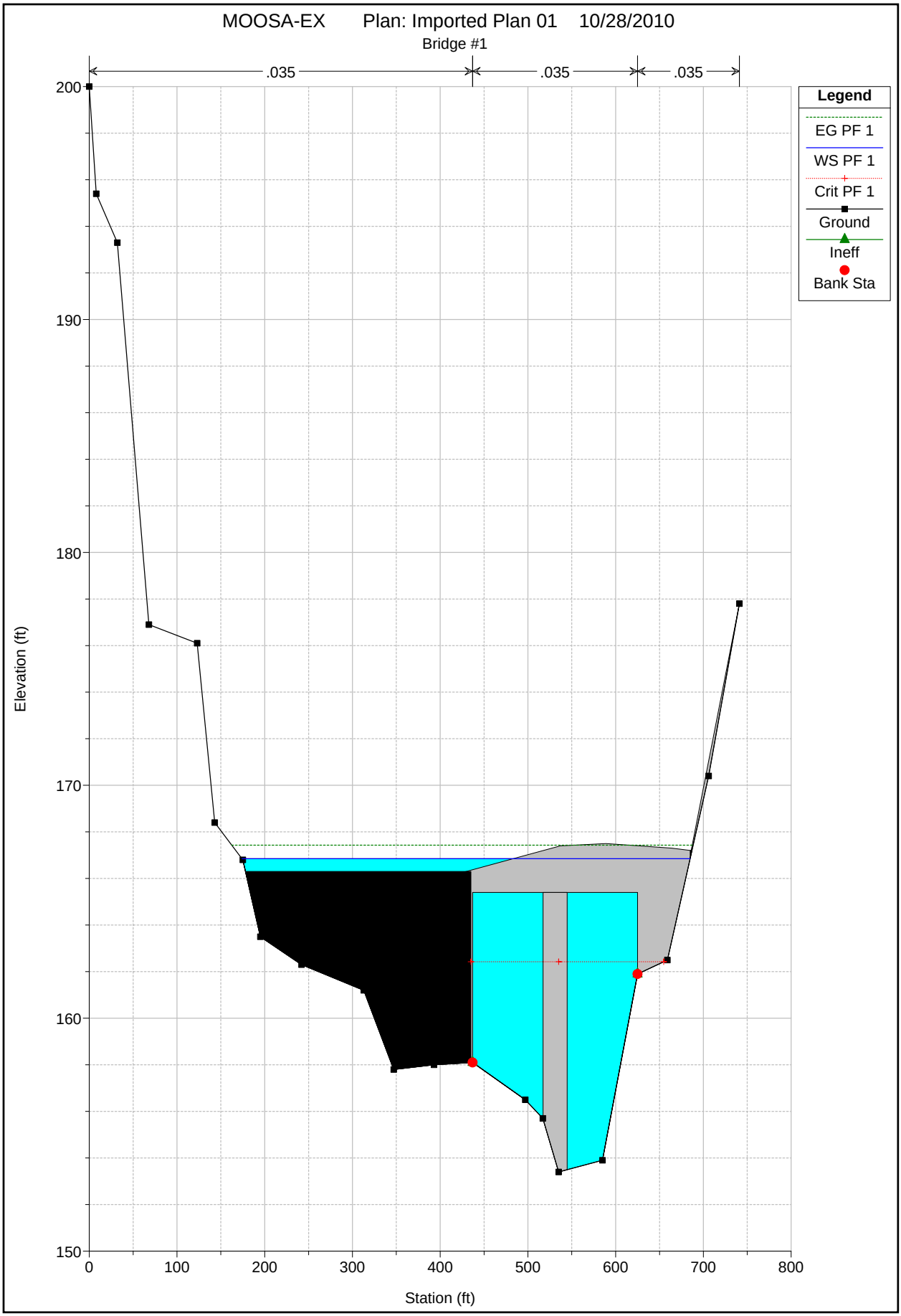

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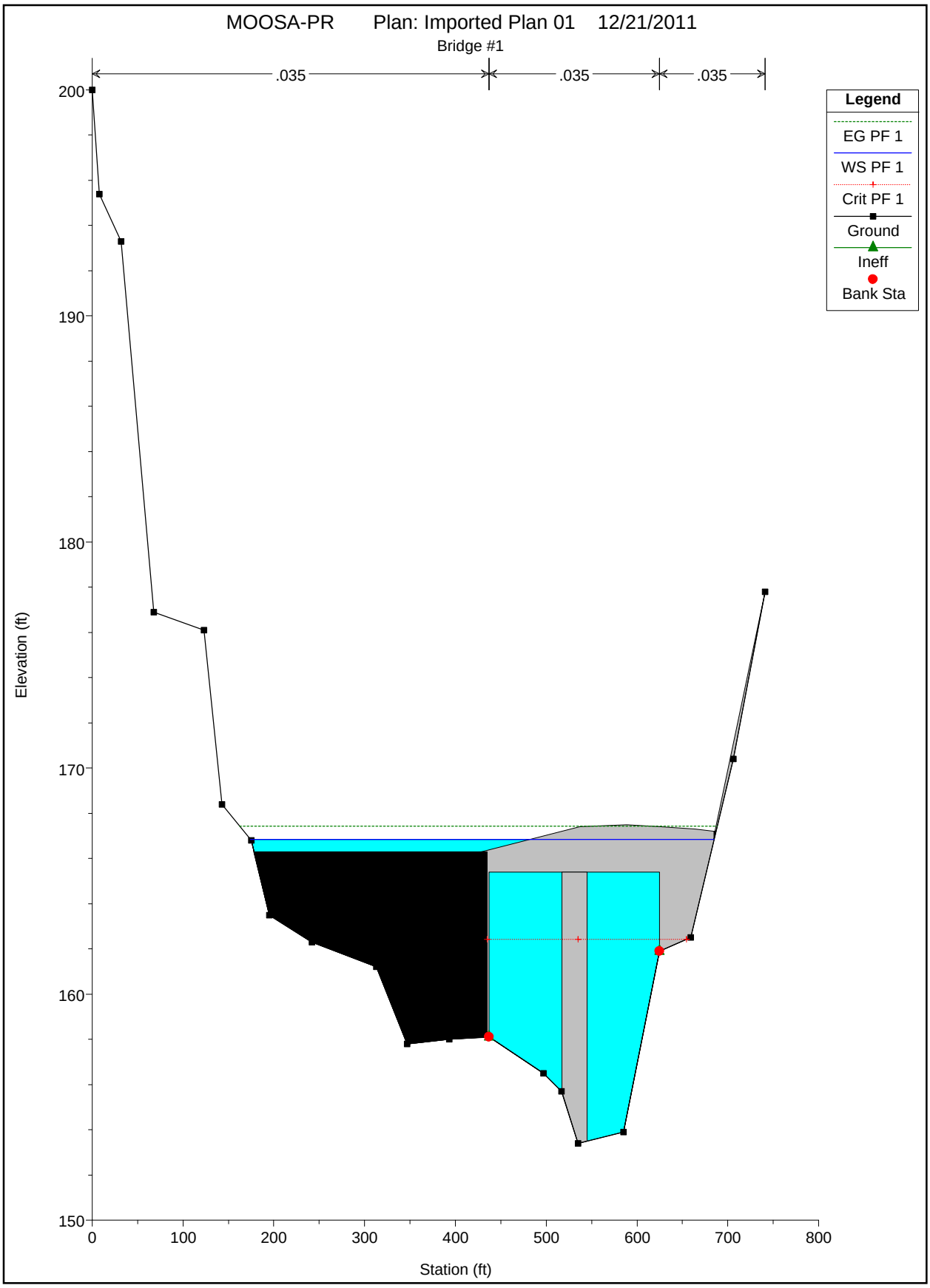

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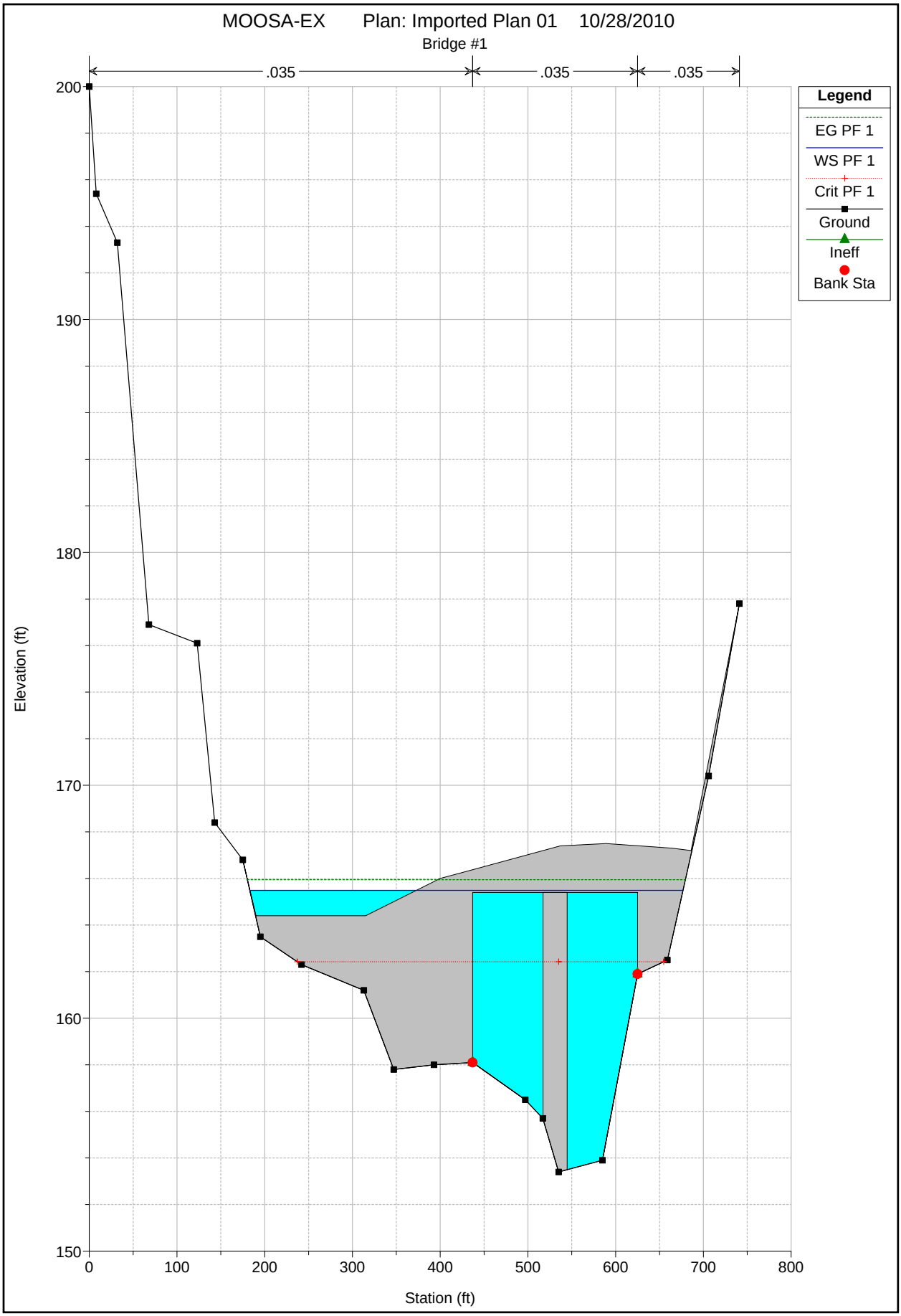

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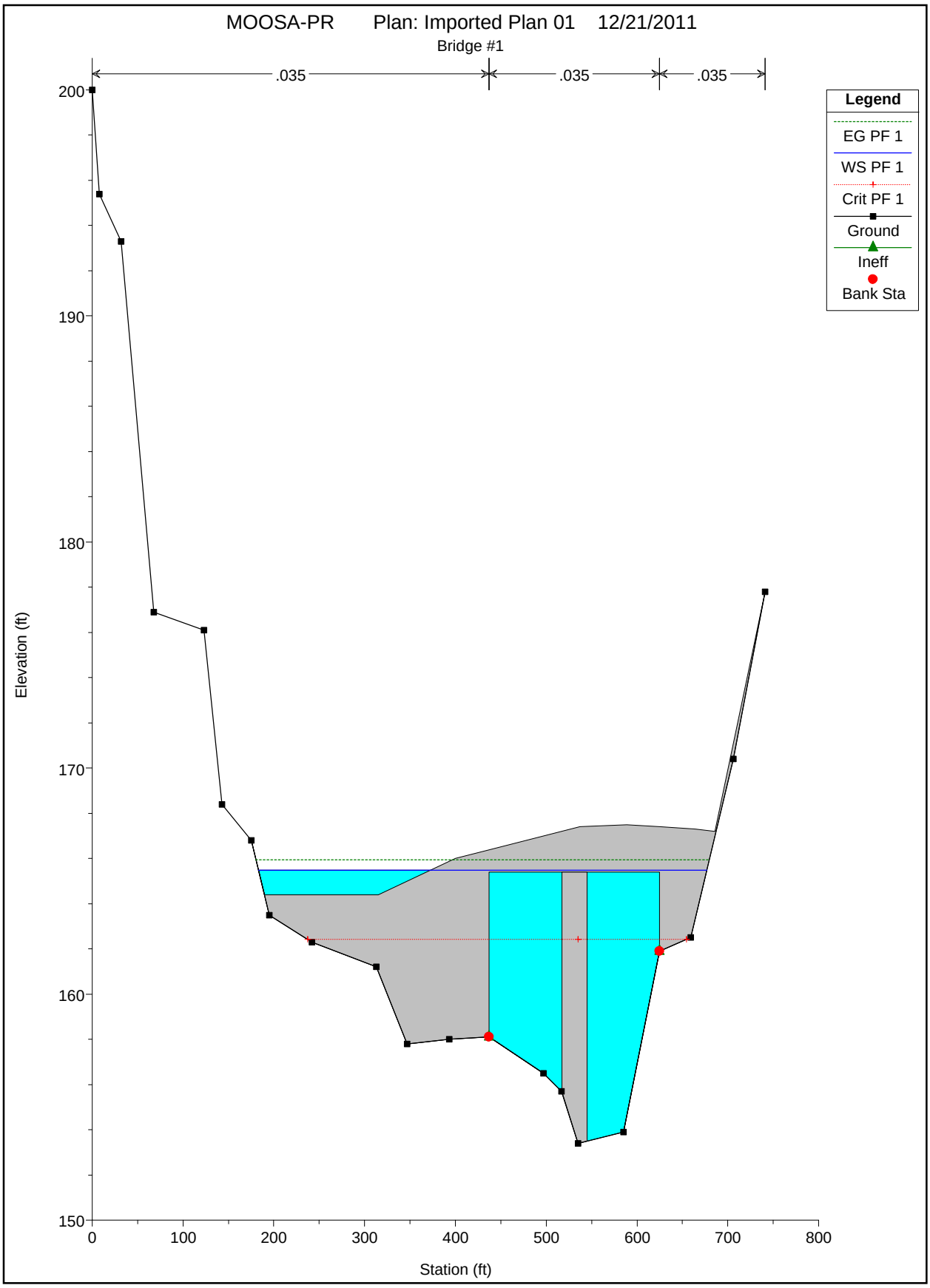

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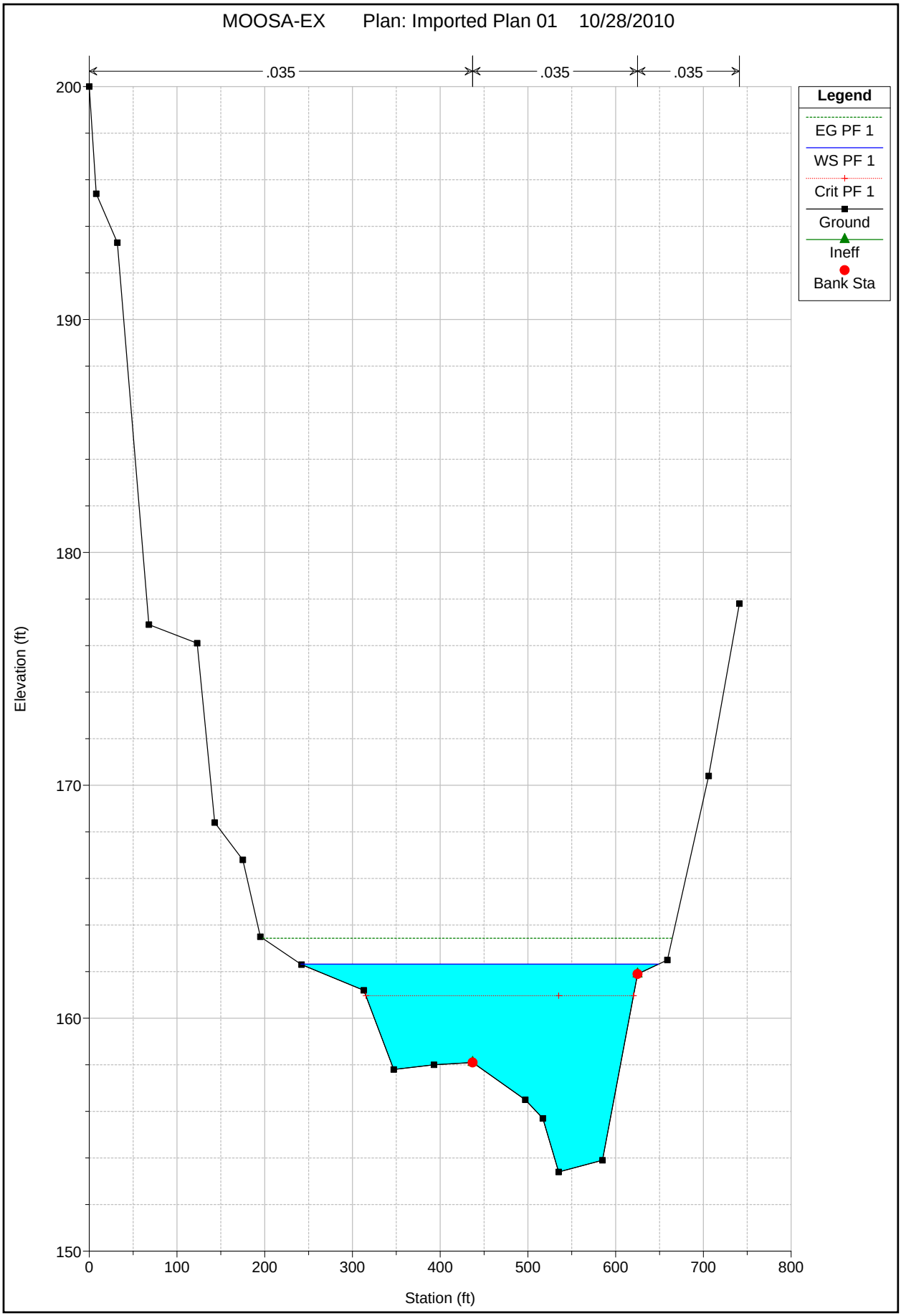

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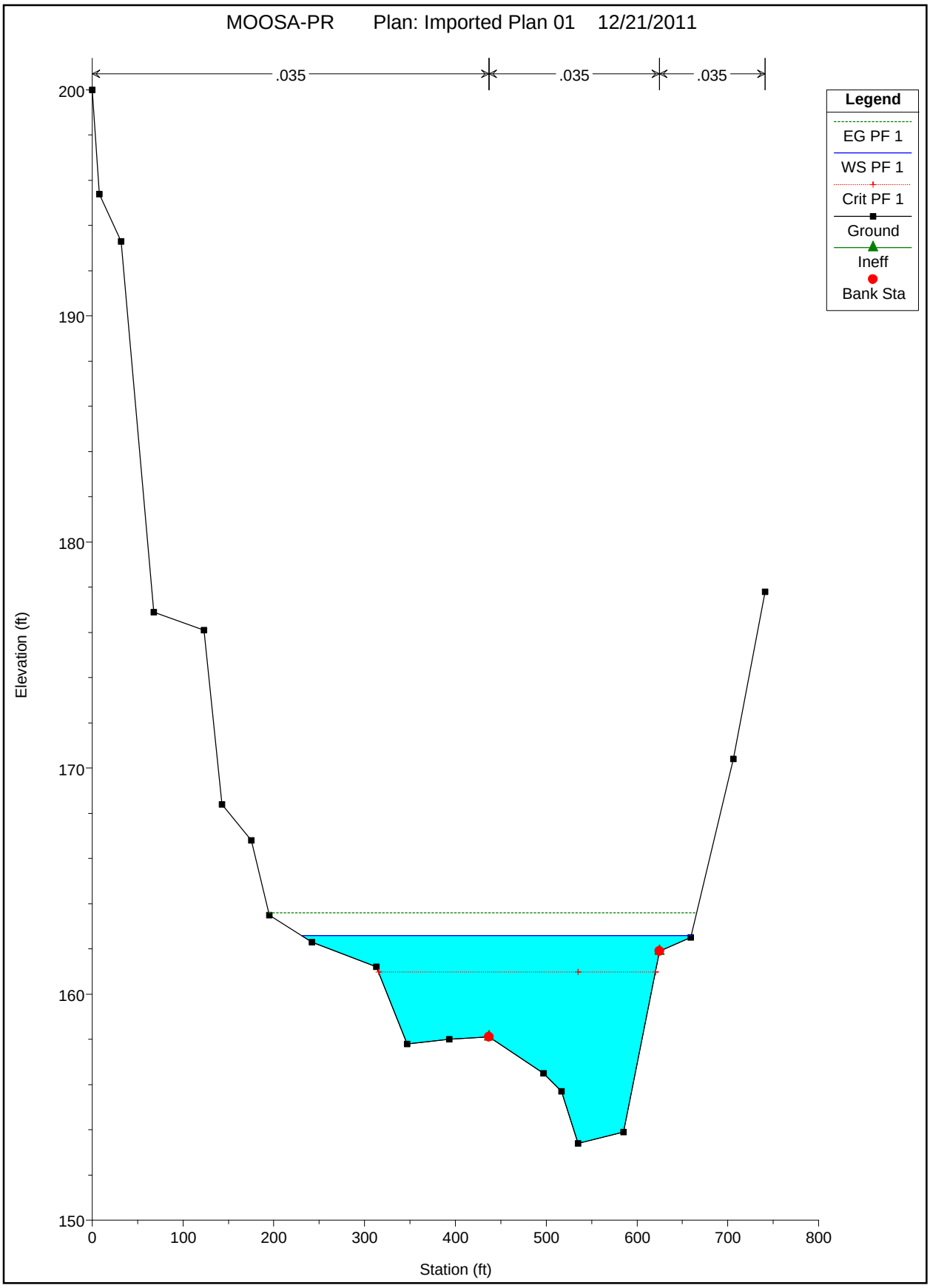

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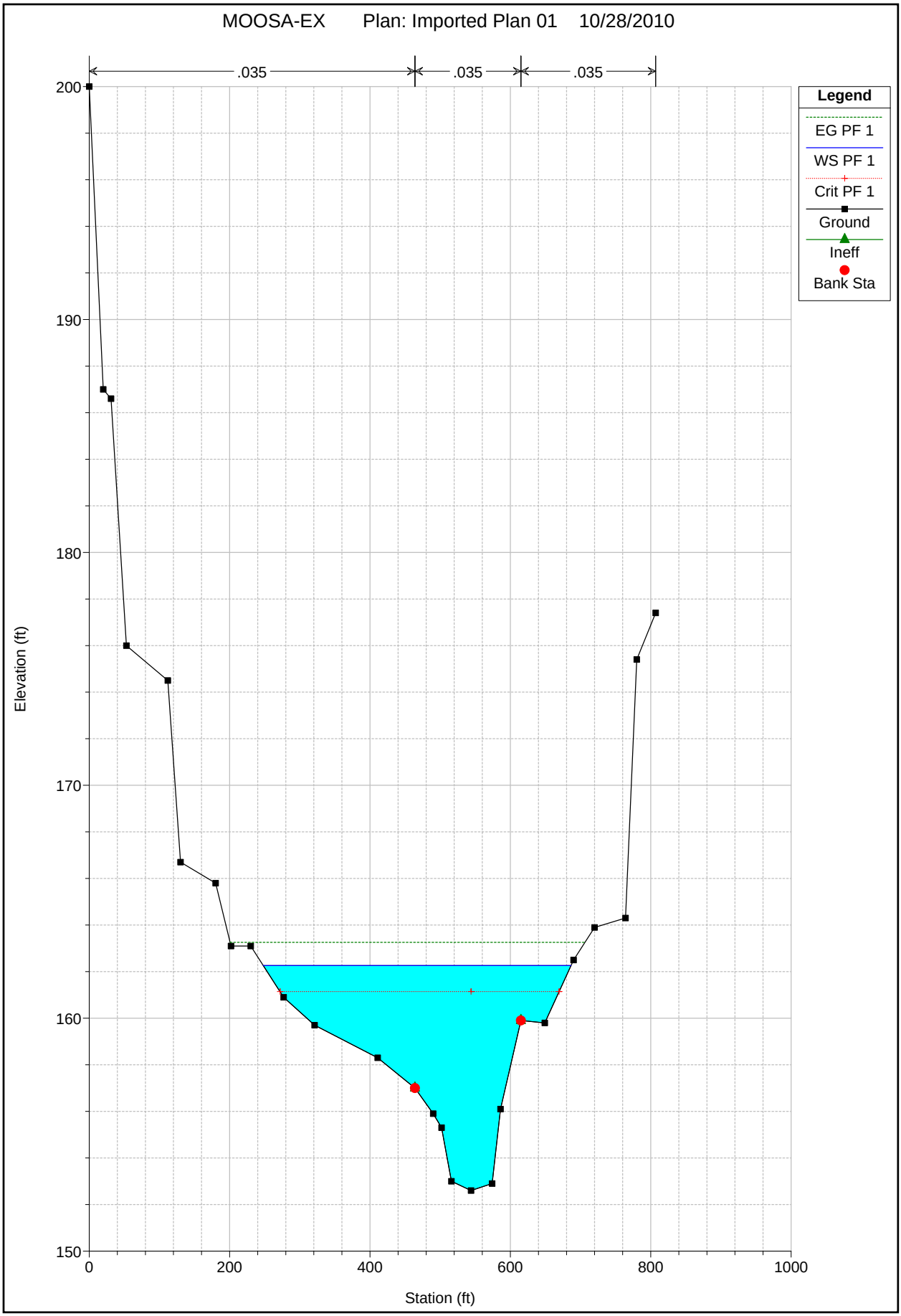

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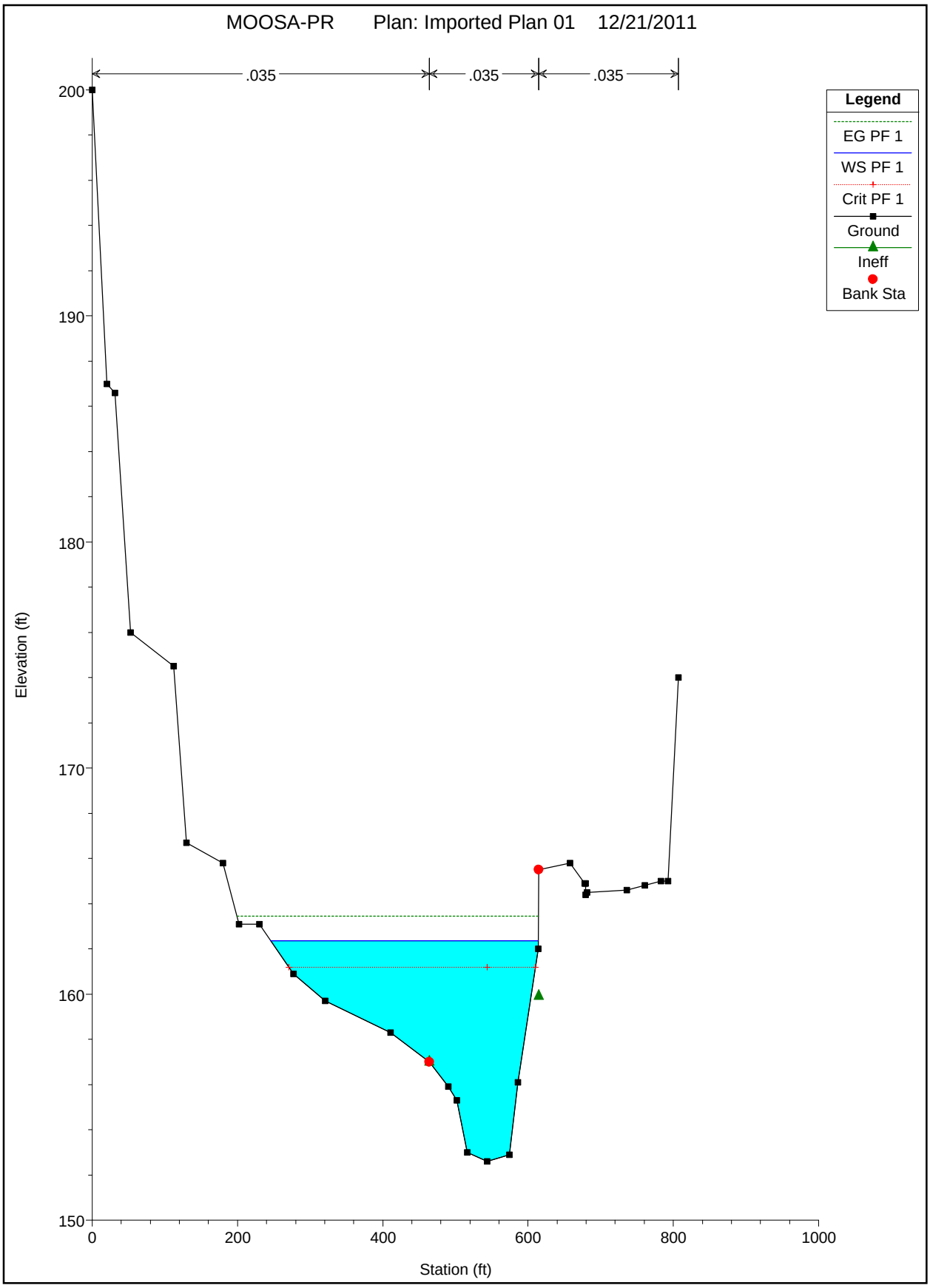

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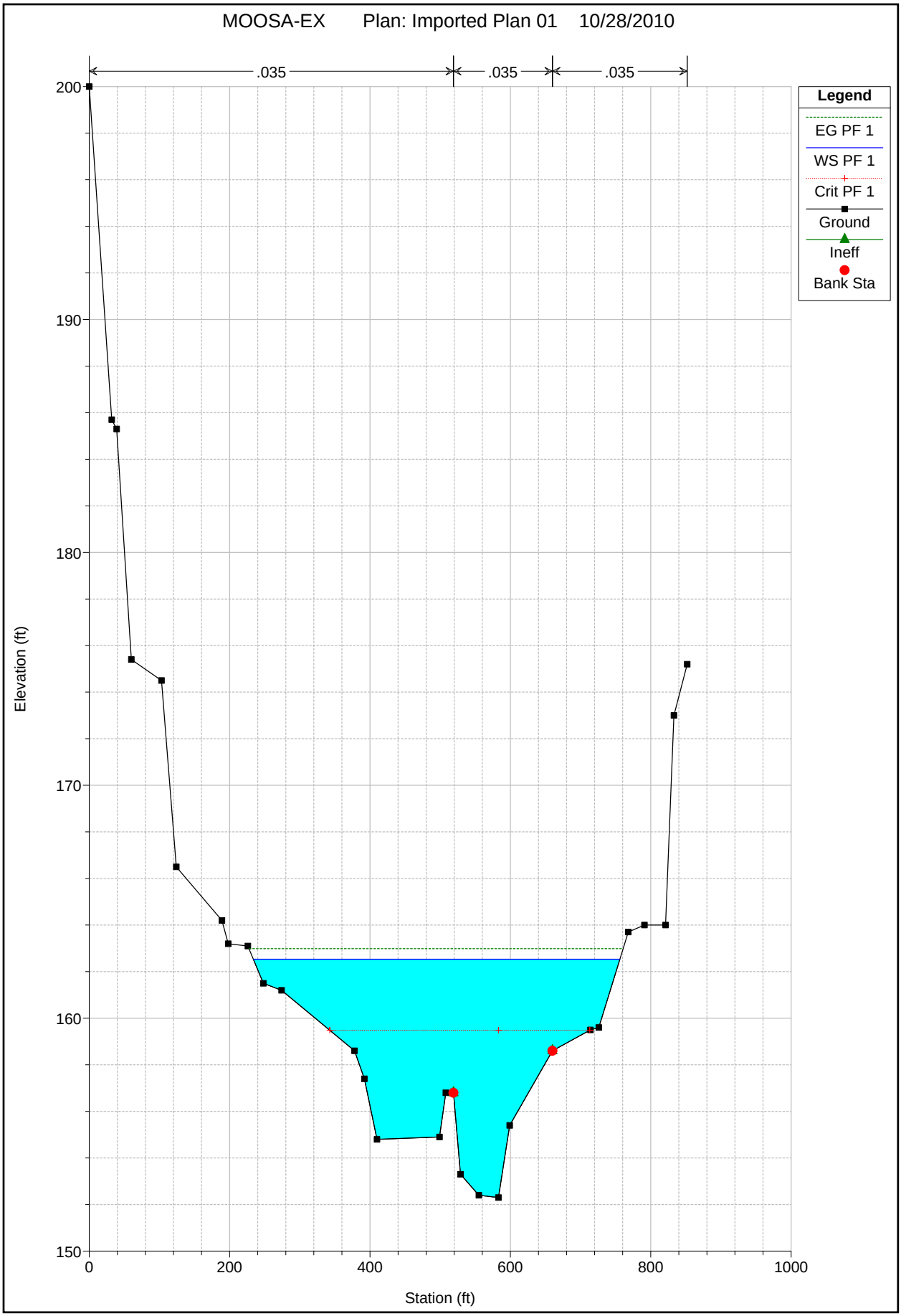

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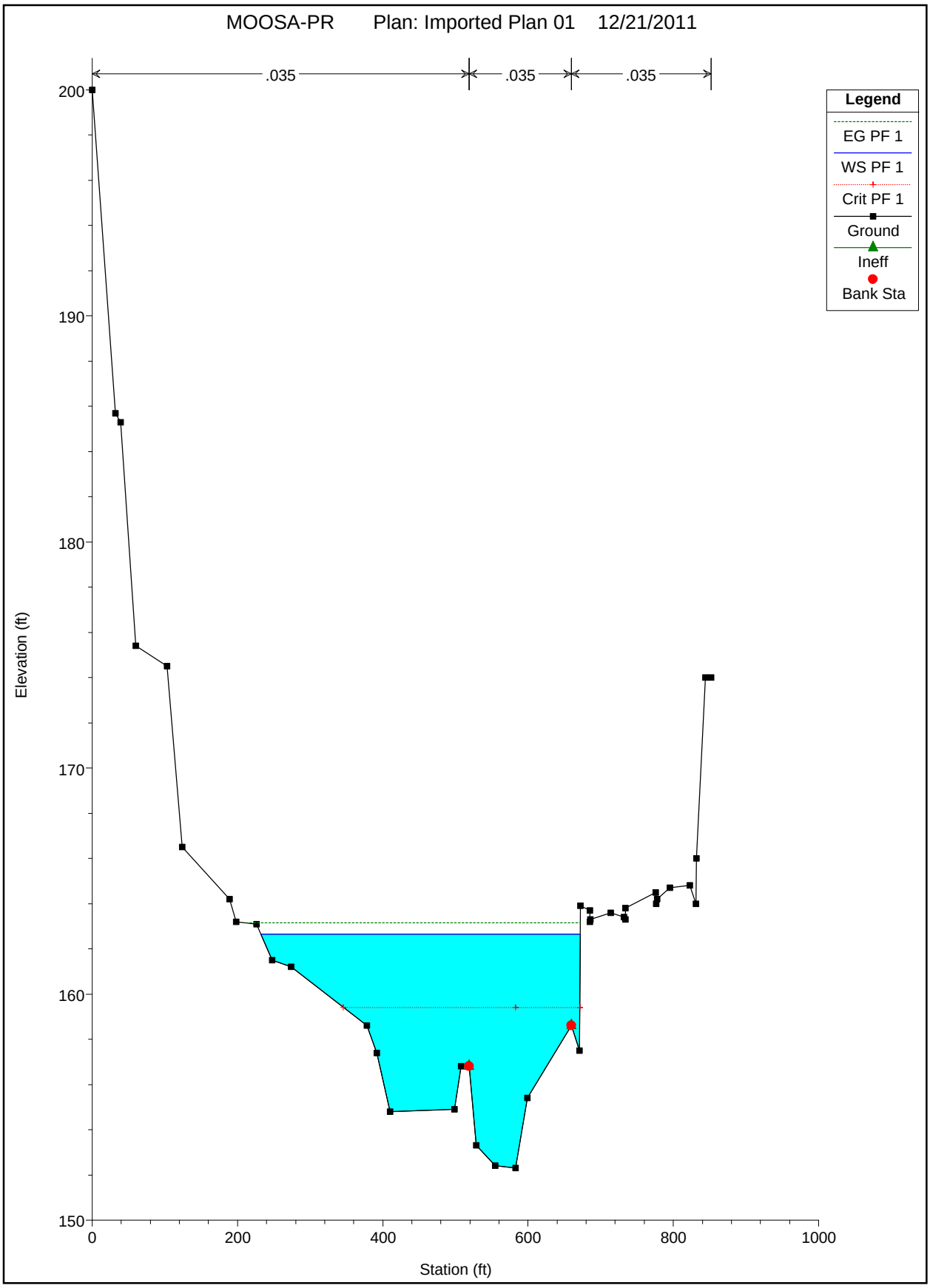

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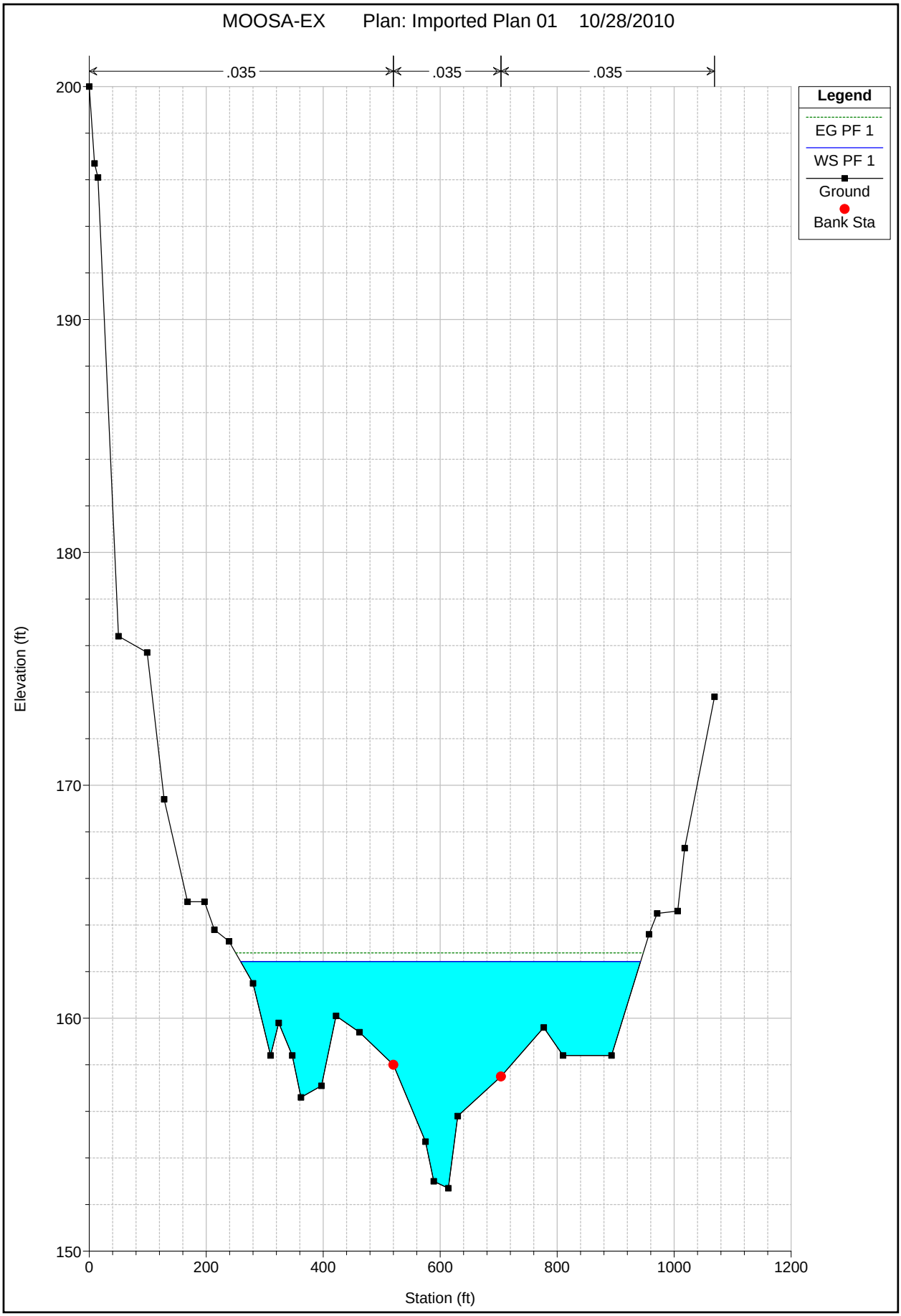

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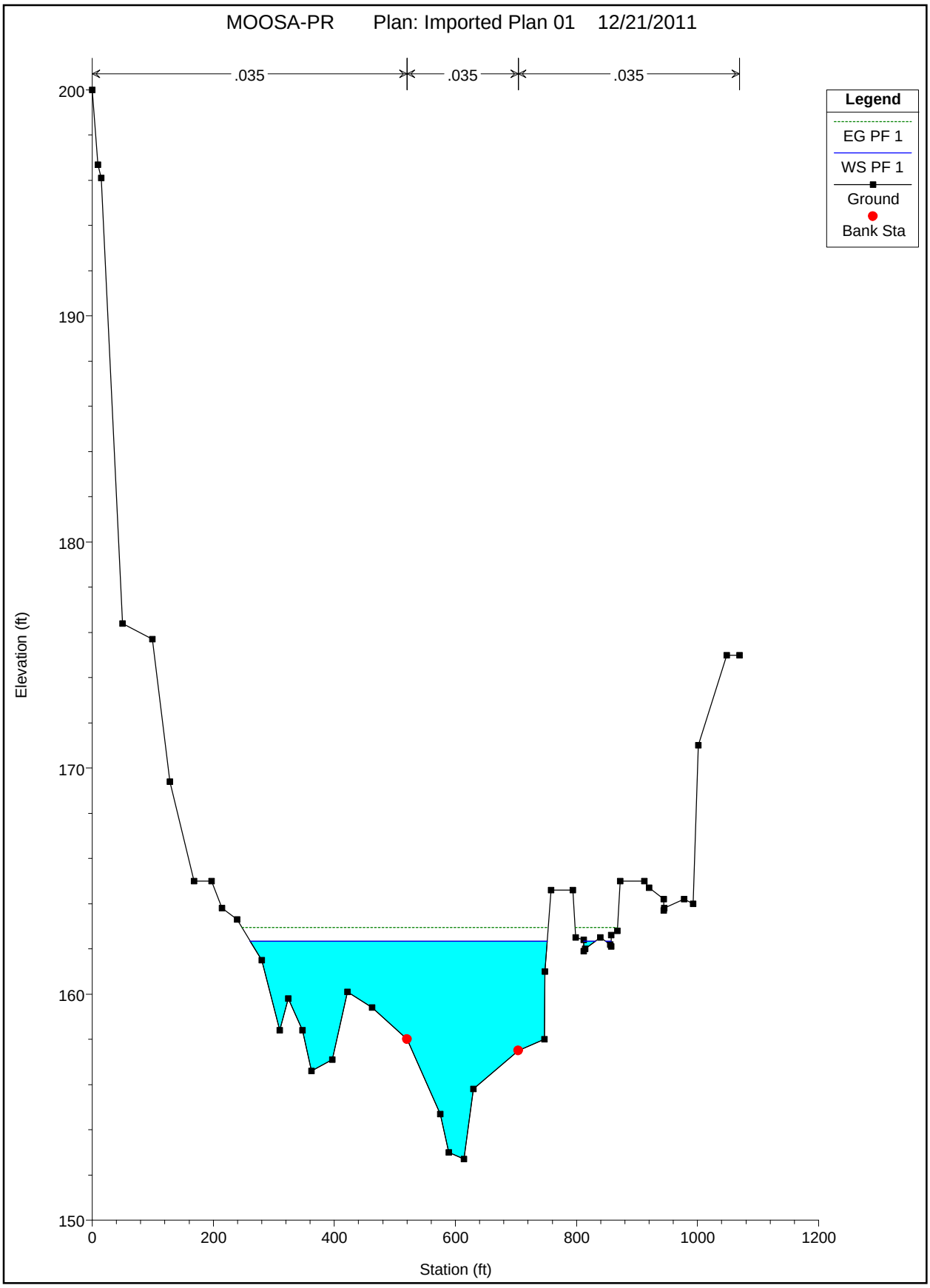

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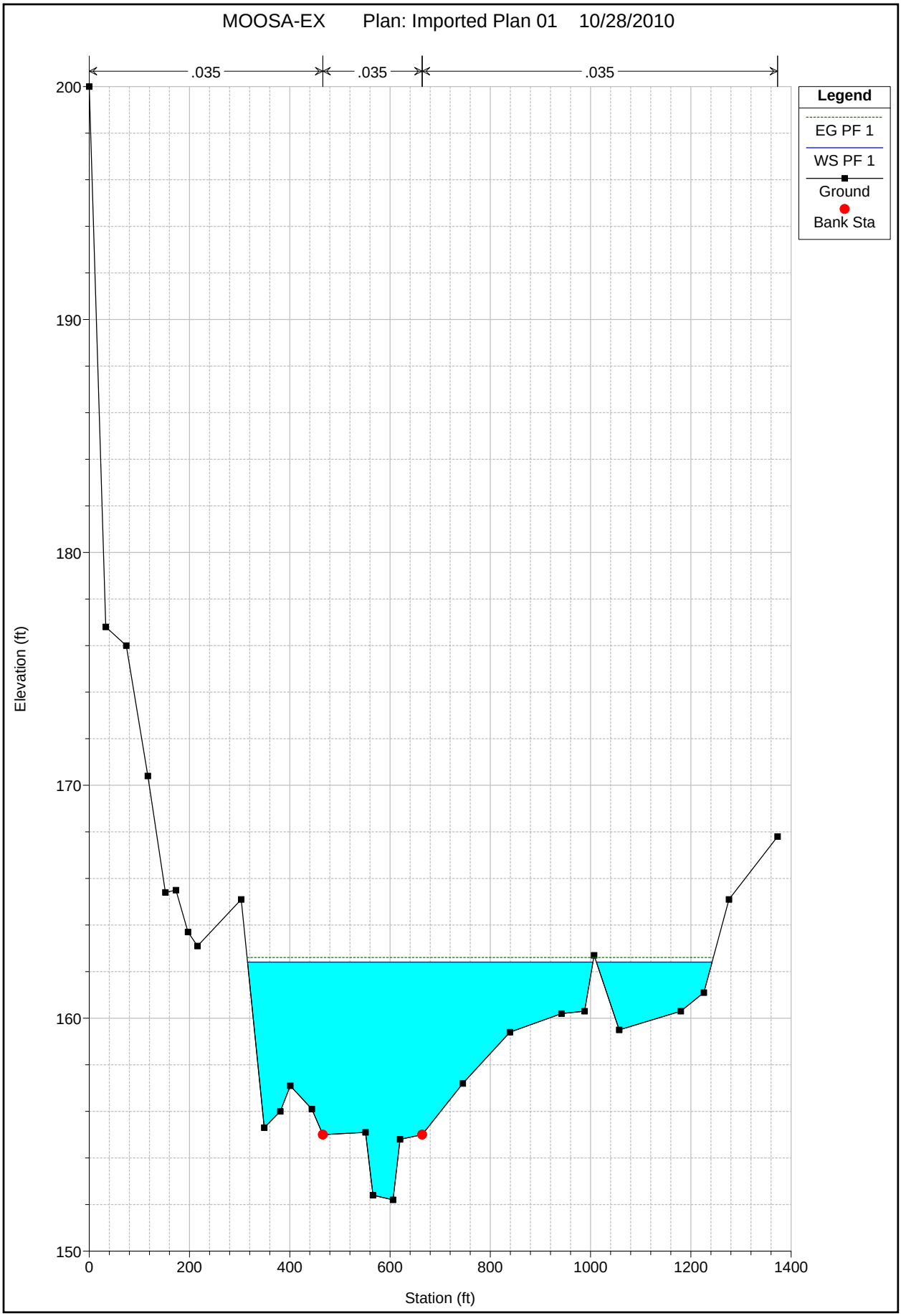

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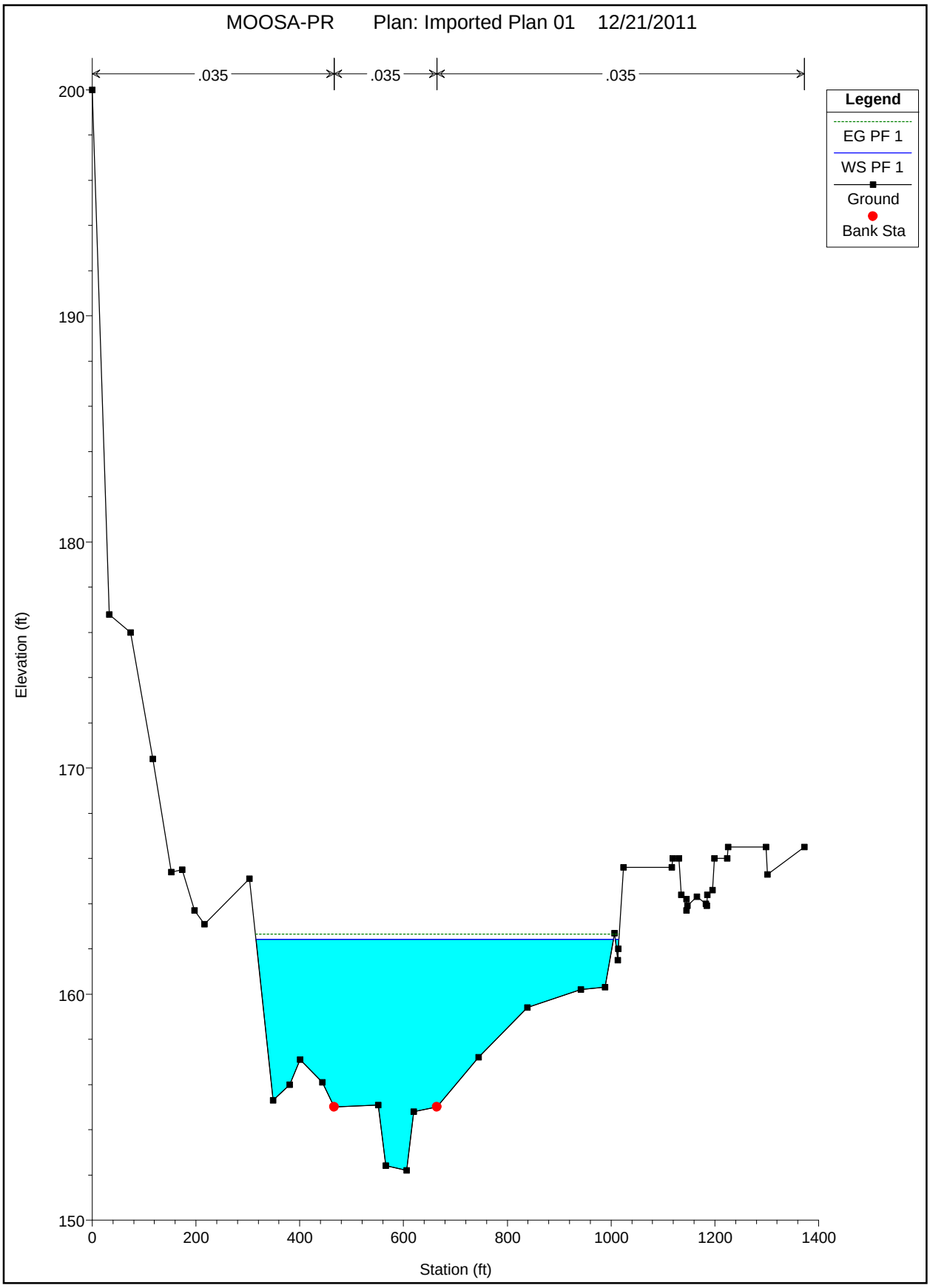

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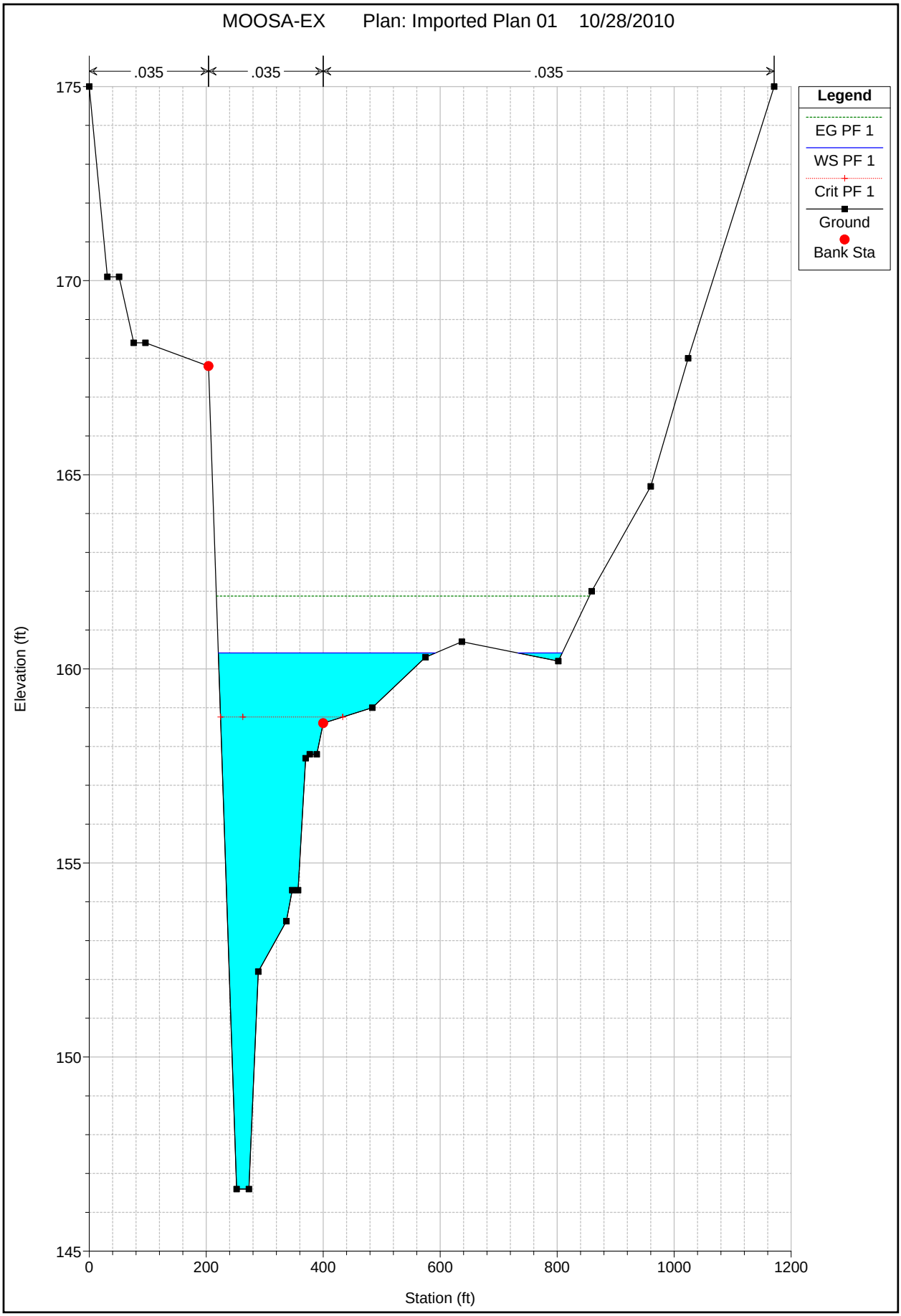

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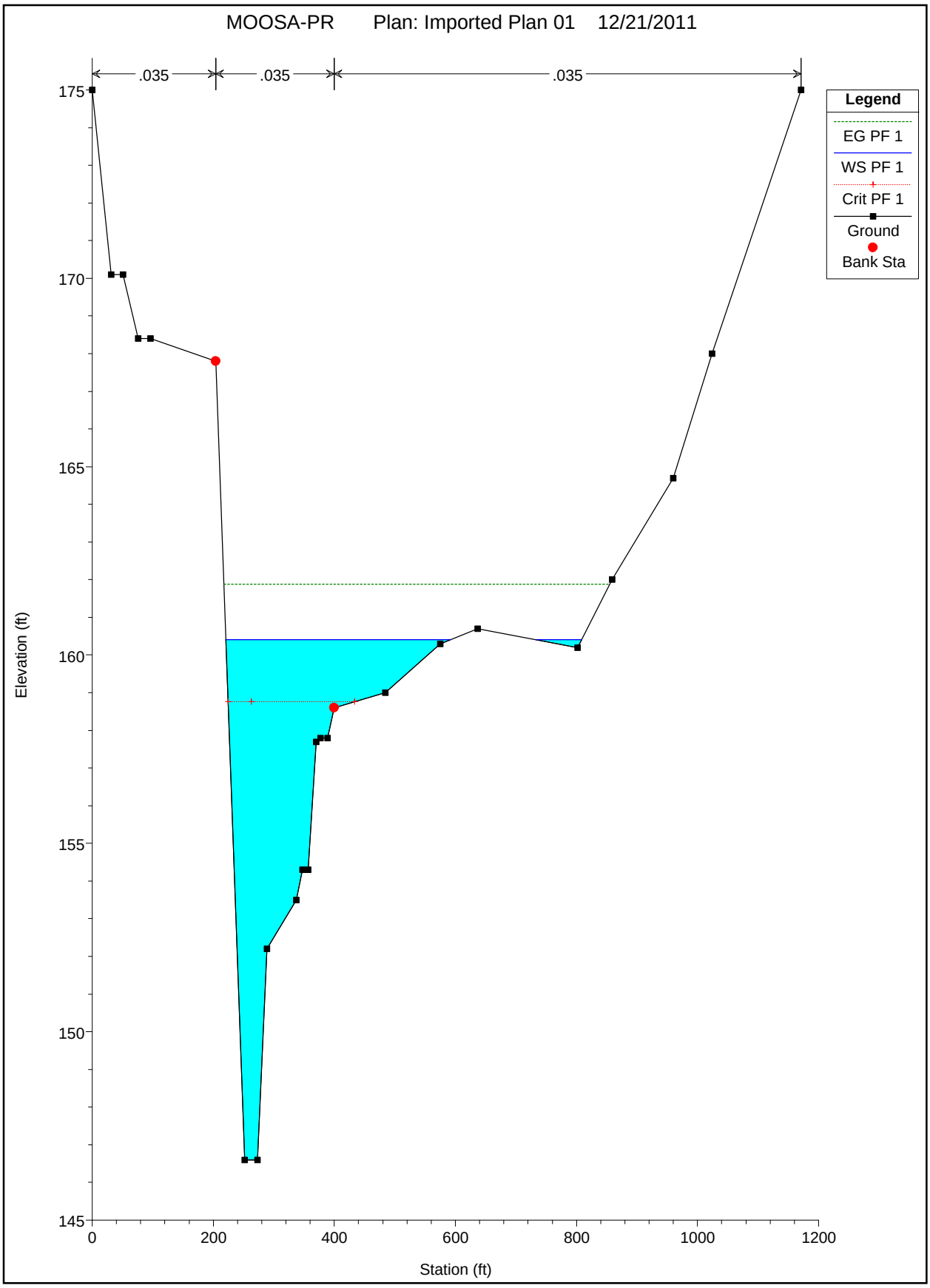


FLOOD INSURANCE STUDY

SAN DIEGO COUNTY, CALIFORNIA
AND INCORPORATED AREAS

Community Name	Community Number
CARLSBAD, CITY OF	060285
CHULA VISTA, CITY OF	065021
CORONADO, CITY OF	060287
DEL MAR, CITY OF	060288
EL CAJON, CITY OF	060289
ENCINITAS, CITY OF	060726
ESCONDIDO, CITY OF	060290
IMPERIAL BEACH, CITY OF	060291
LA MESA, CITY OF	060292
LEMON GROVE, CITY OF	060723
NATIONAL CITY, CITY OF	060293
OCEANSIDE, CITY OF	060294
POWAY, CITY OF	060702
SAN DIEGO, CITY OF	060295
SAN DIEGO COUNTY UNINCORPORATED AREAS	060284
SAN MARCOS, CITY OF	060296
SANTEE, CITY OF	060703
SOLANA BEACH, CITY OF	060725
VISTA, CITY OF	060297

REVISED:
SEPTEMBER 29, 2006

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
06073CV001B

Table 4. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Samagutuma Creek					
At Mouth	6.4	900	2,600	4,000	7,000
San Clemente Canyon Creek					
Upstream of Confluence with Rose Canyon Creek	18.4	1,400	4,200	6,900	16,000
Upstream of Genesee Avenue	15.3	1,200	3,600	5,600	12,000
Upstream of Interstate Highway 805	12.5	1,000	3,100	4,900	11,000
San Diego River					
At Confluence with Murphy Canyon Creek	420.0	3,100	17,000	36,000	112,000
Just Downstream of Confluence of San Vicente Creek	290.0	2,500	--[1]	31,000	--[1]
San Dieguito River					
Upstream of Camino Del Mar Bridge	--[1]	5,700	31,400	41,800	90,000
Upstream of Atchison, Topeka & Santa Fe Railway Bridge	--[1]	5,700	31,400	41,800	90,000
Upstream of Jimmy Durante Bridge	--[1]	5,800	32,100	42,400	90,000
Upstream of U.S. Interstate Highway 5 Bridge	--[1]	5,900	32,500	42,800	90,000
San Elijo Creek					
0.1 Mile Upstream of El Camino Road	5.4	500	1,600	2,100	5,500
San Luis Rey River					
At Mouth	560.0	6,600	31,000	51,000	120,000
Downstream of Confluence with Moosa Canyon	355.6	6,200	30,000	48,000	110,000
Downstream of Confluence with Keys Canyon	252.3	5,000	25,000	41,000	98,000
Upstream of Confluence with Keys Canyon	180.4	4,000[2]	20,000	33,000	85,000
Downstream of Palma	167.3	4,000[2]	18,000	30,000	78,000
Downstream of Confluence with Puma Creek	126.7	4,000[2]	16,800	28,000	72,800
Upstream of Confluence with Puma Creek	71.5	5,000	15,000	24,500	64,000

[1]Data Not Available
[2]Discharge Decreases With Increasing Area Due to Breakouts From the Low Flow Channel

San Luis Rey River
10 Year Storm
Q10 per FEMA Flood Insurance Study

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	17464	PF 1	5000	238.8	241.67		241.9	0.001491	3.82	1307.94	461.48	0.4
Reach-1	17425	PF 1	5000	236.6	241.68		241.76	0.000232	2.19	2282.17	458.3	0.17
Reach-1	17388	PF 1	5000	236.3	241.65		241.71	0.000184	2.05	2457.99	469.44	0.16
Reach-1	17350	PF 1	5000	235.7	241.62		241.68	0.00013	1.85	2732.29	472.35	0.13
Reach-1	17309	PF 1	5000	233.9	241.6		241.65	0.000137	1.7	2993.08	401	0.11
Reach-1	17241	PF 1	5000	240.5	241.27		241.43	0.006496	3.28	1561.86	2191.47	0.67
Reach-1	17194	PF 1	5000	239.3	240.18		240.33	0.005249	3.26	1612.43	2039.48	0.62
Reach-1	17086	PF 1	5000	236.8	237.91		238.04	0.003485	2.99	1688.17	1685.54	0.52
Reach-1	16930	PF 1	5000	230	232.28	232.28	232.89	0.012417	6.31	797.45	658.17	1.01
Reach-1	16724	PF 1	5000	222.8	227.8		228.02	0.001578	3.74	1344.73	515.55	0.41
Reach-1	16531	PF 1	5000	223.9	225.93		226.11	0.002372	3.24	1575.04	1416.83	0.46
Reach-1	16359	PF 1	5000	222	223.01		223.14	0.003856	2.72	1759.94	2016.41	0.53
Reach-1	16206	PF 1	5000	216.2	218.64	218.64	219.15	0.007837	7.03	961.09	929.19	0.87
Reach-1	16032	PF 1	5000	211.9	215.6		215.66	0.00106	2.16	2521.84	1132.27	0.23
Reach-1	15858	PF 1	5000	209.5	212.52		213	0.013574	5.52	900.13	514.41	0.74
Reach-1	15669	PF 1	5000	206.7	208.57		208.66	0.001946	2.03	2033.12	1104.03	0.3
Reach-1	15455	PF 1	5000	202.6	205.93		206.03	0.002896	3.19	2095.04	1175.72	0.4
Reach-1	15256	PF 1	5000	199.3	202.94		203.05	0.003078	3.54	2449.27	2674.56	0.42
Reach-1	15086	PF 1	5000	196.5	199.9		200.01	0.003256	3.21	2881	2143.61	0.41
Reach-1	14891	PF 1	5000	193.5	197.06		197.14	0.00215	2.75	2779.25	1659.19	0.33
Reach-1	14707	PF 1	5000	190.9	193.91		193.99	0.004746	2.7	2536.37	1989.96	0.31
Reach-1	14516	PF 1	5000	185.8	190.02		190.12	0.002971	2.51	1999.75	1224.36	0.27
Reach-1	14311	PF 1	5000	181.7	185.52		185.68	0.005167	2.23	1631.94	1084.51	0.27
Reach-1	14171	PF 1	5000	179.1	183.04		183.12	0.00201	1.67	2217.56	1221.09	0.17
Reach-1	13946	PF 1	5000	176.1	178.51		178.7	0.009268	1.71	1500.39	1564.48	0.27
Reach-1	13827	PF 1	5000	173.6	176.01		176.07	0.001628	0.57	2659.9	1818.24	0.1
Reach-1	13738	PF 1	5000	171.4	174.2		174.34	0.004948	1.19	1751.89	1450.45	0.19
Reach-1	13617	PF 1	5000	166.6	172.36		172.44	0.001463	1.43	2393.59	1029.9	0.15
Reach-1	13516	PF 1	5000	165.5	171.63		171.68	0.001231	1.83	2871.91	904.14	0.15
Reach-1	13402	PF 1	5000	161.2	170.6		170.67	0.001883	2.12	2486.18	1087.61	0.15
Reach-1	13285	PF 1	5000	161	168.11		168.34	0.01036	3.9	1311.21	805.34	0.45
Reach-1	13158	PF 1	5000	159.8	165.38		165.46	0.002181	2.27	2157.59	1127.38	0.25
Reach-1	13048	PF 1	5000	156.8	162.73		162.96	0.009306	3.45	1379.33	743.08	0.37
Reach-1	12938	PF 1	5000	153.3	159.46		159.54	0.003993	2.26	2182.92	847.33	0.22
Reach-1	12843	PF 1	5000	151.1	158.79		158.83	0.000601	1.61	3105.54	1012.51	0.14
Reach-1	12805	PF 1	5000	150.6	158.41		158.57	0.001533	3.33	1615.57	563.56	0.29
Reach-1	12798	PF 1	5000	150.3	158.38		158.47	0.0006	2.44	2081.1	700.71	0.24
Reach-1	12795	PF 1	5000	154.4	158.17		158.38	0.001331	3.85	1423.84	604.25	0.38
Reach-1	12793	PF 1	5000	150.4	158.18		158.29	0.000695	2.69	1928.25	668.32	0.26
Reach-1	12785	PF 1	5000	150.1	158		158.19	0.002123	3.45	1447.41	386.65	0.31
Reach-1	12679	PF 1	5000	149.8	156.93		157.07	0.001445	3.16	1681.05	558.58	0.24
Reach-1	12543	PF 1	5000	148	155.88		156.04	0.001618	3.45	1642.31	655.37	0.25
Reach-1	12469	PF 1	6200	148.3	154.68		155.13	0.005869	5.4	1147.18	477.78	0.61
Reach-1	12429	PF 1	6200	146.4	154.38	150.83	154.43	0.000577	1.84	3383.24	1441.51	0.21
Reach-1	12308	PF 1	6200	144.7	153.65		153.81	0.002001	3.15	1966.66	960.74	0.39
Reach-1	12155	PF 1	6200	144.9	152.55		152.7	0.000728	3.04	2042.79	577.18	0.28
Reach-1	12060	PF 1	6200	143.7	150.61		151.37	0.003882	7.05	977.85	458.17	0.58
Reach-1	12020	PF 1	6200	141.4	150.25		150.46	0.001453	3.66	1764.76	598.58	0.32
Reach-1	11965	PF 1	6200	142.6	149.13		149.69	0.002597	6.03	1052.59	330.54	0.54
Reach-1	11872	PF 1	6200	141.4	148.22		148.43	0.001525	3.67	1691.54	571.69	0.37
Reach-1	11762	PF 1	6200	140.6	147.1		147.34	0.002737	3.97	1560.25	582.1	0.43
Reach-1	11667	PF 1	6200	140.8	146.28		146.44	0.001192	3.22	1925.16	642.45	0.33
Reach-1	11591	PF 1	6200	140.8	145.67		145.89	0.001484	3.82	1623.76	504.11	0.37
Reach-1	11477	PF 1	6200	139.4	144.75		144.95	0.002909	3.61	1715.12	585.65	0.37
Reach-1	11371	PF 1	6200	136.8	143.47		143.58	0.002038	2.7	2298.62	781.09	0.28
Reach-1	11312	PF 1	6200	136.2	142.41		142.56	0.003199	3.13	2002.55	676.89	0.31
Reach-1	11191	PF 1	6200	134	140.53		140.7	0.002839	3.37	1859.93	771.77	0.37
Reach-1	11093	PF 1	6200	132.3	139.05		139.11	0.002699	1.71	3411.52	865.2	0.14
Reach-1	11051	PF 1	6200	131	138.79		138.85	0.00159	1.7	3453.09	813.58	0.14
Reach-1	11002	PF 1	6200	129.8	138.48		138.52	0.000929	1.54	3838.53	856.54	0.12
Reach-1	10939	PF 1	6200	129.6	138.13		138.16	0.001272	1.43	4339.47	932.95	0.12
Reach-1	10854	PF 1	6200	130.3	137.35		137.4	0.002403	1.79	3458.98	822.76	0.15
Reach-1	10778	PF 1	6200	130	136.26		136.31	0.002893	1.87	3253.84	746.98	0.15
Reach-1	10742	PF 1	6200	129.9	135.5		135.59	0.006662	2.43	2551.96	684.1	0.22
Reach-1	10640	PF 1	6200	128.8	133.81		133.97	0.001381	1.06	2718.04	702.26	0.1
Reach-1	10541	PF 1	6200	125.9	132.5		132.6	0.005148	2.46	2521.07	553.65	0.2
Reach-1	10482	PF 1	6200	125	131.68		131.75	0.00178	2.01	3111.23	527.7	0.14
Reach-1	10474	PF 1	6200	125	131.64	126.66	131.69	0.000601	1.84	3383.61	511.65	0.13
Reach-1	10470		Bridge									
Reach-1	10466	PF 1	6200	125	131.63		131.69	0.001231	1.84	3382.45	511.65	0.13
Reach-1	10457	PF 1	6200	123.7	131.56		131.61	0.001359	1.92	3272.14	486.19	0.13
Reach-1	10409	PF 1	6200	120.2	131.19		131.25	0.001463	1.9	3275.38	465.97	0.12
Reach-1	10359	PF 1	6200	120.4	130.34		130.49	0.006305	3.3	2066.61	431.8	0.23
Reach-1	10243	PF 1	6200	119.6	126.57		126.84	0.005034	4.46	1584.55	635.42	0.41
Reach-1	10120	PF 1	6200	119	125.49		125.59	0.000853	2.51	2621.8	636.77	0.2
Reach-1	10020	PF 1	6200	117.1	124.68		124.85	0.002044	3.33	1995.77	657.76	0.3
Reach-1	9920	PF 1	6200	115.6	124.42		124.45	0.000211	1.56	4434.18	868.8	0.1
Reach-1	9820	PF 1	6200	113.7	124.35		124.37	0.000148	1.32	4996.41	964.73	0.09
Reach-1	9720	PF 1	6200	112.5	124.25		124.29	0.000234	1.7	4035.46	758.26	0.11
Reach-1	9620	PF 1	6200	113.2	124.19	116.76	124.21	0.000082	1.11	5972.02	840.98	0.07

Refer to Appendix G for an exhibit showing the section locations with 10 Year water surface elevations

Moosa Canyon Creek
10 Year Storm
Q10=2,700 cfs per email from Anthony Berry at County

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # C
Reach-1	1.88	PF 1	2700	176.6	182.16	182.16	184.3	0.011689	11.76	229.65	53.54	1
Reach-1	1.87	PF 1	2700	171.5	179.96	179.96	180.98	0.00602	8.83	387.13	241.62	0.73
Reach-1	1.84	PF 1	2700	170	178.1	177.66	178.85	0.003582	7.62	466.78	408.06	0.58
Reach-1	1.78	PF 1	2700	169.4	176.44	176.44	177.36	0.006109	8.83	417.73	304.12	0.73
Reach-1	1.65	PF 1	2700	169	175.39	173.05	175.48	0.000562	2.88	1152.16	538.72	0.23
Reach-1	1.64	PF 1	2700	168.9	175.37	173.24	175.42	0.000375	2.2	1562.26	545.72	0.18
Reach-1	1.63	PF 1	2700	168	175.2	174.68	175.38	0.003673	4.72	785.53	503.21	0.33
Reach-1	1.625		Bridge									
Reach-1	1.62	PF 1	2700	168	174.64	174.64	175.08	0.011852	8.24	550.26	519.9	0.6
Reach-1	1.6	PF 1	2700	165.3	171.2	171.2	171.89	0.00465	7.52	511.49	314.39	0.64
Reach-1	1.53	PF 1	2700	163.1	168.57	168.19	168.91	0.0024	5.74	749.06	494.22	0.47
Reach-1	1.52	PF 1	2700	163.1	168.54	167.6	168.74	0.00131	4.35	948.41	538.79	0.35
Reach-1	1.47	PF 1	2700	163.1	168.5	166.35	168.55	0.000346	2.36	1681.57	668.34	0.18
Reach-1	1.39	PF 1	2700	163.5	168.39	165.75	168.42	0.000233	1.78	1917.98	631.89	0.15
Reach-1	1.34	PF 1	2700	163.9	168.25	166.91	168.33	0.000589	2.49	1331.99	534.07	0.23
Reach-1	1.28	PF 1	2700	162.4	168.21	165.02	168.23	0.000129	1.51	2442.84	827.07	0.11
Reach-1	1.23	PF 1	2700	162.4	168.19		168.21	0.000053	0.99	3042.71	716.47	0.07
Reach-1	1.19	PF 1	2700	162.4	168.18		168.2	0.000065	1.08	2696.21	587.38	0.08
Reach-1	1.18	PF 1	2700	161	167.95	166.97	168.14	0.002784	4.16	811.5	438.52	0.32
Reach-1	1.175		Bridge									
Reach-1	1.17	PF 1	2700	161	167.59	166.97	167.87	0.004735	5.17	660.2	388.53	0.41
Reach-1	1.15	PF 1	2700	159.9	165.13	165.13	167.03	0.011848	11.06	244.05	144.65	1
Reach-1	1.04	PF 1	2700	159	164.94	160.83	164.96	0.000126	1.48	2215.25	642.03	0.11
Reach-1	0.95	PF 1	2700	158.8	164.1	164.1	164.72	0.004855	7.26	568.05	493.41	0.65
Reach-1	0.93	PF 1	2700	158.8	163.4	163.4	163.66	0.003632	5.37	814.18	678.26	0.54
Reach-1	0.87	PF 1	2700	156.5	162.58	161.45	162.68	0.000842	3.21	1218.47	562.9	0.27
Reach-1	0.76	PF 1	2700	154.6	161.27	160.13	161.73	0.00322	5.55	524.4	298.62	0.52
Reach-1	0.62	PF 1	2700	153.6	160.18	158.42	160.35	0.001146	3.56	882.58	344.66	0.32
Reach-1	0.56	PF 1	2700	153.3	159.9		160.05	0.000812	3.37	986.79	369.73	0.27
Reach-1	0.54	PF 1	2700	153.2	159.86	157.29	159.94	0.000527	2.42	1263.27	418.14	0.22
Reach-1	0.52	PF 1	2700	153.3	159.44	157.33	159.8	0.002047	4.76	567.23	197.99	0.42
Reach-1	0.51	PF 1	2700	153.4	159.44	157.45	159.71	0.001686	4.15	651.68	177.69	0.38
Reach-1	0.505		Bridge									
Reach-1	0.5	PF 1	2700	153.4	158.51	157.45	158.94	0.00394	5.35	539.14	268.16	0.56
Reach-1	0.49	PF 1	2700	152.6	158.44	156.56	158.81	0.002126	4.93	577.53	195.2	0.43
Reach-1	0.48	PF 1	2700	152.3	158.54	156.55	158.67	0.000877	3.02	949.39	290.86	0.27
Reach-1	0.46	PF 1	2700	152.7	157.48	157.48	158.35	0.012987	7.59	370.09	220.01	0.95
Reach-1	0.43	PF 1	2700	152.2	156.87		157.16	0.003159	4.53	677.57	377.57	0.49
Reach-1	0.35	PF 1	2700	146.6	154.79	153.3	155.37	0.004005	6.12	440.97	125.39	0.58

Refer to Appendix G for an exhibit showing the section locations with 10 Year water surface elevations

APPENDIX F

San Diego County Flood Hazard Map
Sheet 406-1701

COUNTY OF SAN DIEGO

TOPOGRAPHIC SURVEY

-LEGEND-

- Horizontal Control Monument *Third Order* / Vertical Control Monument *Second Order or Better*
- Horizontal Control Monument *Second Order or Better* / Vertical Control Monument *Third Order*
- Horizontal Control Monument *Second Order or Better*
- Horizontal Control Monument & Bench Mark *Second Order or Better*
- Horizontal Control Monument *Third Order*
- Horizontal Control Monument & Bench Mark *Third Order*
- Bench Mark *Second Order or Better*
- Vertical Control Monument *Third Order*
- 36 31 T 10 S / 1 6 T 11 S / R 2 W / R 1 W — Found Section, Grant or Subdivision Corner.
- Photograph, Nadir Point
- Geographic Tick

BOUNDARIES IN ORDER OF PRECEDENCE

- National
- *Name / Name* — County
- City (*Use at Border with County*)
- *Name within Bdry* — Reservation
- *Name within Bdry.* — National, State or County Park
- *Name within Bdry.* — Land Grant
- *T2S / T3S* — Township, Range, Section or Subdivision (*Name of Subdivision within Bdry.*)

PREPARED UNDER THE DIRECTION OF THE COUNTY ENGINEER OF THE COUNTY OF SAN DIEGO, CALIFORNIA

MAP CONTROL DATA FURNISHED BY THE COUNTY OF SAN DIEGO.

HORIZONTAL CONTROL IS BASED ON NORTH AMERICAN 1927 DATUM.

LAND LINES SHOWN ARE APPROXIMATE.

TOPOGRAPHY COMPILED BY PHOTO-GRAMMETRIC METHODS FROM PHOTOGRAPHY DATED 7-22-73

ORTHOPHOTO IMAGE PREPARED FROM PHOTOGRAPHY DATED 7-22-73

11/09/2004

PRELIMINARY
SUBJECT TO
REVISION

Mark Hurd
AERIAL SURVEYS, INC.
SANTA BARBARA, CALIFORNIA

SCALE 1:2400

200 0 200 400 600 800 1000

CONTOUR INTERVAL 5 FEET

U.S.C. & G.S. SEA LEVEL DATUM OF 1929

TWO THOUSAND FOOT CALIFORNIA RECTANGULAR GRID (ZONE VI)

THE LAST THREE DIGITS OF THE GRID NUMBERS ARE OMITTED

THE RECTANGULAR COORDINATE VALUES ARE SHOWN ON THE SOUTH AND WEST MARGINS

THE GEOGRAPHIC VALUES ARE SHOWN ON THE NORTH AND EAST MARGINS

INDEX TO ADJOINING SHEETS

410-1695	410-1701	410-1707
406-1695	406-1701	406-1707
402-1695	402-1701	402-1707

UPPER SAN LUIS REY RIVER
SHEET 26 OF 64
PROJECT SFC 3752

SEE DEPARTMENT OF SANITATION AND FLOOD CONTROL FOR LATEST FLOODPLAIN INFORMATION

SAN DIEGO COUNTY
CALIFORNIA

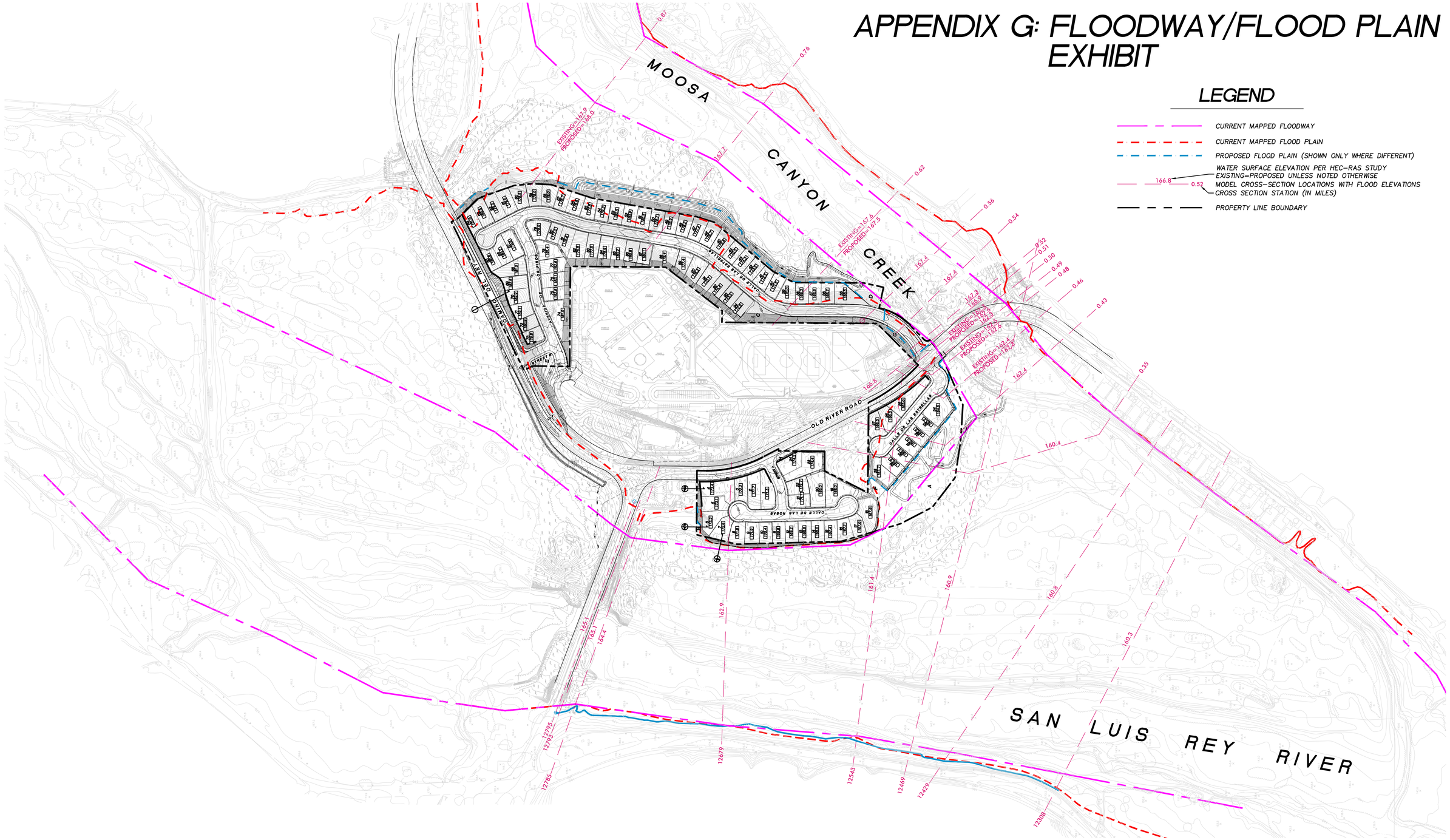
EDITION OF 1973

SHEET 406-1701

APPENDIX G

<u>Flood Mapping Exhibits</u>
Floodway / Floodplain Exhibit
Floodway / Floodplain Exhibit with FEMA Map Overlay
Extended Detention Basin Details with 10 Year Flood Elevations

APPENDIX G: FLOODWAY/FLOOD PLAIN EXHIBIT



LEGEND

- CURRENT MAPPED FLOODWAY
- CURRENT MAPPED FLOOD PLAIN
- PROPOSED FLOOD PLAIN (SHOWN ONLY WHERE DIFFERENT)
- 166.8 — WATER SURFACE ELEVATION PER HEC-RAS STUDY EXISTING=PROPOSED UNLESS NOTED OTHERWISE
- 0.52 — MODEL CROSS-SECTION LOCATIONS WITH FLOOD ELEVATIONS CROSS SECTION STATION (IN MILES)
- PROPERTY LINE BOUNDARY

SCALE: 1" = 200'

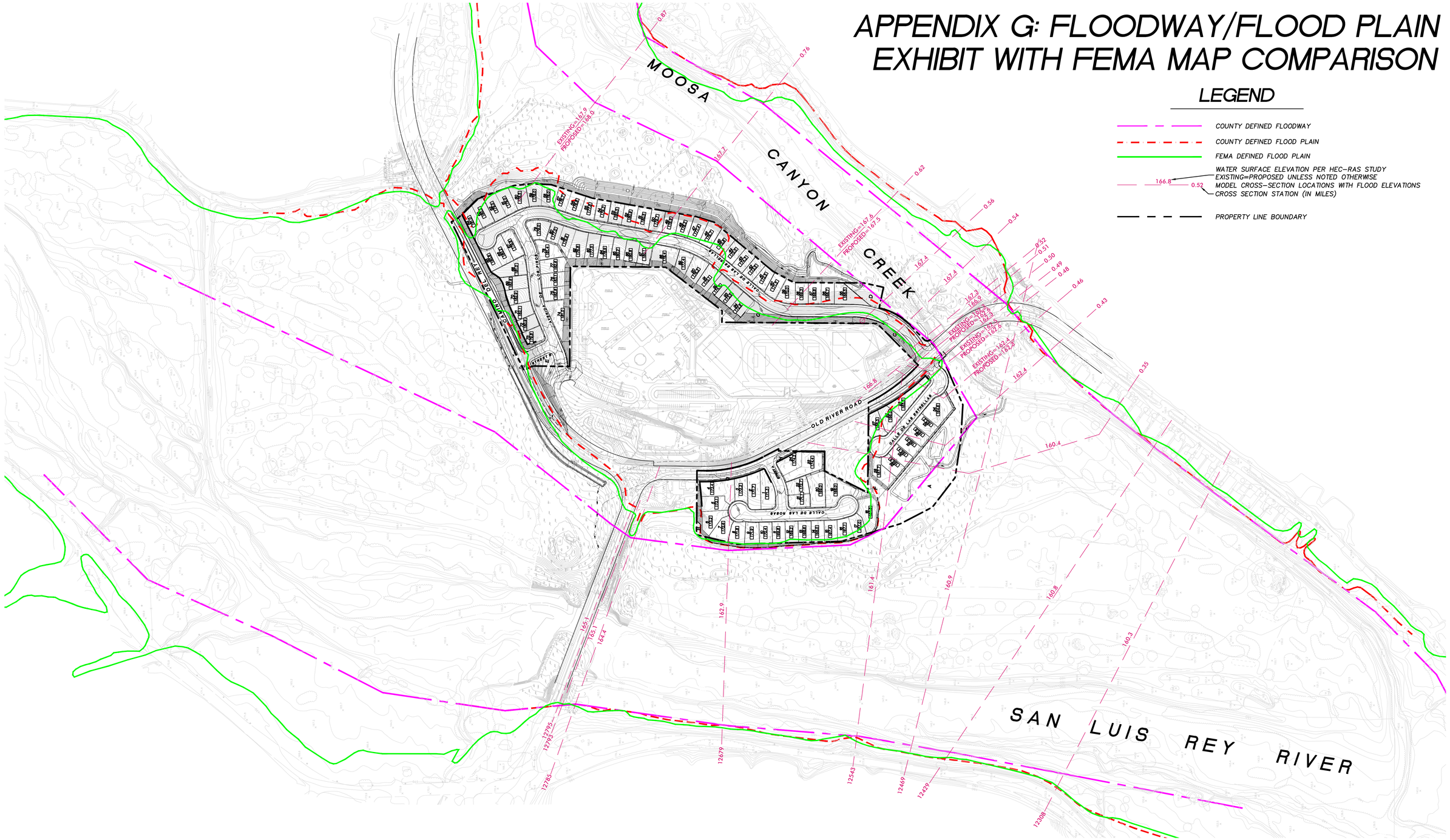
200 100 0 200 400 600

GRAPHIC SCALE IN FEET

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335
www.fuscoe.com

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_2472\APPENDIX G1 FLOOD PLAINEXHIBIT.DWG (02-16-12 11:20:55AM) Plotted by: rroberts

APPENDIX G: FLOODWAY/FLOOD PLAIN EXHIBIT WITH FEMA MAP COMPARISON



SCALE: 1" = 200'

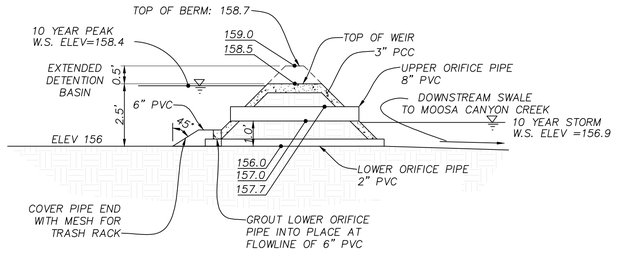
200 100 0 200 400 600

GRAPHIC SCALE IN FEET

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335
www.fuscoe.com

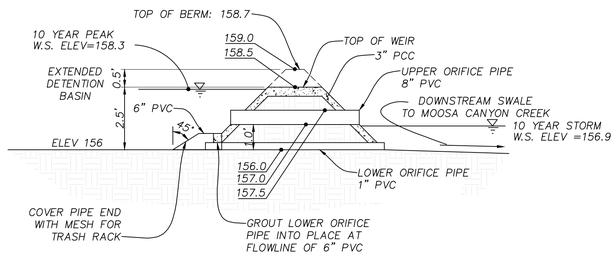
C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_2472\APPENDIX G2 FLOOD PLANEXHIBIT.DWG (02-16-12 11:26:43AM) Plotted by: rroberts

APPENDIX G: EXTENDED DETENTION BASIN DETAILS WITH 10 YEAR FLOOD ELEVATIONS



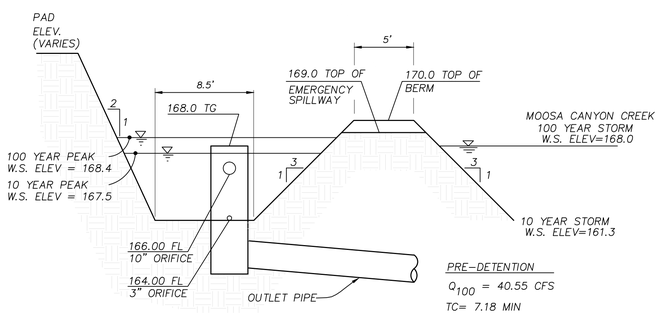
EXTENDED DETENTION BASINS 2A

NOT TO SCALE



EXTENDED DETENTION BASINS 2B

NOT TO SCALE



PRE-DETENTION

Q_{100} = 40.55 CFS

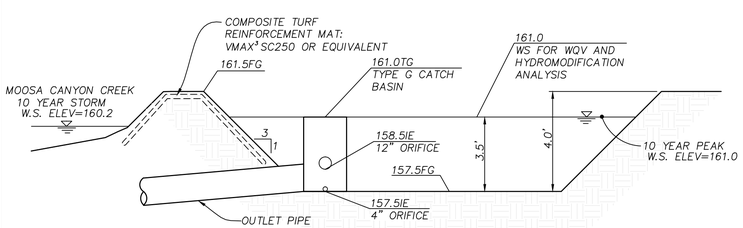
TC= 7.18 MIN

POST-DETENTION

Q_{100} = 9.5 @ 4.2 HOURS

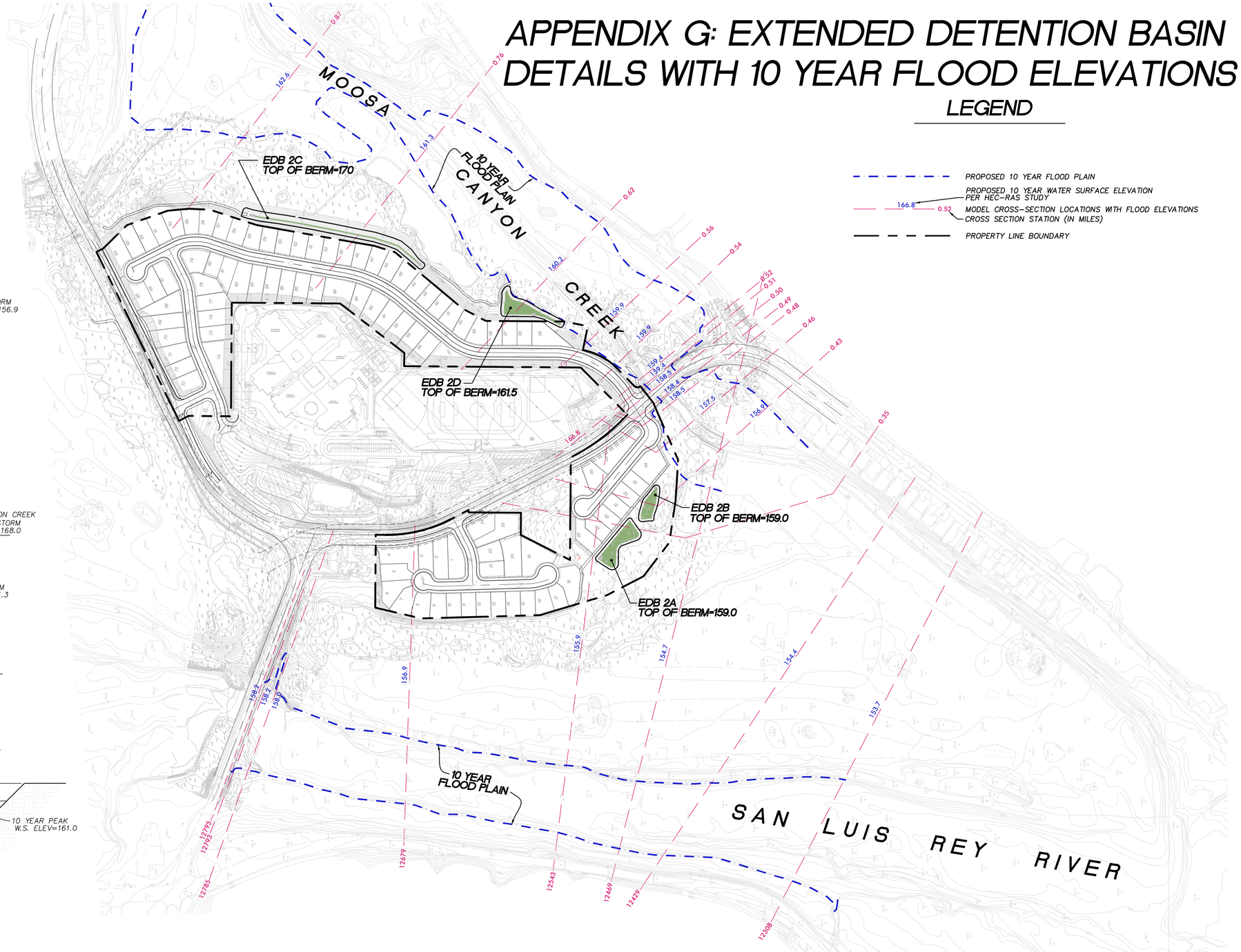
EXTENDED DETENTION BASIN 2C

NOT TO SCALE



EXTENDED DETENTION BASIN 2D

NOT TO SCALE



LEGEND

- PROPOSED 10 YEAR FLOOD PLAIN
- PROPOSED 10 YEAR WATER SURFACE ELEVATION PER HEC-RAS STUDY
- 166.8 — 0.52 — MODEL CROSS-SECTION LOCATIONS WITH FLOOD ELEVATIONS CROSS SECTION STATION (IN MILES)
- PROPERTY LINE BOUNDARY

SCALE: 1" = 200'

200 100 0 200 400 600

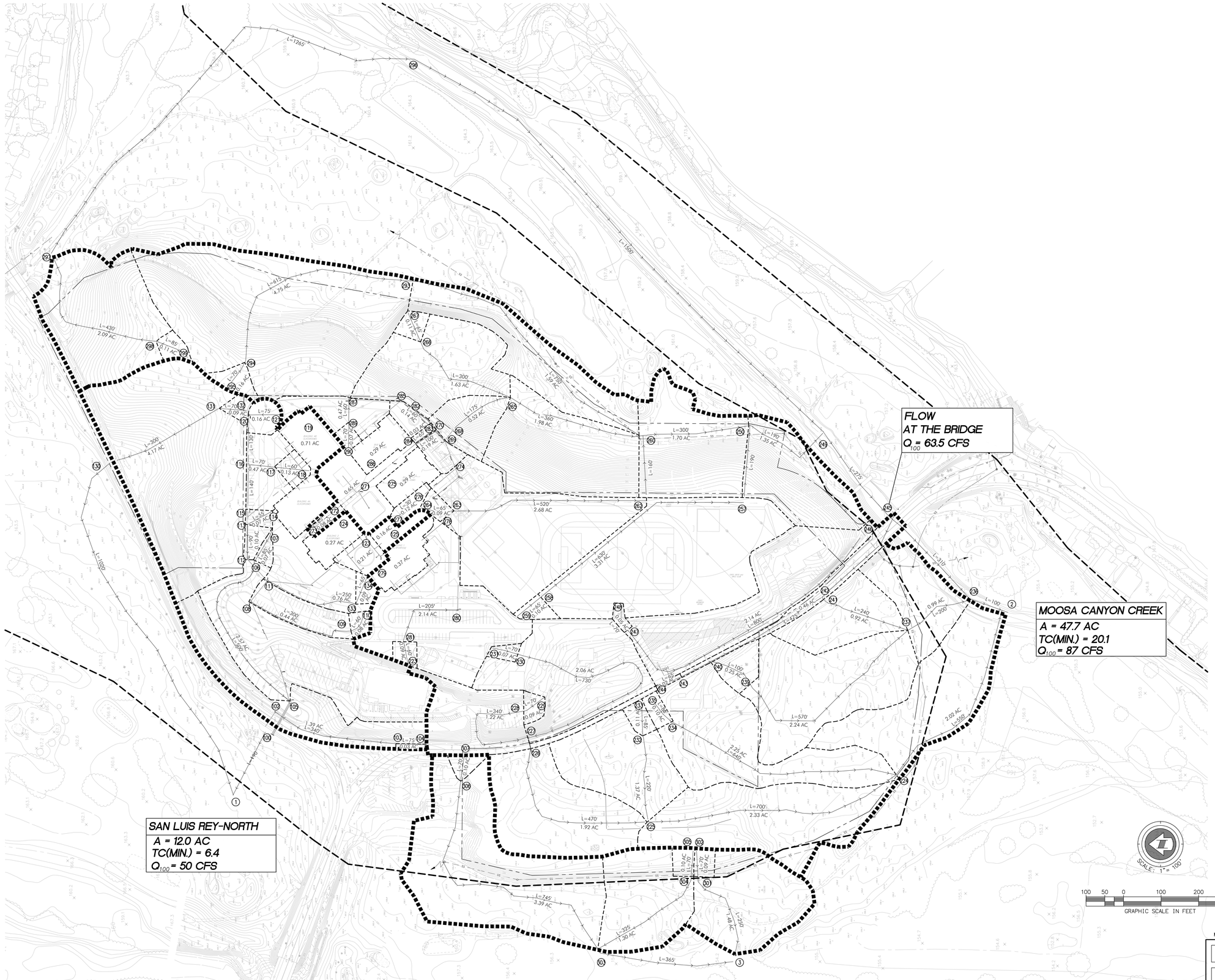
GRAPHIC SCALE IN FEET

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335
www.fuscoe.com

M:\PROJECTS\2518- SAN LUIS REY DOWNS LLC\02A- GOLF GREEN\ENG\HYDROLOGY\CEQA DRAINAGE STUDY\APPENDIX G3 10 YEAR FLOOD ELEVATIONS.DW Plotted by: roberts

APPENDIX H

<u>Hydrology Exhibits</u>
Existing Hydrology Exhibit
Proposed Hydrology Exhibit



FUSCOE ENGINEERING
full circle thinking

MDRA NO. _____

Sheet 01	COUNTY OF SAN DIEGO Department of Development Services	01 Sheets

EXISTING HYDROLOGY FOR:

GOLF GREEN ESTATES

California Coordinate Index

City Engineer

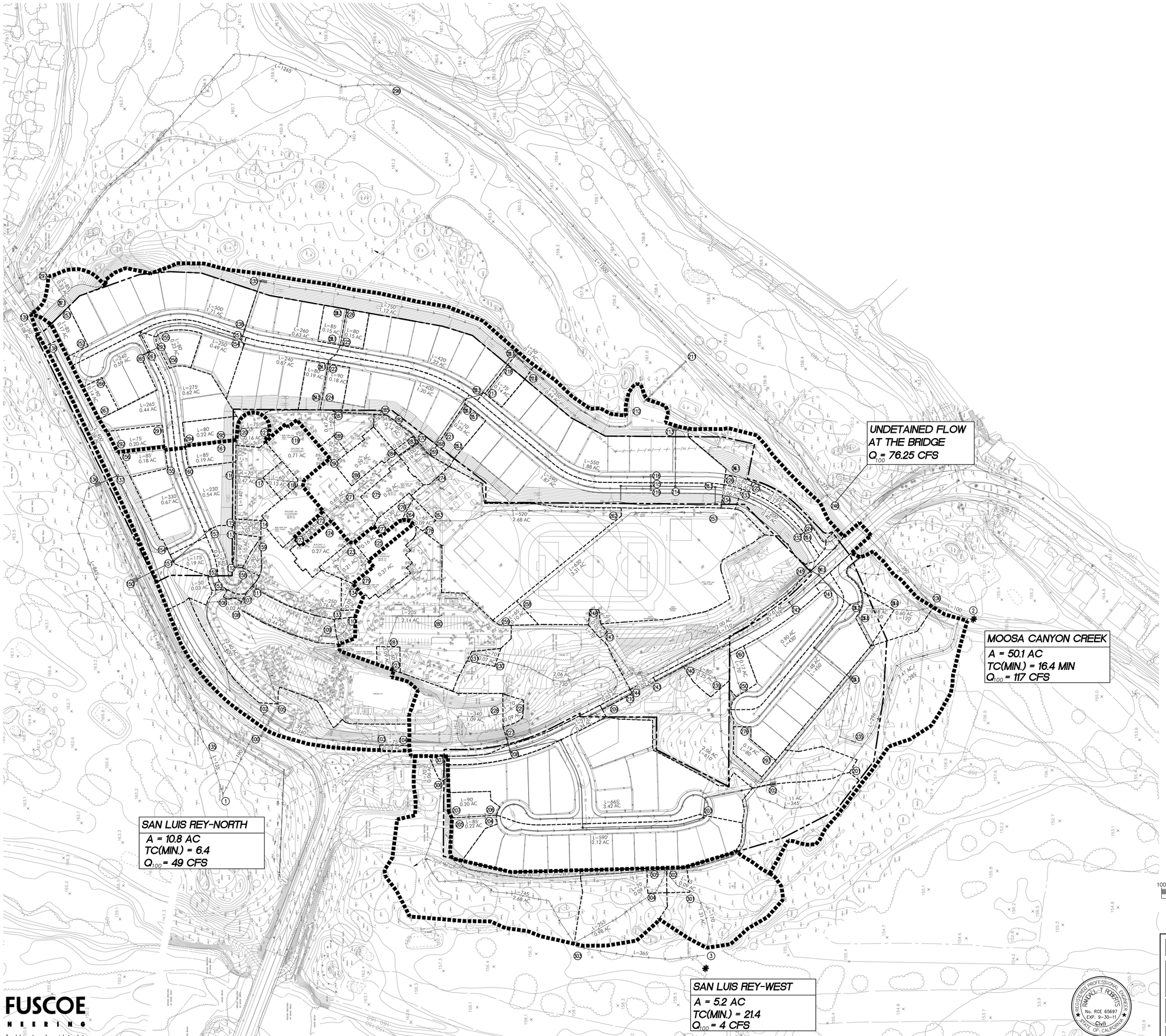
R.C.E. Expires

Engineer of Work: Randall Roberts

R.C.E.41903 EXP. 9/30/09

REGISTERED PROFESSIONAL ENGINEER RANDALL T. ROBERTS No. RCE 65697 EXP. 9-30-11 Civil STATE OF CALIFORNIA

M:\PROJECTS\2016-SAN LUIS REY OWNS LLC\GOLF GREEN\LDEV\HYDROLOGY\CEQA DRAINAGE STDY\APPENDIX A EXISTING HYDROLOGY EXHIBIT.D



FUSCOE ENGINEERING
full circle thinking

MDRA NO. _____

Sheet 01	COUNTY OF SAN DIEGO Department of Development Services	01 Sheets

PROPOSED HYDROLOGY FOR:

GOLF GREEN ESTATES

California Coordinate Index

City Engineer

R.C.E.	Expires

Engineer of Work: Randall Roberts

R.C.E.41903 EXP. 9/30/09

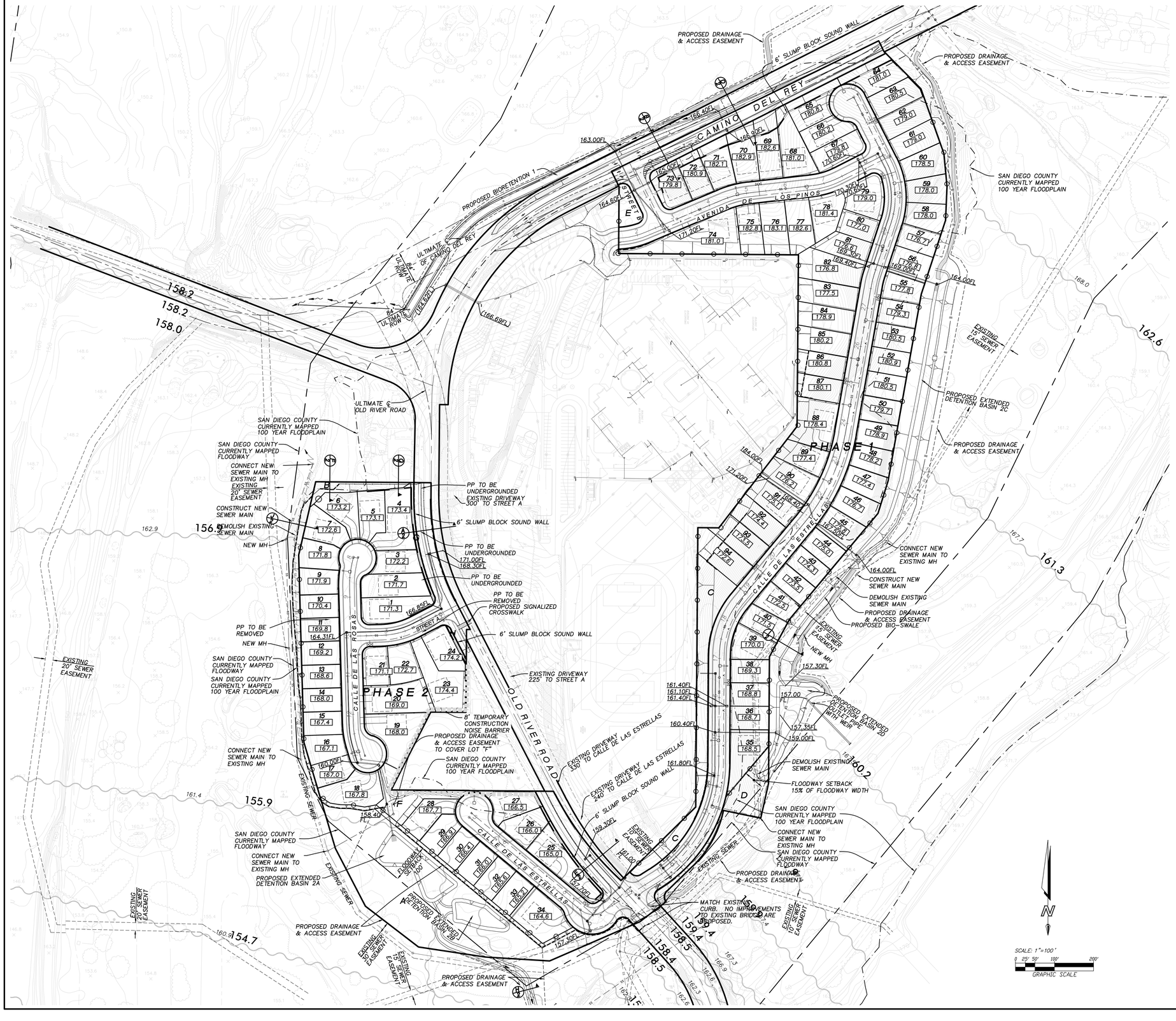
REGISTERED PROFESSIONAL ENGINEER RANDALL T. ROBERTS No. RCE 65697 EXP. 9-30-11 Civil STATE OF CALIFORNIA

\USERS\PROJECTS\APPDATA\LOCAL\TEMP\ACPUBLISH_2472\APPZ\DWG + PROPOSED HYDROLOGY Layout.DWG 12-16-12 11:33:19AM

APPENDIX I

Preliminary Grading Plan

COUNTY OF SAN DIEGO TRACT TM 5498 RPL3
PRELIMINARY GRADING PLAN
GOLF GREENS ESTATES



STREET B (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
N26°47'39"W	--	185.36'	1+00.00

AVENIDA DE LOS PINOS (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
Δ= 111°25'23"	43.00'	83.62'	0+67.23
Δ= 20°34'09"	200.00'	71.80'	1+50.85
N67°11'49"E	--	213.19'	2+22.65
Δ= 16°18'27"	250.00'	71.15'	4+35.84
N83°30'16"E	--	162.86'	5+06.99
Δ= 20°17'55"	200.00'	70.86'	6+69.85
N63°12'21"E	--	127.35'	7+40.71

CALLE DE LAS ESTRELLAS (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
Δ= 11°48'40"	200.00'	41.23'	1+00.00
N45°47'57"E	--	110.27'	1+41.23
Δ= 45°26'28"	350.00'	277.58'	2+51.50
N00°21'29"E	--	277.01'	5+29.08
Δ= 39°24'14"	220.00'	151.30'	8+06.09
N39°45'43"E	--	255.92'	9+57.39
Δ= 29°46'14"	500.00'	259.80'	12+13.31
N09°59'29"E	--	384.91'	14+73.11
Δ= 08°08'42"	200.00'	28.43'	18+58.02
N18°08'11"E	--	56.18'	18+86.45
N18°08'11"E	--	84.74'	19+42.63
Δ= 42°24'42"	200.00'	148.04'	20+27.37
N26°47'39"W	--	196.32'	21+75.41

CALLE DE LAS ROSAS (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
N13°01'17"E	--	66.70'	8+74.36
Δ= 14°38'14"	250.00'	63.87'	9+41.05
N01°36'57"W	--	341.39'	10+04.92
Δ= 15°00'02"	250.00'	65.45'	13+46.32
N16°36'59"W	--	124.89'	14+11.77
Δ= 39°15'43"	200.00'	137.05'	15+36.66
N55°52'42"W	--	30.29'	16+73.71
Δ= 13°37'44"	200.00'	47.57'	17+04.00
N42°14'58"W	--	96.98'	17+51.57
Δ= 44°17'17"	200.00'	154.59'	18+48.55
N86°32'15"W	--	13.25'	20+03.15
Δ= 32°18'21"	200.00'	112.77'	20+16.40

STREET A (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
N88°22'59"E	--	88.56'	3+44.31
Δ= 16°28'53"	200.00'	57.53'	2+55.75
N71°54'06"E	--	98.22'	1+98.22

AVENDIA DE ROSAS (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
N88°23'03"E	--	124.02'	1+00.00
Δ= 05°08'33"	200.00'	17.95'	2+24.02
N83°14'30"E	--	99.55'	2+41.98

AVENDIA TOLEDO (PUBLIC)			
DELTA/BRG	RADIUS	LENGTH	BEGINNING STA
N47°45'02"E	--	112.00'	1+00.00
Δ= 24°58'06"	200.00'	87.16'	2+12.00
N72°43'08"E	--	164.87'	2+99.16

ENGINEER OF WORK

FUSCOE ENGINEERING • SAN DIEGO, INC.
6390 GREENWICH DRIVE, STE. 170
SAN DIEGO, CA 92122
(858)554-1500

ERIC K. ARMSTRONG RCE 36083 DATE

REGISTERED PROFESSIONAL ENGINEER ERIC K. ARMSTRONG No. RCE 36083 EXP. 6-30-10 Civil STATE OF CALIFORNIA

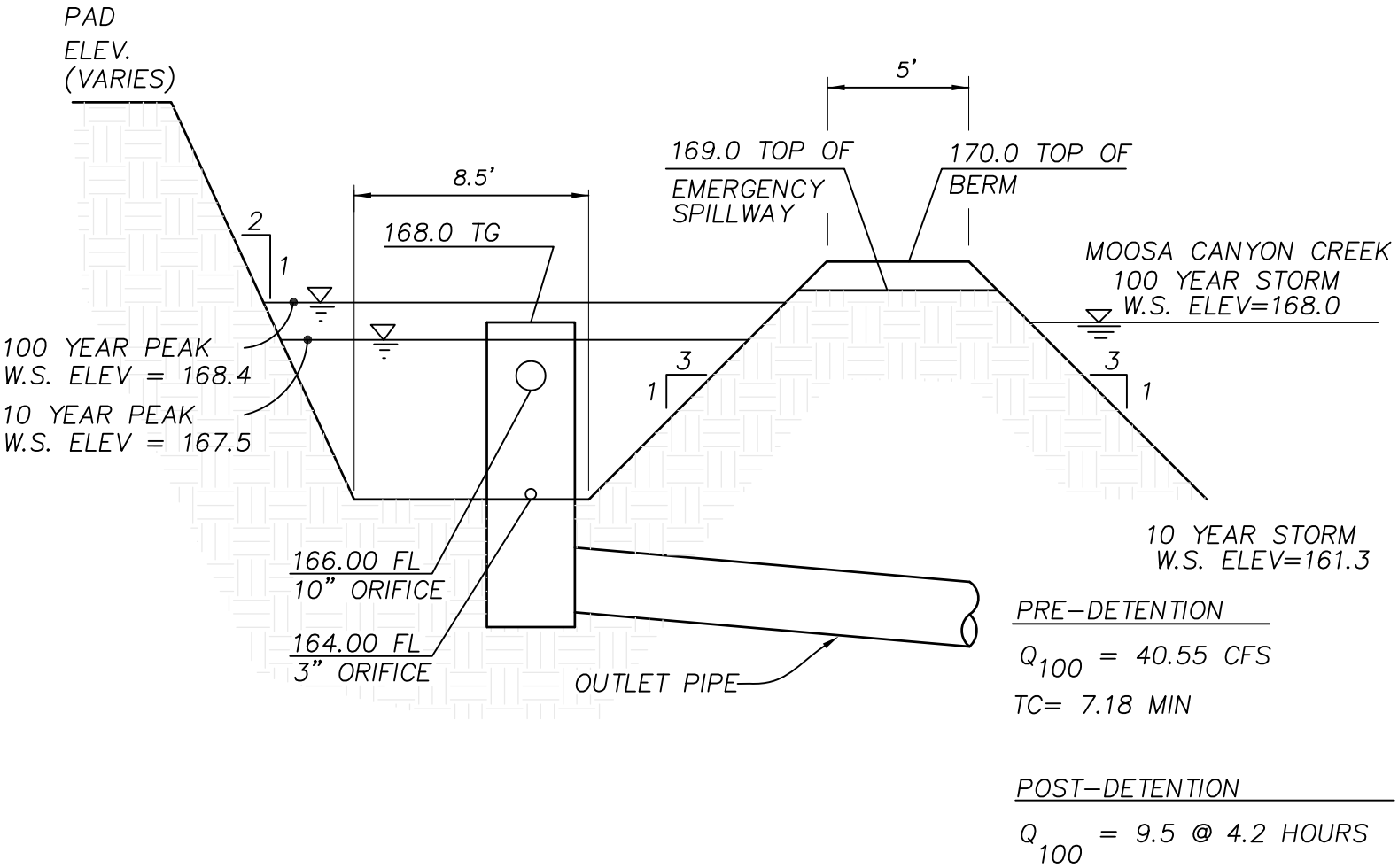
SHEET 3 OF 3

NO.	DATE	REVISION

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

APPENDIX J

<u>Detention Basin Analysis</u>
100 Year Storm – Basin 2C
10 Year Storm – Basin 2A
10 Year Storm – Basin 2B
10 Year Storm – Basin 2C
10 Year Storm – Basin 2D



PRE-DETENTION

Q_{100} = 40.55 CFS

TC= 7.18 MIN

POST-DETENTION

Q_{100} = 9.5 @ 4.2 HOURS

EXTENDED DETENTION BASIN 2C

NOT TO SCALE

100 Year Storm

Proposed Hydrology Output from Node 220.1 used to determine model storm to apply at extended detention basin

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY
RUN DATE 12/21/2011

TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 15.4 ACRES
RUNOFF COEFFICIENT 0.58
PEAK DISCHARGE 40.55 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0
TIME (MIN) = 7 DISCHARGE (CFS) = 1.6
TIME (MIN) = 14 DISCHARGE (CFS) = 1.6
TIME (MIN) = 21 DISCHARGE (CFS) = 1.7
TIME (MIN) = 28 DISCHARGE (CFS) = 1.7
TIME (MIN) = 35 DISCHARGE (CFS) = 1.7
TIME (MIN) = 42 DISCHARGE (CFS) = 1.8
TIME (MIN) = 49 DISCHARGE (CFS) = 1.8
TIME (MIN) = 56 DISCHARGE (CFS) = 1.9
TIME (MIN) = 63 DISCHARGE (CFS) = 1.9
TIME (MIN) = 70 DISCHARGE (CFS) = 1.9
TIME (MIN) = 77 DISCHARGE (CFS) = 2
TIME (MIN) = 84 DISCHARGE (CFS) = 2.1
TIME (MIN) = 91 DISCHARGE (CFS) = 2.1
TIME (MIN) = 98 DISCHARGE (CFS) = 2.2
TIME (MIN) = 105 DISCHARGE (CFS) = 2.3
TIME (MIN) = 112 DISCHARGE (CFS) = 2.3
TIME (MIN) = 119 DISCHARGE (CFS) = 2.4
TIME (MIN) = 126 DISCHARGE (CFS) = 2.5
TIME (MIN) = 133 DISCHARGE (CFS) = 2.6
TIME (MIN) = 140 DISCHARGE (CFS) = 2.7
TIME (MIN) = 147 DISCHARGE (CFS) = 2.9
TIME (MIN) = 154 DISCHARGE (CFS) = 3
TIME (MIN) = 161 DISCHARGE (CFS) = 3.2
TIME (MIN) = 168 DISCHARGE (CFS) = 3.3
TIME (MIN) = 175 DISCHARGE (CFS) = 3.6
TIME (MIN) = 182 DISCHARGE (CFS) = 3.8
TIME (MIN) = 189 DISCHARGE (CFS) = 4.2
TIME (MIN) = 196 DISCHARGE (CFS) = 4.4
TIME (MIN) = 203 DISCHARGE (CFS) = 5.1
TIME (MIN) = 210 DISCHARGE (CFS) = 5.5
TIME (MIN) = 217 DISCHARGE (CFS) = 6.7
TIME (MIN) = 224 DISCHARGE (CFS) = 7.7
TIME (MIN) = 231 DISCHARGE (CFS) = 11.3
TIME (MIN) = 238 DISCHARGE (CFS) = 32.1

TIME (MIN) = 245 DISCHARGE (CFS) = 40.55
TIME (MIN) = 252 DISCHARGE (CFS) = 9
TIME (MIN) = 259 DISCHARGE (CFS) = 6
TIME (MIN) = 266 DISCHARGE (CFS) = 4.7
TIME (MIN) = 273 DISCHARGE (CFS) = 4
TIME (MIN) = 280 DISCHARGE (CFS) = 3.4
TIME (MIN) = 287 DISCHARGE (CFS) = 3.1
TIME (MIN) = 294 DISCHARGE (CFS) = 2.8
TIME (MIN) = 301 DISCHARGE (CFS) = 2.6
TIME (MIN) = 308 DISCHARGE (CFS) = 2.4
TIME (MIN) = 315 DISCHARGE (CFS) = 2.2
TIME (MIN) = 322 DISCHARGE (CFS) = 2.1
TIME (MIN) = 329 DISCHARGE (CFS) = 2
TIME (MIN) = 336 DISCHARGE (CFS) = 1.9
TIME (MIN) = 343 DISCHARGE (CFS) = 1.8
TIME (MIN) = 350 DISCHARGE (CFS) = 1.7
TIME (MIN) = 357 DISCHARGE (CFS) = 1.7
TIME (MIN) = 364 DISCHARGE (CFS) = 0

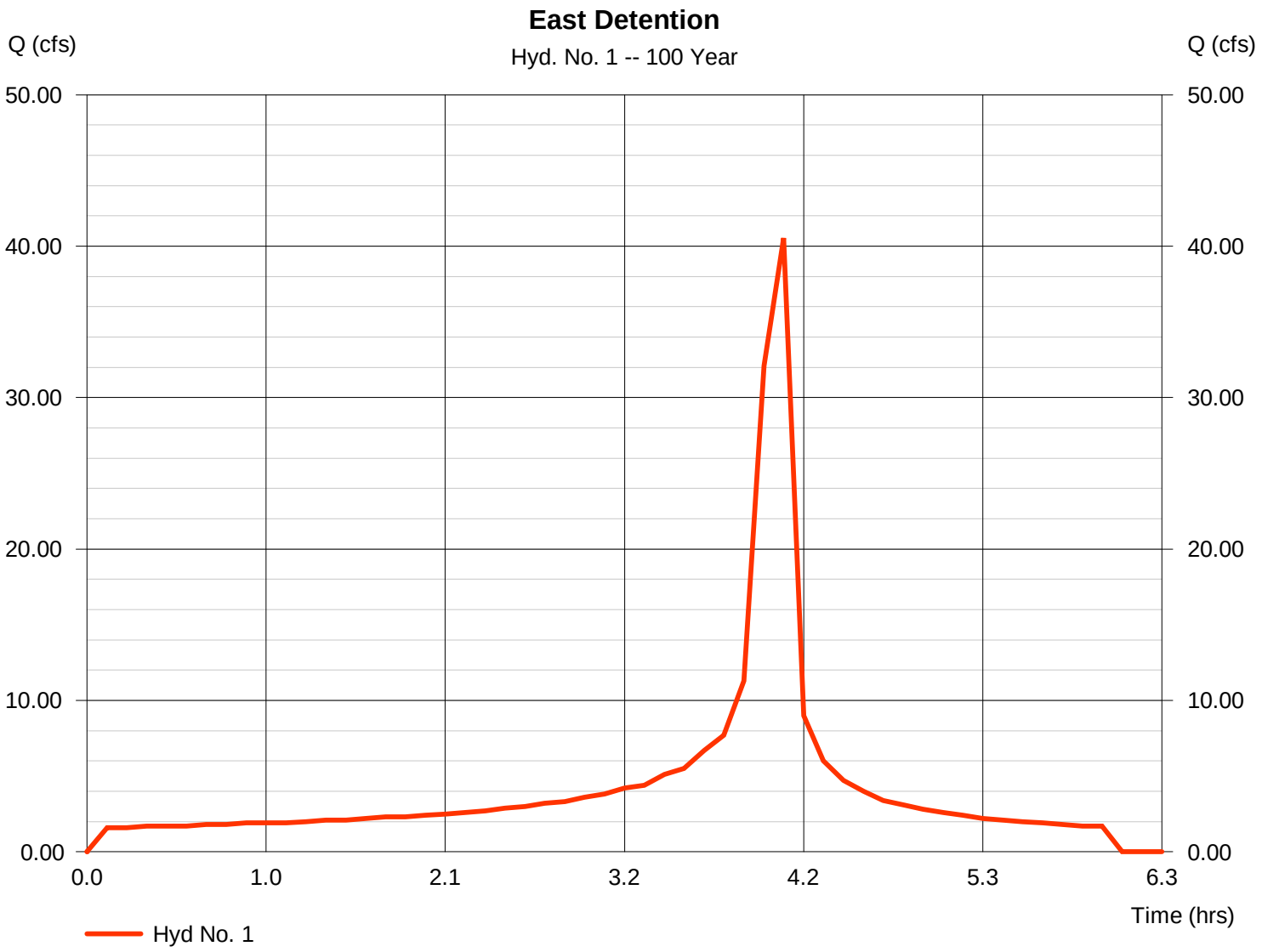
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 10, 2012

Hyd. No. 1

East Detention

Hydrograph type	= Manual	Peak discharge	= 40.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 7 min	Hyd. volume	= 96,411 cuft



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 10, 2012

Pond No. 1 - East Detention

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 164.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	164.00	6,100	0	0
1.00	165.00	9,700	7,900	7,900
2.00	166.00	13,600	11,650	19,550
3.00	167.00	17,400	15,500	35,050
4.00	168.00	21,300	19,350	54,400
5.00	169.00	25,300	23,300	77,700
6.00	170.00	29,300	27,300	105,000

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	10.00	0.00
Span (in)	= 18.00	3.00	10.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 161.00	164.01	166.00	0.00
Length (ft)	= 550.00	0.01	0.01	0.00
Slope (%)	= 0.50	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

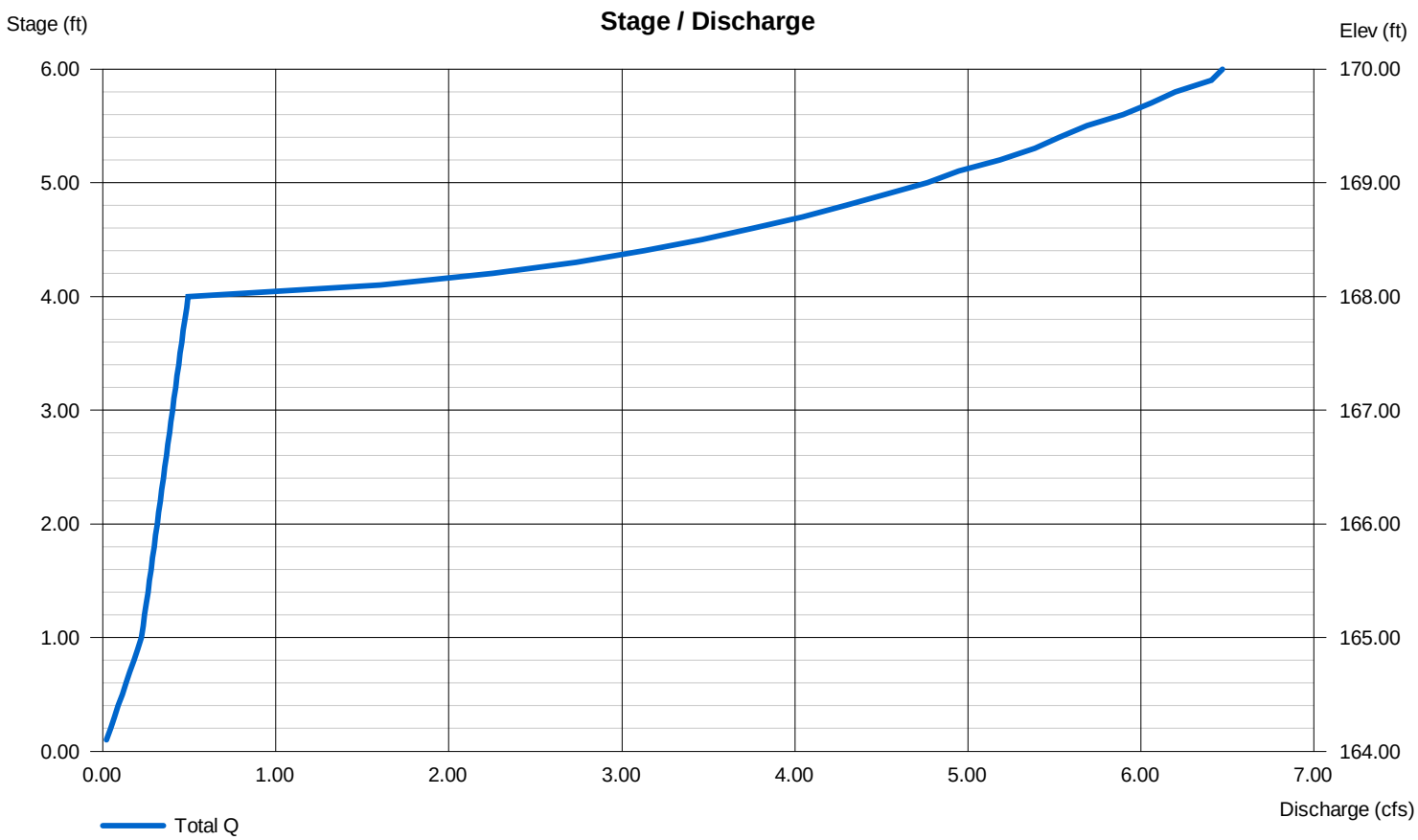
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 168.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 168.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 10, 2012

Pond No. 1 - East Detention

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 164.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	164.00	6,100	0	0
1.00	165.00	9,700	7,900	7,900
2.00	166.00	13,600	11,650	19,550
3.00	167.00	17,400	15,500	35,050
4.00	168.00	21,300	19,350	54,400
5.00	169.00	25,300	23,300	77,700
6.00	170.00	29,300	27,300	105,000

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	10.00	0.00
Span (in)	= 18.00	3.00	10.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 161.00	164.01	166.00	0.00
Length (ft)	= 550.00	0.01	0.01	0.00
Slope (%)	= 0.50	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

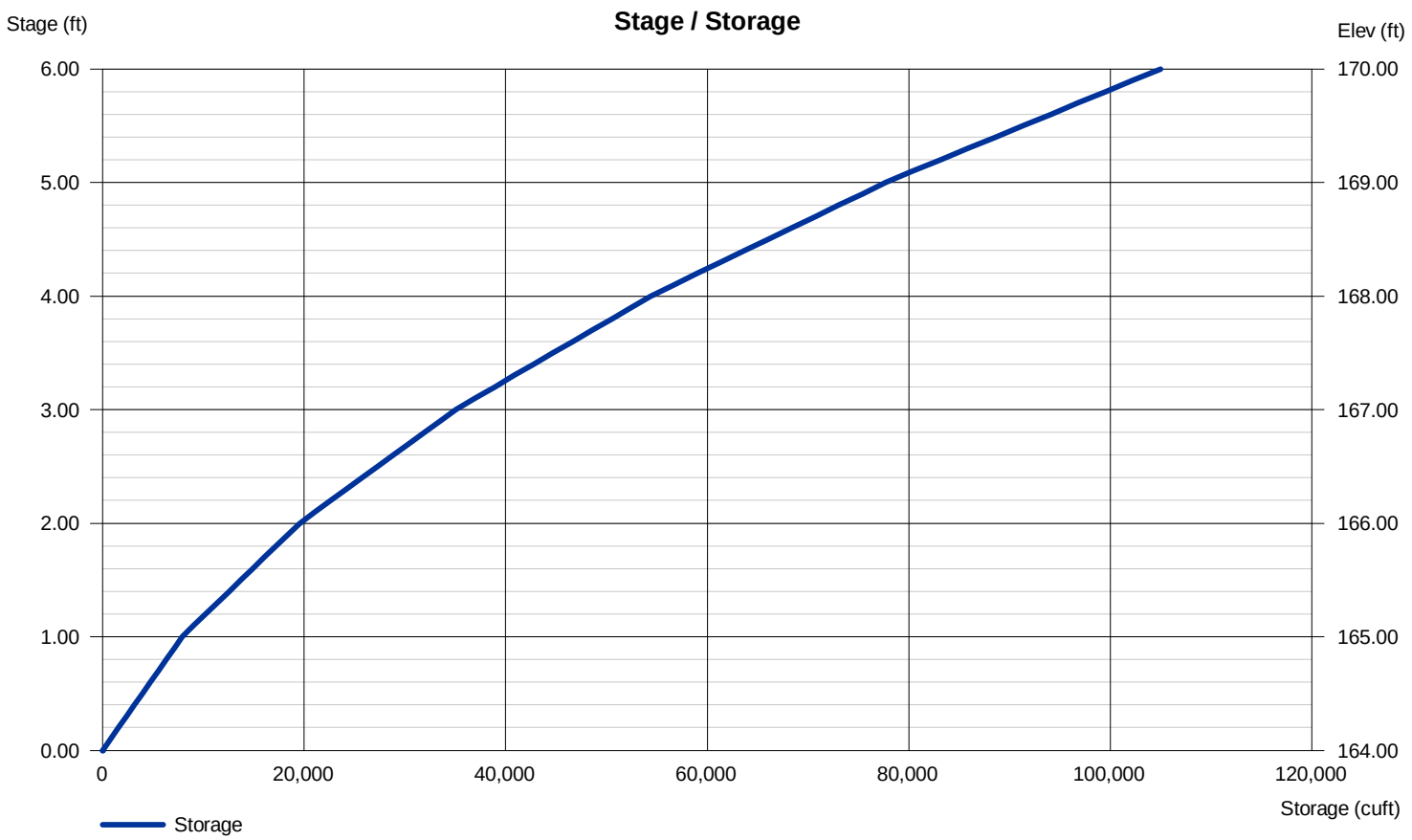
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 168.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 168.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

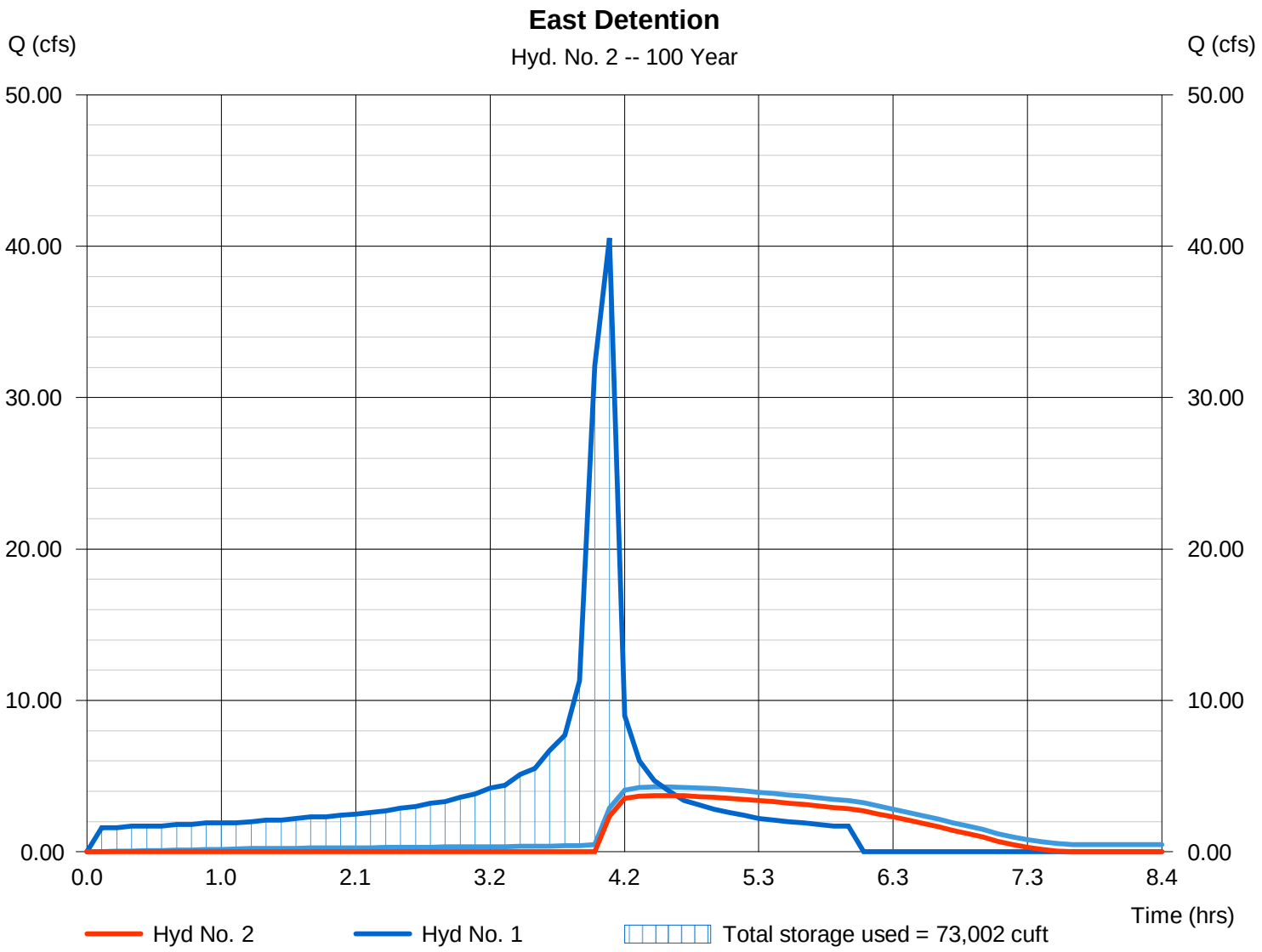
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 10, 2012

Hyd. No. 2

East Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.724 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.55 hrs
Time interval	= 7 min	Hyd. volume	= 31,557 cuft
Inflow hyd. No.	= 1 - East Detention	Max. Elevation	= 168.80 ft
Reservoir name	= East Detention	Max. Storage	= 73,002 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

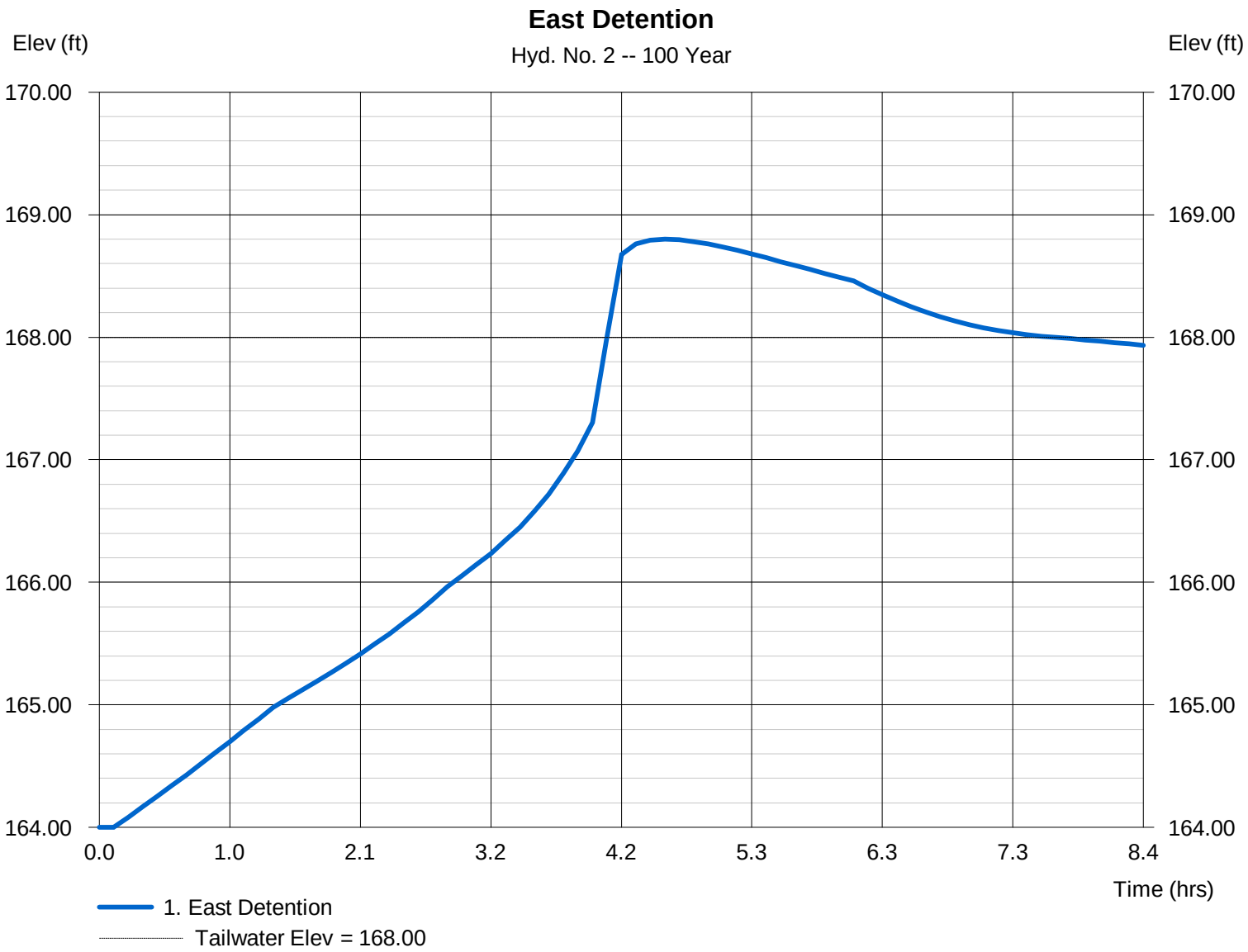
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 10, 2012

Hyd. No. 2

East Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.724 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.55 hrs
Time interval	= 7 min	Hyd. volume	= 31,557 cuft
Inflow hyd. No.	= 1 - East Detention	Max. Elevation	= 168.80 ft
Reservoir name	= East Detention	Max. Storage	= 73,002 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



10 Year Storm – AES Results to use in Detention Basin Analysis

Per Isopluvials found in 2003 Hydrology Manual
10 Year P_6 = 2.1
10 Year P_{24} = 3.5

Extended Detention Basin 2A
Use data from Node 202

Q_{10} = 19.19 cfs
Tc = 8.67 min
A = 9.6 ac

Extended Detention Basin 2B
Use data from Node 236.1

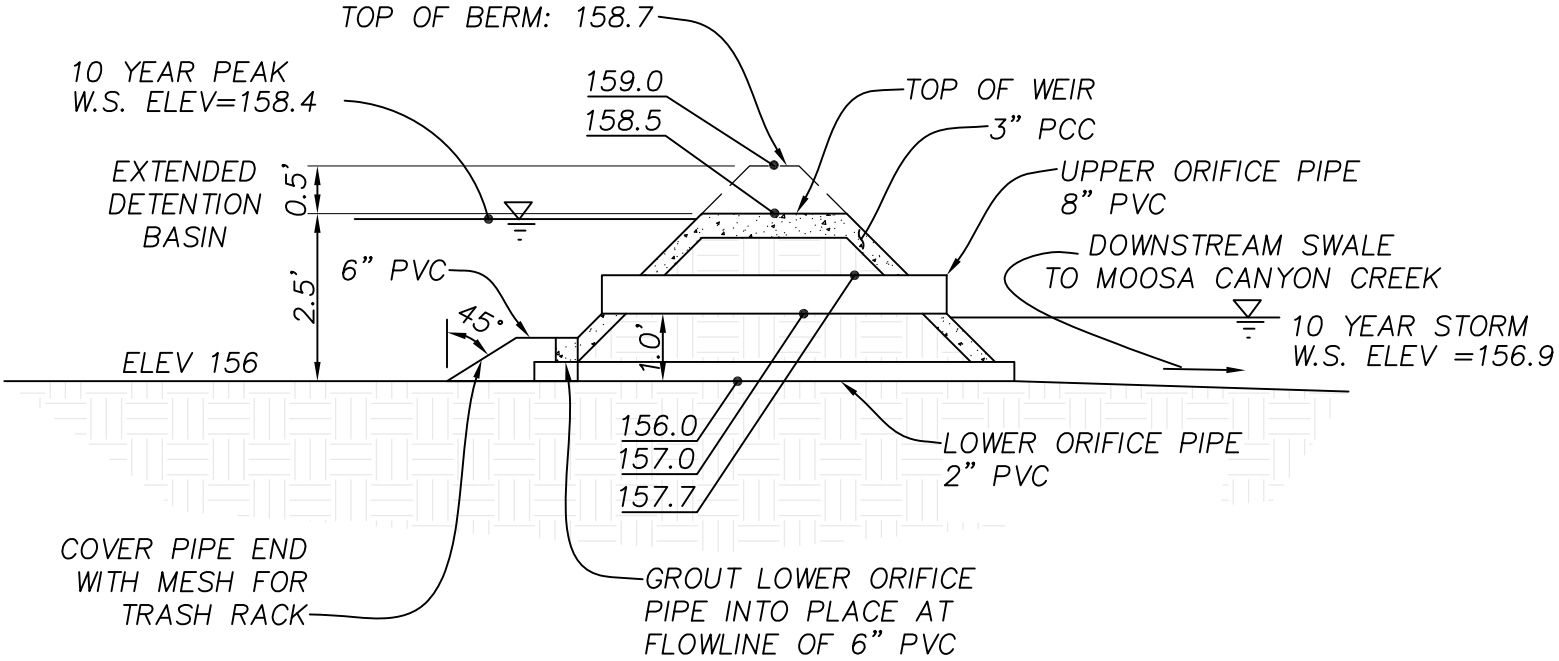
Q_{10} = 10.33 cfs
Tc = 8.03 min
A = 4.8 ac

Extended Detention Basin 2C
Use data from Node 220.1

Q_{10} = 27.82 cfs
Tc = 7.32 min
A = 15.4 ac

Extended Detention Basin 2D
With a detention basin holding back flows, at Tc=11 min, EDB 2C does not have a significant Qout, thus only peak flow from Node 213-212 were considered

Q_{10} = 25.78 cfs
Tc = 10.99 min
A = 11.0 ac



EXTENDED DETENTION BASINS 2A

NOT TO SCALE

10 Year Storm

RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 2/14/2012

TIME OF CONCENTRATION 9 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 9.6 ACRES
RUNOFF COEFFICIENT 0.57
PEAK DISCHARGE 19.19 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0
TIME (MIN) = 9 DISCHARGE (CFS) = 0
TIME (MIN) = 18 DISCHARGE (CFS) = 0.7
TIME (MIN) = 27 DISCHARGE (CFS) = 0.7
TIME (MIN) = 36 DISCHARGE (CFS) = 0.7
TIME (MIN) = 45 DISCHARGE (CFS) = 0.7
TIME (MIN) = 54 DISCHARGE (CFS) = 0.8
TIME (MIN) = 63 DISCHARGE (CFS) = 0.8
TIME (MIN) = 72 DISCHARGE (CFS) = 0.8
TIME (MIN) = 81 DISCHARGE (CFS) = 0.8
TIME (MIN) = 90 DISCHARGE (CFS) = 0.9
TIME (MIN) = 99 DISCHARGE (CFS) = 0.9
TIME (MIN) = 108 DISCHARGE (CFS) = 1
TIME (MIN) = 117 DISCHARGE (CFS) = 1
TIME (MIN) = 126 DISCHARGE (CFS) = 1
TIME (MIN) = 135 DISCHARGE (CFS) = 1.1
TIME (MIN) = 144 DISCHARGE (CFS) = 1.2
TIME (MIN) = 153 DISCHARGE (CFS) = 1.2
TIME (MIN) = 162 DISCHARGE (CFS) = 1.3
TIME (MIN) = 171 DISCHARGE (CFS) = 1.4
TIME (MIN) = 180 DISCHARGE (CFS) = 1.5
TIME (MIN) = 189 DISCHARGE (CFS) = 1.6
TIME (MIN) = 198 DISCHARGE (CFS) = 1.9
TIME (MIN) = 207 DISCHARGE (CFS) = 2
TIME (MIN) = 216 DISCHARGE (CFS) = 2.5
TIME (MIN) = 225 DISCHARGE (CFS) = 2.8
TIME (MIN) = 234 DISCHARGE (CFS) = 4.1
TIME (MIN) = 243 DISCHARGE (CFS) = 7.3
TIME (MIN) = 252 DISCHARGE (CFS) = 19.19
TIME (MIN) = 261 DISCHARGE (CFS) = 3.3
TIME (MIN) = 270 DISCHARGE (CFS) = 2.2
TIME (MIN) = 279 DISCHARGE (CFS) = 1.7
TIME (MIN) = 288 DISCHARGE (CFS) = 1.4
TIME (MIN) = 297 DISCHARGE (CFS) = 1.3
TIME (MIN) = 306 DISCHARGE (CFS) = 1.1
TIME (MIN) = 315 DISCHARGE (CFS) = 1
TIME (MIN) = 324 DISCHARGE (CFS) = 0.9
TIME (MIN) = 333 DISCHARGE (CFS) = 0.9
TIME (MIN) = 342 DISCHARGE (CFS) = 0.8
TIME (MIN) = 351 DISCHARGE (CFS) = 0.8
TIME (MIN) = 360 DISCHARGE (CFS) = 0.7
TIME (MIN) = 369 DISCHARGE (CFS) = 0

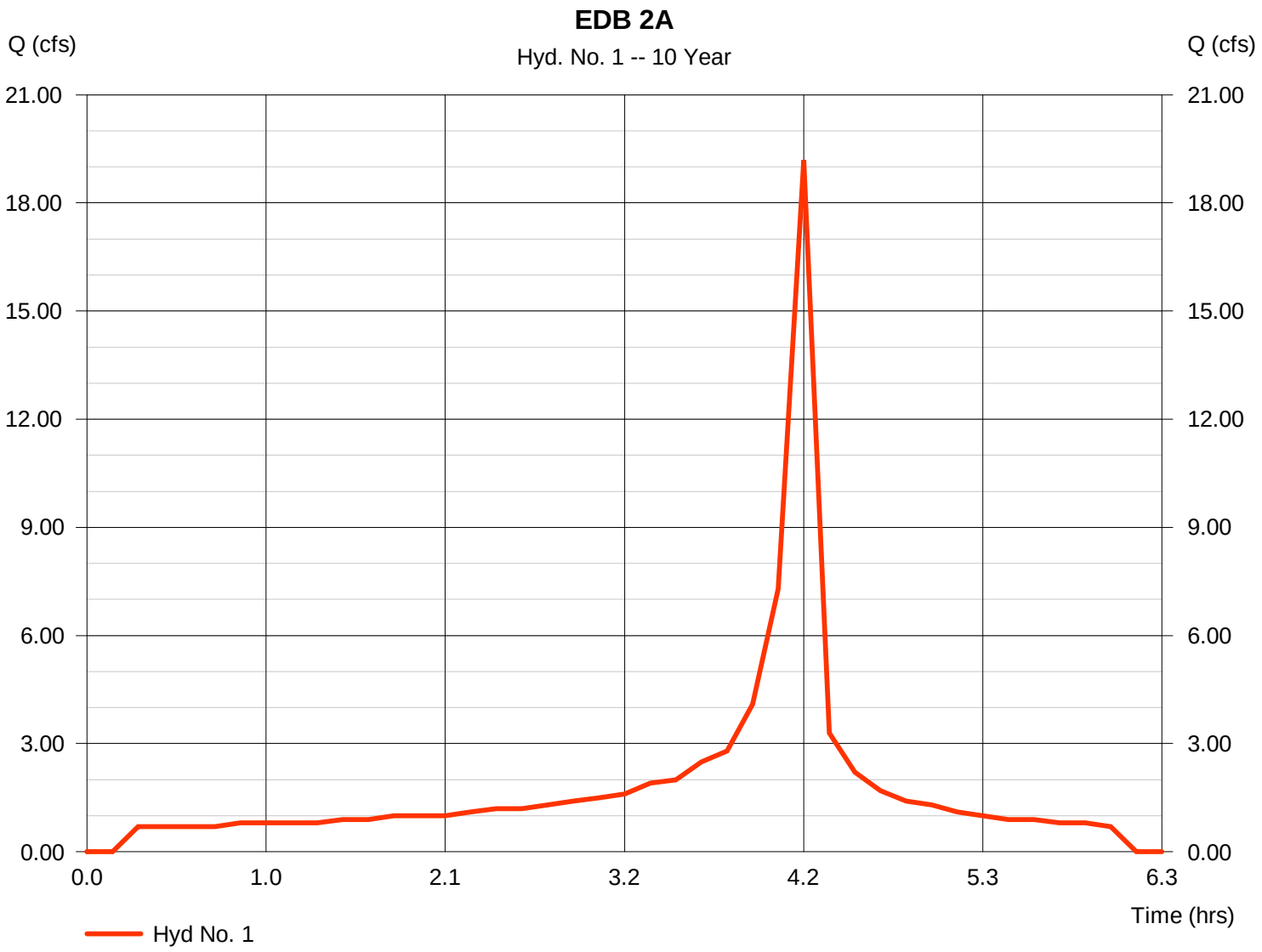
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 1

EDB 2A

Hydrograph type	= Manual	Peak discharge	= 19.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.20 hrs
Time interval	= 9 min	Hyd. volume	= 41,035 cuft



Hydrograph Report

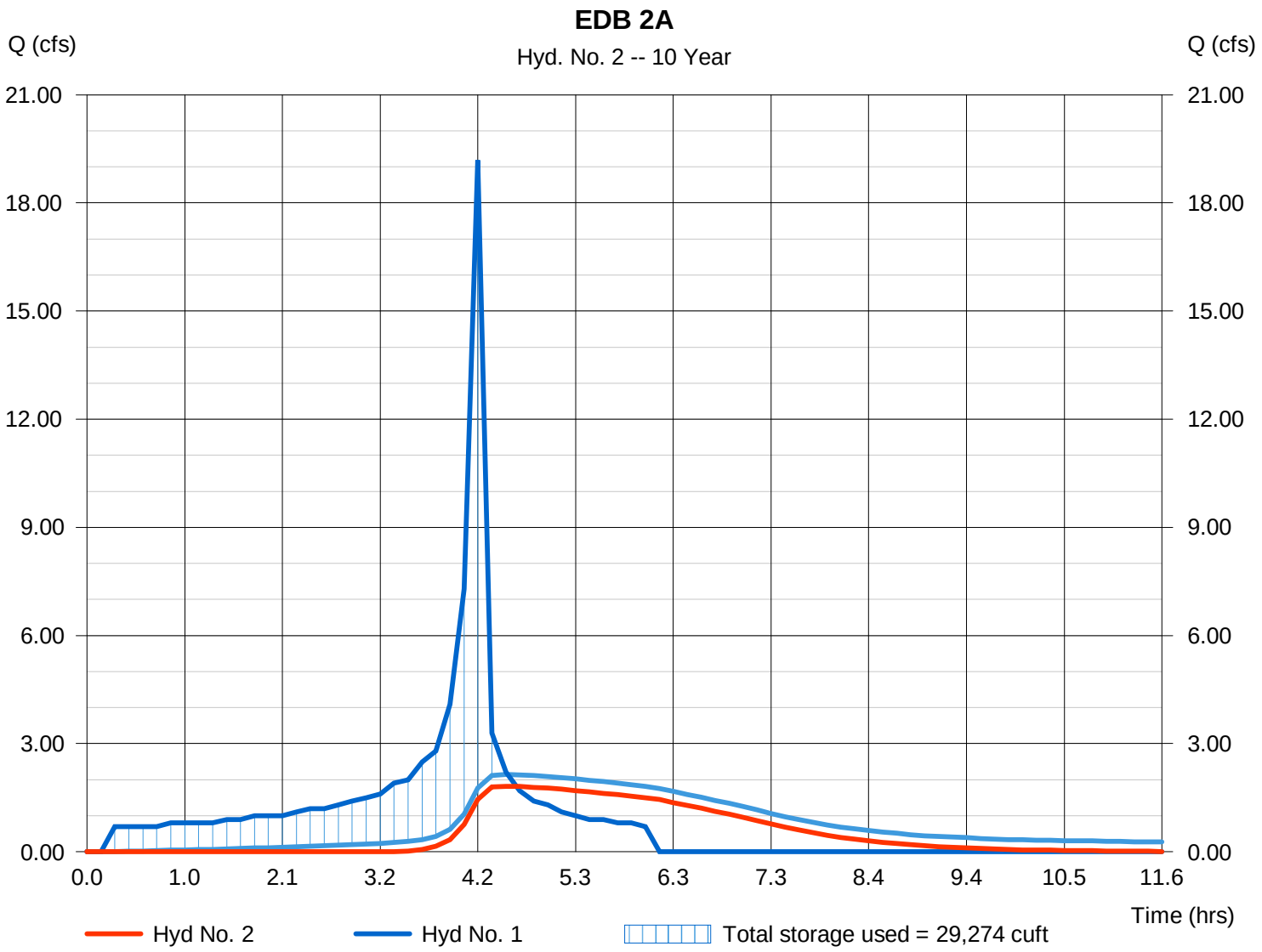
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 2

EDB 2A

Hydrograph type	= Reservoir	Peak discharge	= 1.814 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.50 hrs
Time interval	= 9 min	Hyd. volume	= 20,703 cuft
Inflow hyd. No.	= 1 - EDB 2A	Max. Elevation	= 158.41 ft
Reservoir name	= EDB 2A	Max. Storage	= 29,274 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Pond No. 1 - EDB 2A

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 156.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	156.00	10,165	0	0
1.00	157.00	11,800	10,983	10,983
2.00	158.00	13,500	12,650	23,633
2.50	158.50	14,369	6,967	30,600
3.00	159.00	15,252	7,405	38,005

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	8.00	0.00	0.00
Span (in)	= 2.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 156.00	157.00	0.00	0.00
Length (ft)	= 20.00	20.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

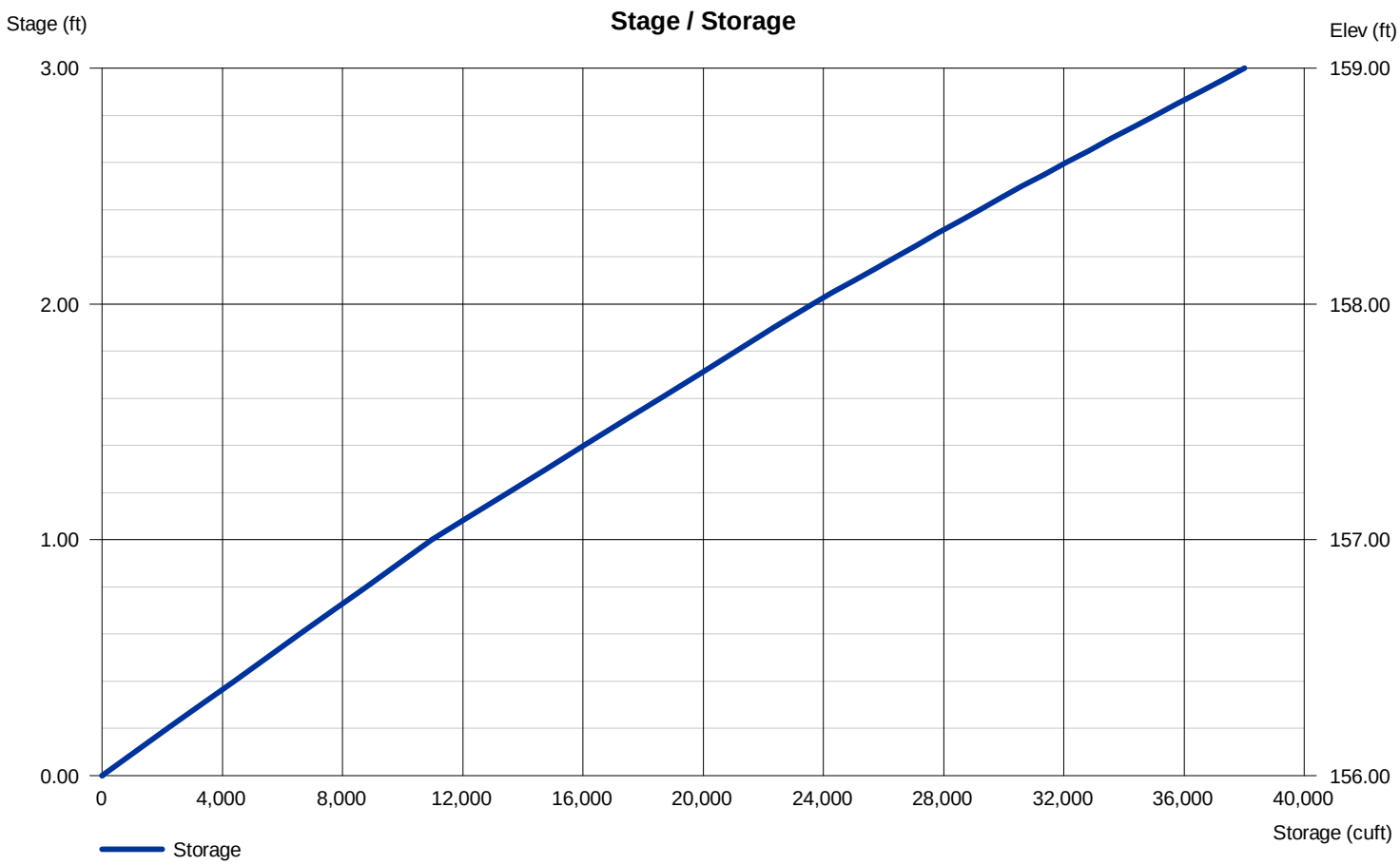
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 158.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 156.90

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Pond No. 1 - EDB 2A

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 156.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	156.00	10,165	0	0
1.00	157.00	11,800	10,983	10,983
2.00	158.00	13,500	12,650	23,633
2.50	158.50	14,369	6,967	30,600
3.00	159.00	15,252	7,405	38,005

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	8.00	0.00	0.00
Span (in)	= 2.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 156.00	157.00	0.00	0.00
Length (ft)	= 20.00	20.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

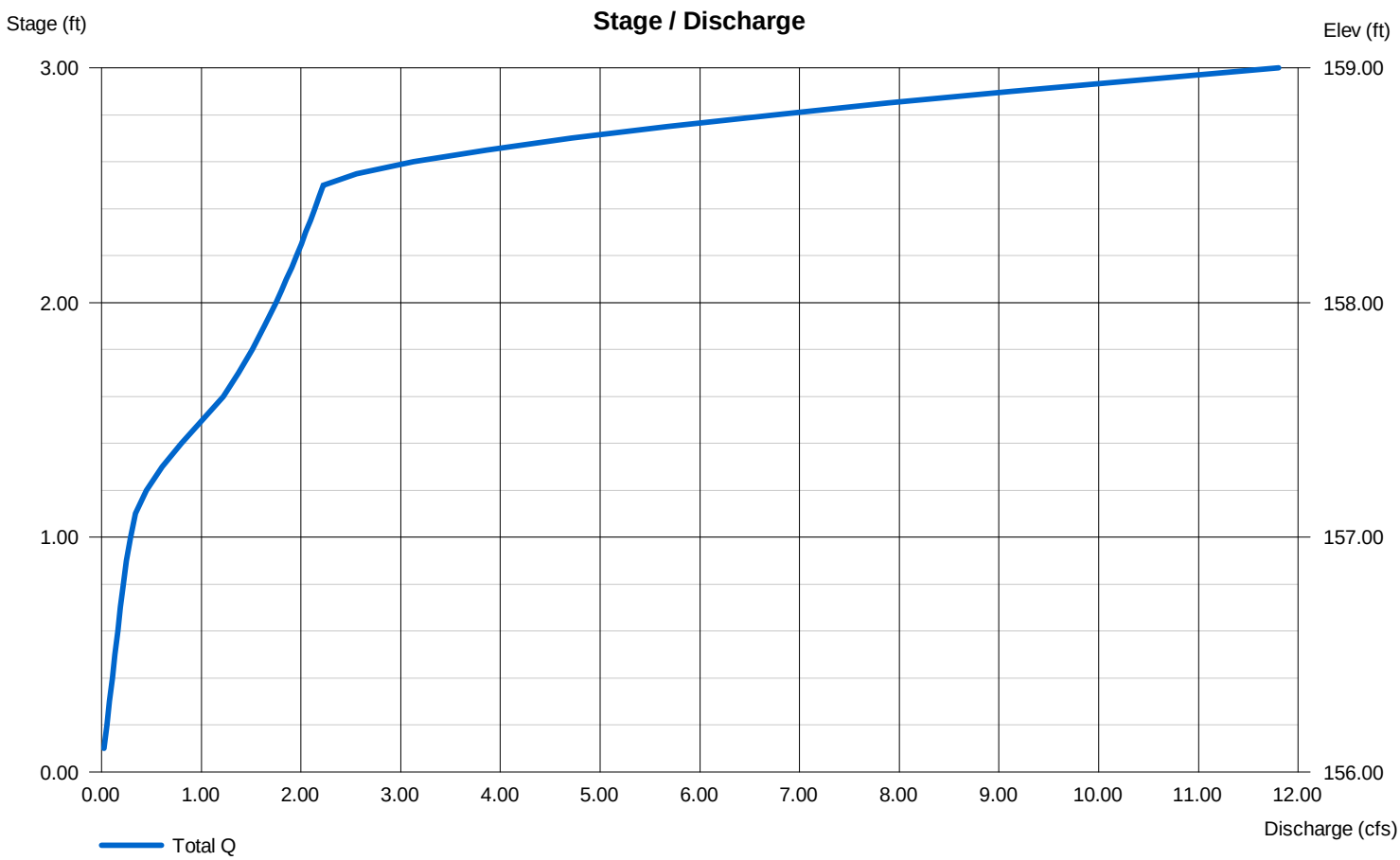
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 158.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 156.90

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

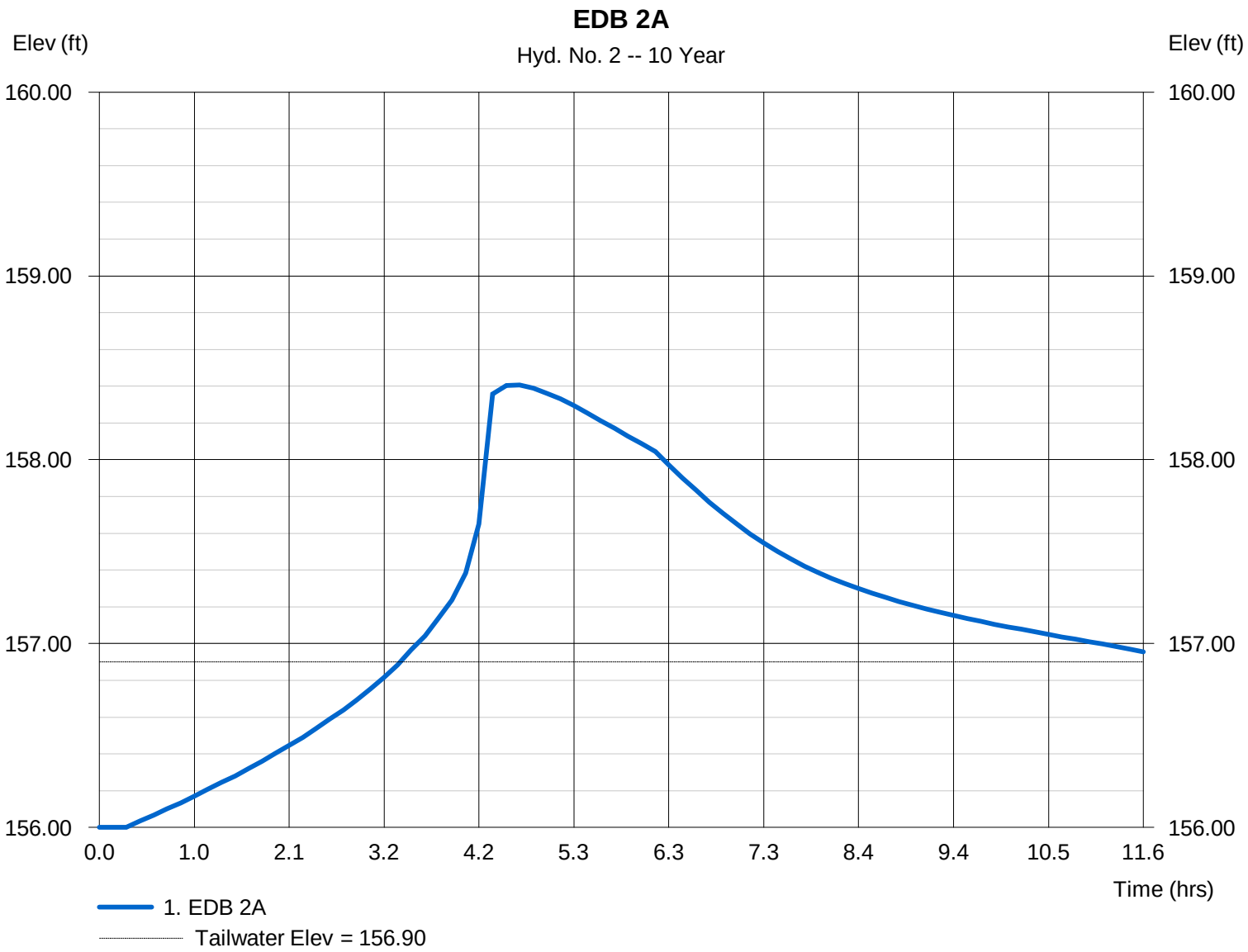
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

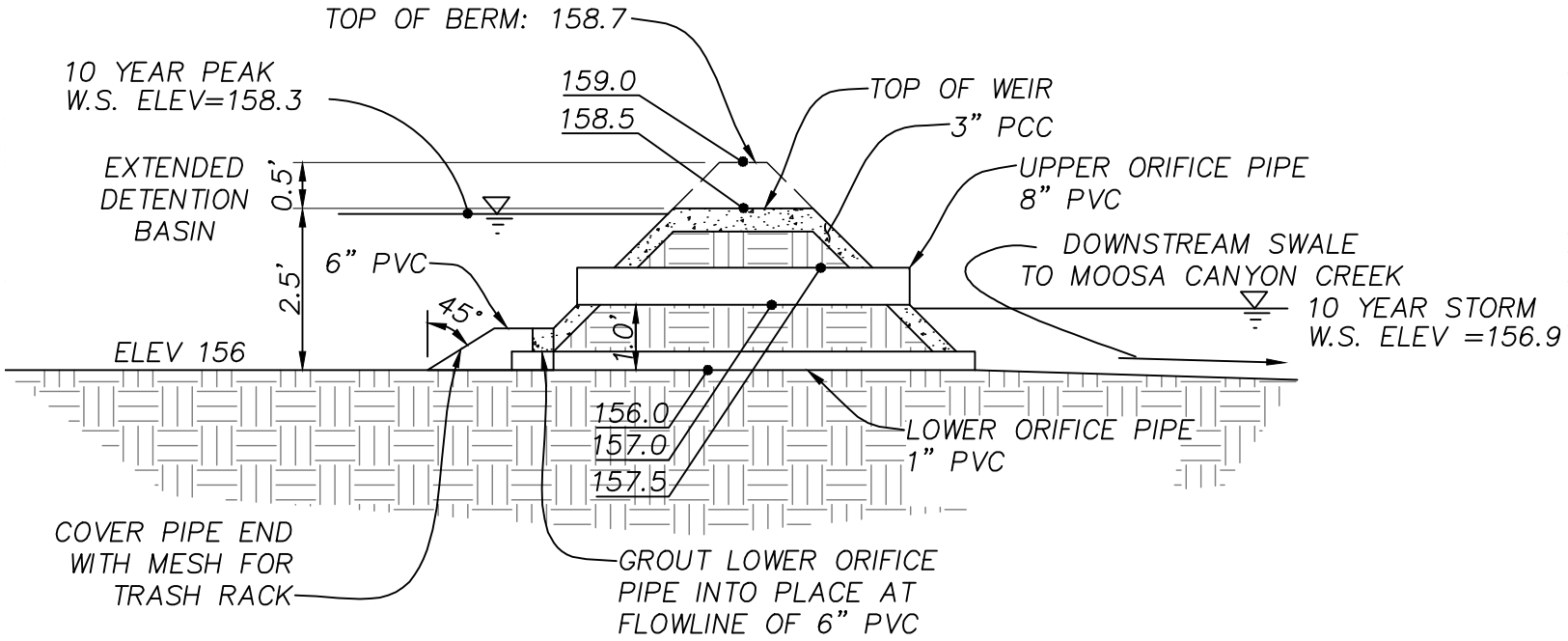
Hyd. No. 2

EDB 2A

Hydrograph type	= Reservoir	Peak discharge	= 1.814 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.50 hrs
Time interval	= 9 min	Hyd. volume	= 20,703 cuft
Inflow hyd. No.	= 1 - EDB 2A	Max. Elevation	= 158.41 ft
Reservoir name	= EDB 2A	Max. Storage	= 29,274 cuft

Storage Indication method used. Exfiltration extracted from Outflow.





EXTENDED DETENTION BASINS 2B

NOT TO SCALE

10 Year Storm

RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 2/13/2012

TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 4.8 ACRES
RUNOFF COEFFICIENT 0.57
PEAK DISCHARGE 10.33 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0
TIME (MIN) = 8 DISCHARGE (CFS) = 0.3
TIME (MIN) = 16 DISCHARGE (CFS) = 0.3
TIME (MIN) = 24 DISCHARGE (CFS) = 0.4
TIME (MIN) = 32 DISCHARGE (CFS) = 0.4
TIME (MIN) = 40 DISCHARGE (CFS) = 0.4
TIME (MIN) = 48 DISCHARGE (CFS) = 0.4
TIME (MIN) = 56 DISCHARGE (CFS) = 0.4
TIME (MIN) = 64 DISCHARGE (CFS) = 0.4
TIME (MIN) = 72 DISCHARGE (CFS) = 0.4
TIME (MIN) = 80 DISCHARGE (CFS) = 0.4
TIME (MIN) = 88 DISCHARGE (CFS) = 0.4
TIME (MIN) = 96 DISCHARGE (CFS) = 0.5
TIME (MIN) = 104 DISCHARGE (CFS) = 0.5
TIME (MIN) = 112 DISCHARGE (CFS) = 0.5
TIME (MIN) = 120 DISCHARGE (CFS) = 0.5
TIME (MIN) = 128 DISCHARGE (CFS) = 0.5
TIME (MIN) = 136 DISCHARGE (CFS) = 0.6
TIME (MIN) = 144 DISCHARGE (CFS) = 0.6
TIME (MIN) = 152 DISCHARGE (CFS) = 0.6
TIME (MIN) = 160 DISCHARGE (CFS) = 0.7
TIME (MIN) = 168 DISCHARGE (CFS) = 0.7
TIME (MIN) = 176 DISCHARGE (CFS) = 0.7
TIME (MIN) = 184 DISCHARGE (CFS) = 0.8
TIME (MIN) = 192 DISCHARGE (CFS) = 0.9
TIME (MIN) = 200 DISCHARGE (CFS) = 1
TIME (MIN) = 208 DISCHARGE (CFS) = 1.1
TIME (MIN) = 216 DISCHARGE (CFS) = 1.3
TIME (MIN) = 224 DISCHARGE (CFS) = 1.5
TIME (MIN) = 232 DISCHARGE (CFS) = 2.2
TIME (MIN) = 240 DISCHARGE (CFS) = 4
TIME (MIN) = 248 DISCHARGE (CFS) = 10.33
TIME (MIN) = 256 DISCHARGE (CFS) = 1.8
TIME (MIN) = 264 DISCHARGE (CFS) = 1.2
TIME (MIN) = 272 DISCHARGE (CFS) = 0.9
TIME (MIN) = 280 DISCHARGE (CFS) = 0.8
TIME (MIN) = 288 DISCHARGE (CFS) = 0.7
TIME (MIN) = 296 DISCHARGE (CFS) = 0.6
TIME (MIN) = 304 DISCHARGE (CFS) = 0.5
TIME (MIN) = 312 DISCHARGE (CFS) = 0.5
TIME (MIN) = 320 DISCHARGE (CFS) = 0.5
TIME (MIN) = 328 DISCHARGE (CFS) = 0.4
TIME (MIN) = 336 DISCHARGE (CFS) = 0.4
TIME (MIN) = 344 DISCHARGE (CFS) = 0.4
TIME (MIN) = 352 DISCHARGE (CFS) = 0.4
TIME (MIN) = 360 DISCHARGE (CFS) = 0.4
TIME (MIN) = 368 DISCHARGE (CFS) = 0

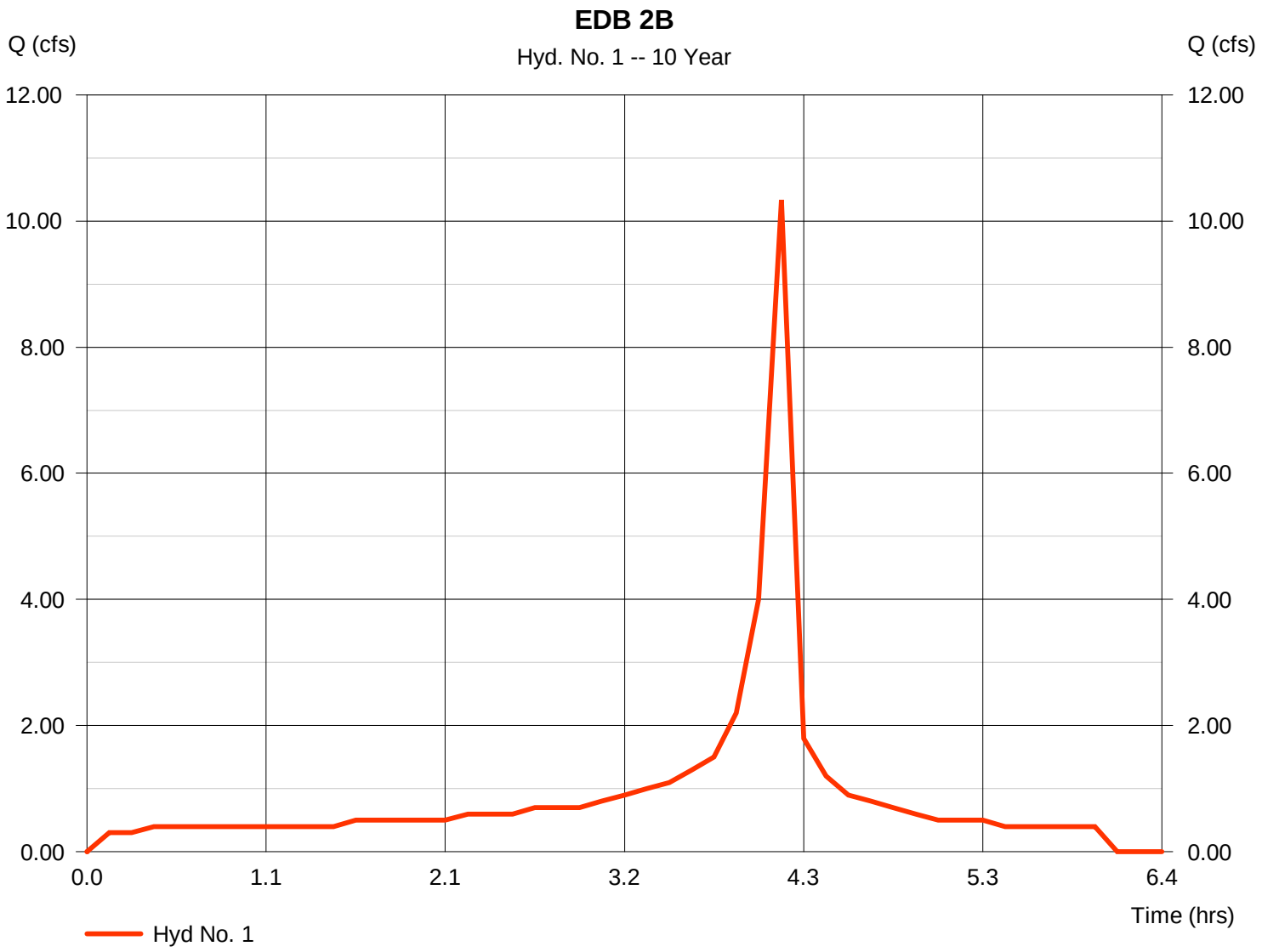
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 1

EDB 2B

Hydrograph type	= Manual	Peak discharge	= 10.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.13 hrs
Time interval	= 8 min	Hyd. volume	= 20,750 cuft



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 6, 2012

Pond No. 1 - EDB 2B

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 156.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	156.00	4,840	0	0
1.00	157.00	5,842	5,341	5,341
2.00	158.00	6,900	6,371	11,712
2.50	158.50	7,451	3,588	15,300
3.00	159.00	8,016	3,867	19,167

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 1.00	8.00	0.00	0.00
Span (in)	= 1.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 156.00	157.00	0.00	0.00
Length (ft)	= 20.00	20.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

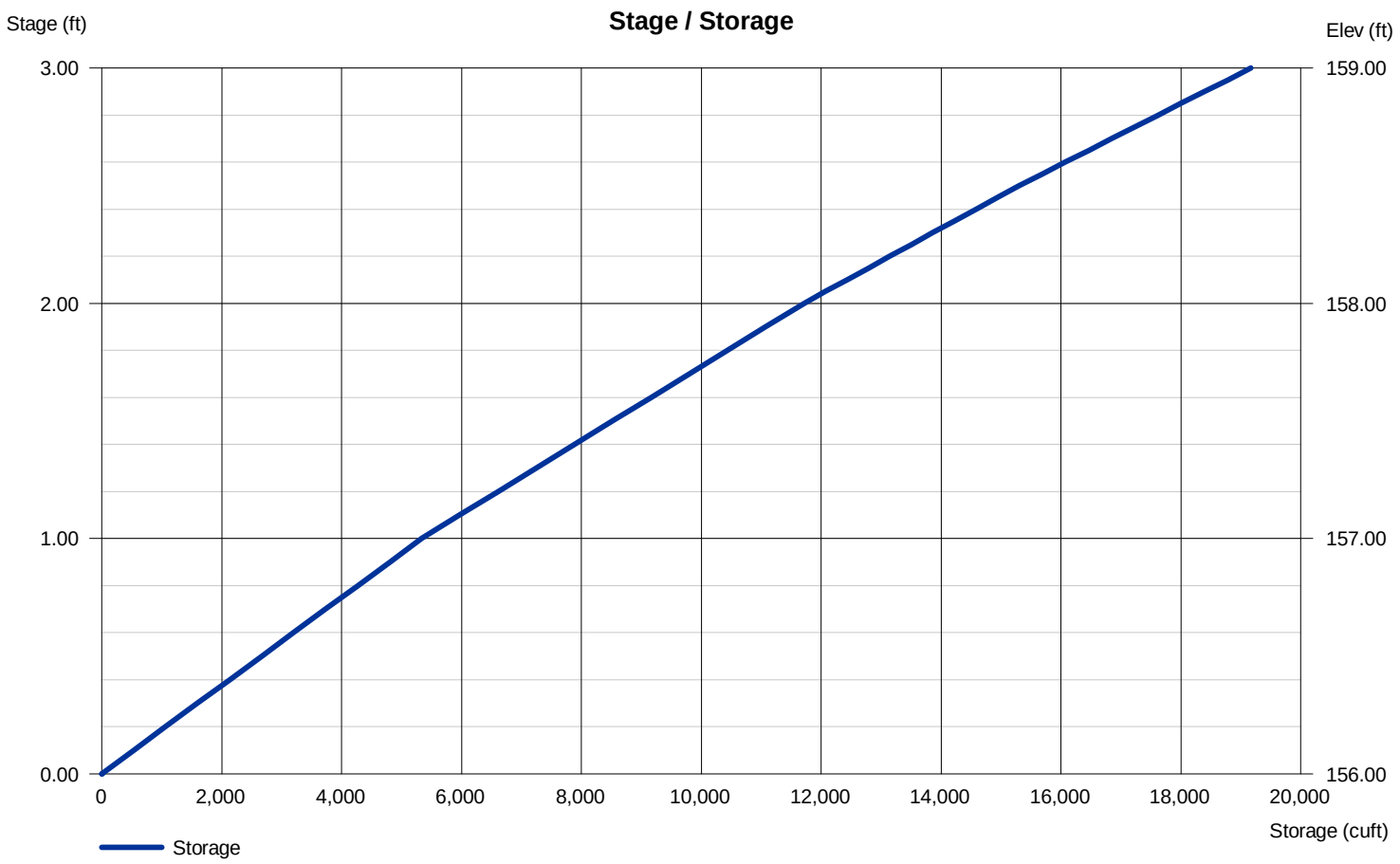
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 158.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 156.90

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 6, 2012

Pond No. 1 - EDB 2B

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 156.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	156.00	4,840	0	0
1.00	157.00	5,842	5,341	5,341
2.00	158.00	6,900	6,371	11,712
2.50	158.50	7,451	3,588	15,300
3.00	159.00	8,016	3,867	19,167

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 1.00	8.00	0.00	0.00
Span (in)	= 1.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 156.00	157.00	0.00	0.00
Length (ft)	= 20.00	20.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

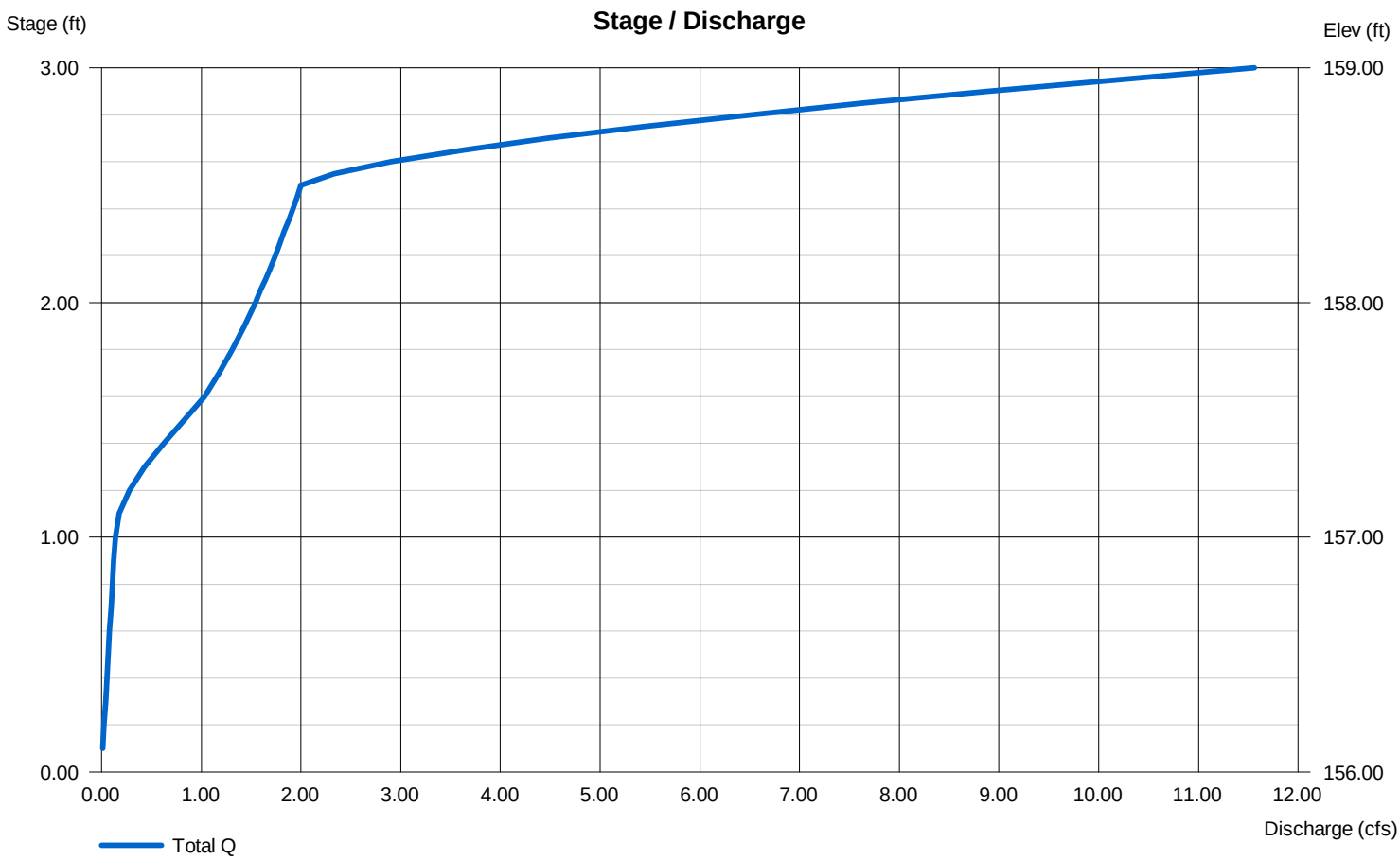
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 158.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 156.90

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

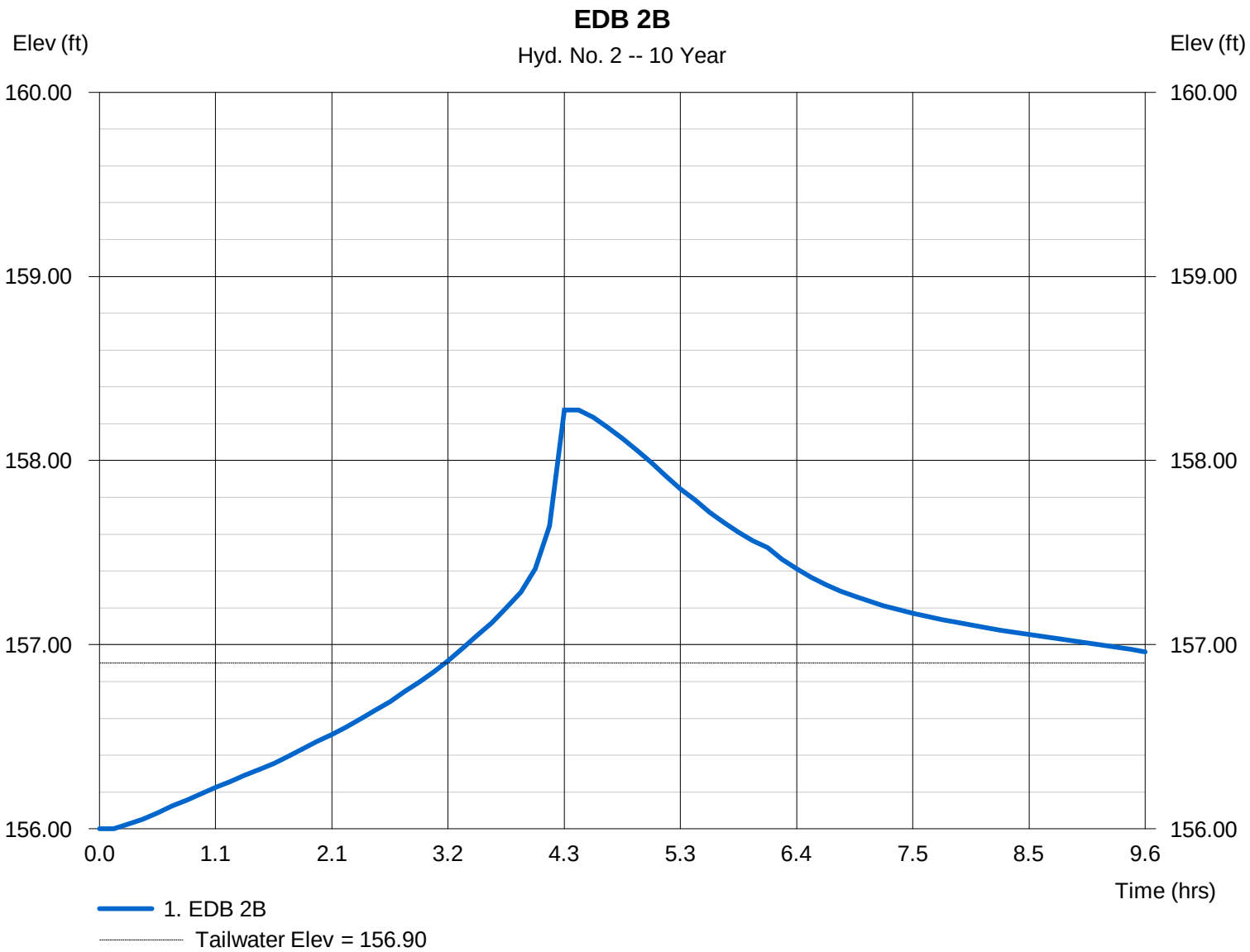
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Friday, 00 6, 2012

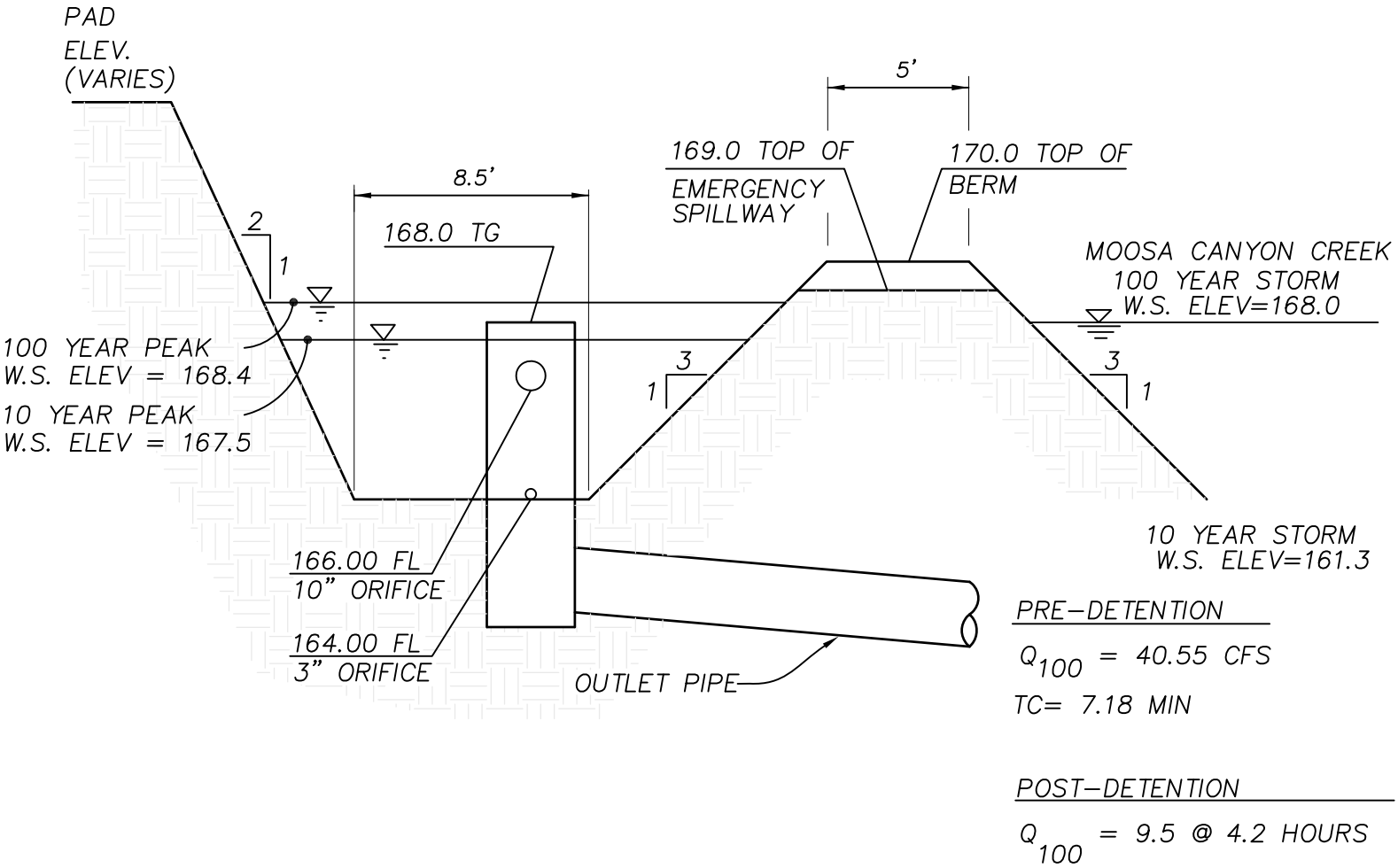
Hyd. No. 2

EDB 2B

Hydrograph type	= Reservoir	Peak discharge	= 1.643 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.27 hrs
Time interval	= 8 min	Hyd. volume	= 11,679 cuft
Inflow hyd. No.	= 1 - EDB 2B	Max. Elevation	= 158.28 ft
Reservoir name	= EDB 2B	Max. Storage	= 13,685 cuft

Storage Indication method used. Exfiltration extracted from Outflow.





PRE-DETENTION

Q_{100} = 40.55 CFS

TC= 7.18 MIN

POST-DETENTION

Q_{100} = 9.5 @ 4.2 HOURS

EXTENDED DETENTION BASIN 2C

NOT TO SCALE

10 Year Storm

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY
RUN DATE 2/14/2012

TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 15.4 ACRES
RUNOFF COEFFICIENT 0.57
PEAK DISCHARGE 27.82 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0
TIME (MIN) = 7 DISCHARGE (CFS) = 1.1
TIME (MIN) = 14 DISCHARGE (CFS) = 1.1
TIME (MIN) = 21 DISCHARGE (CFS) = 1.2
TIME (MIN) = 28 DISCHARGE (CFS) = 1.2
TIME (MIN) = 35 DISCHARGE (CFS) = 1.2
TIME (MIN) = 42 DISCHARGE (CFS) = 1.2
TIME (MIN) = 49 DISCHARGE (CFS) = 1.3
TIME (MIN) = 56 DISCHARGE (CFS) = 1.3
TIME (MIN) = 63 DISCHARGE (CFS) = 1.3
TIME (MIN) = 70 DISCHARGE (CFS) = 1.3
TIME (MIN) = 77 DISCHARGE (CFS) = 1.4
TIME (MIN) = 84 DISCHARGE (CFS) = 1.4
TIME (MIN) = 91 DISCHARGE (CFS) = 1.5
TIME (MIN) = 98 DISCHARGE (CFS) = 1.5
TIME (MIN) = 105 DISCHARGE (CFS) = 1.6
TIME (MIN) = 112 DISCHARGE (CFS) = 1.6
TIME (MIN) = 119 DISCHARGE (CFS) = 1.7
TIME (MIN) = 126 DISCHARGE (CFS) = 1.7
TIME (MIN) = 133 DISCHARGE (CFS) = 1.8
TIME (MIN) = 140 DISCHARGE (CFS) = 1.9
TIME (MIN) = 147 DISCHARGE (CFS) = 2
TIME (MIN) = 154 DISCHARGE (CFS) = 2
TIME (MIN) = 161 DISCHARGE (CFS) = 2.2
TIME (MIN) = 168 DISCHARGE (CFS) = 2.3
TIME (MIN) = 175 DISCHARGE (CFS) = 2.5
TIME (MIN) = 182 DISCHARGE (CFS) = 2.6
TIME (MIN) = 189 DISCHARGE (CFS) = 2.9
TIME (MIN) = 196 DISCHARGE (CFS) = 3
TIME (MIN) = 203 DISCHARGE (CFS) = 3.5
TIME (MIN) = 210 DISCHARGE (CFS) = 3.8
TIME (MIN) = 217 DISCHARGE (CFS) = 4.6
TIME (MIN) = 224 DISCHARGE (CFS) = 5.3
TIME (MIN) = 231 DISCHARGE (CFS) = 7.7
TIME (MIN) = 238 DISCHARGE (CFS) = 22.2
TIME (MIN) = 245 DISCHARGE (CFS) = 27.82
TIME (MIN) = 252 DISCHARGE (CFS) = 6.2
TIME (MIN) = 259 DISCHARGE (CFS) = 4.2
TIME (MIN) = 266 DISCHARGE (CFS) = 3.3
TIME (MIN) = 273 DISCHARGE (CFS) = 2.7
TIME (MIN) = 280 DISCHARGE (CFS) = 2.4
TIME (MIN) = 287 DISCHARGE (CFS) = 2.1
TIME (MIN) = 294 DISCHARGE (CFS) = 1.9
TIME (MIN) = 301 DISCHARGE (CFS) = 1.8
TIME (MIN) = 308 DISCHARGE (CFS) = 1.6
TIME (MIN) = 315 DISCHARGE (CFS) = 1.5

TIME (MIN) = 322 DISCHARGE (CFS) = 1.4
TIME (MIN) = 329 DISCHARGE (CFS) = 1.4
TIME (MIN) = 336 DISCHARGE (CFS) = 1.3
TIME (MIN) = 343 DISCHARGE (CFS) = 1.2
TIME (MIN) = 350 DISCHARGE (CFS) = 1.2
TIME (MIN) = 357 DISCHARGE (CFS) = 1.1
TIME (MIN) = 364 DISCHARGE (CFS) = 0

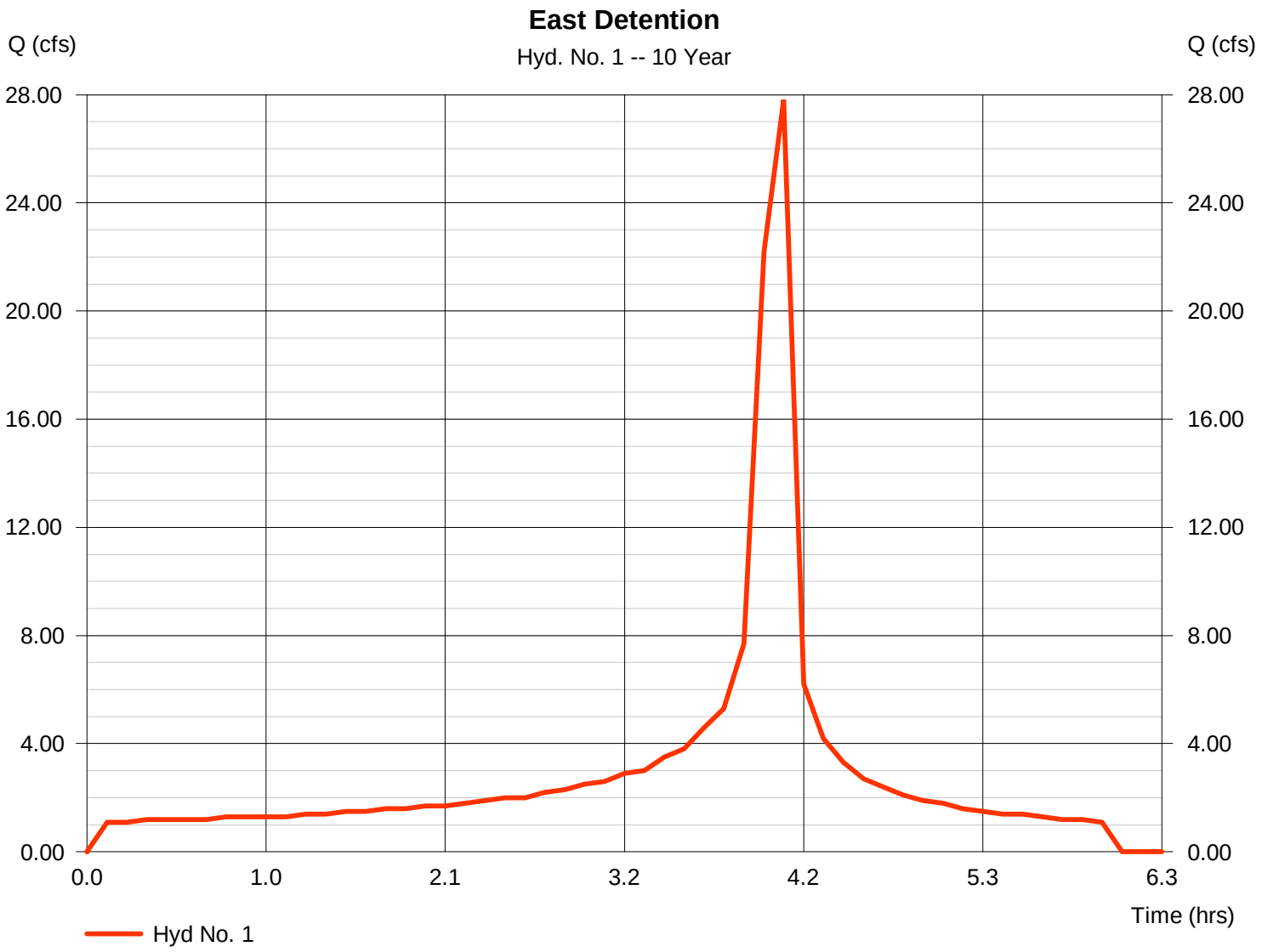
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 1

East Detention

Hydrograph type	= Manual	Peak discharge	= 27.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.08 hrs
Time interval	= 7 min	Hyd. volume	= 66,368 cuft



Hydrograph Report

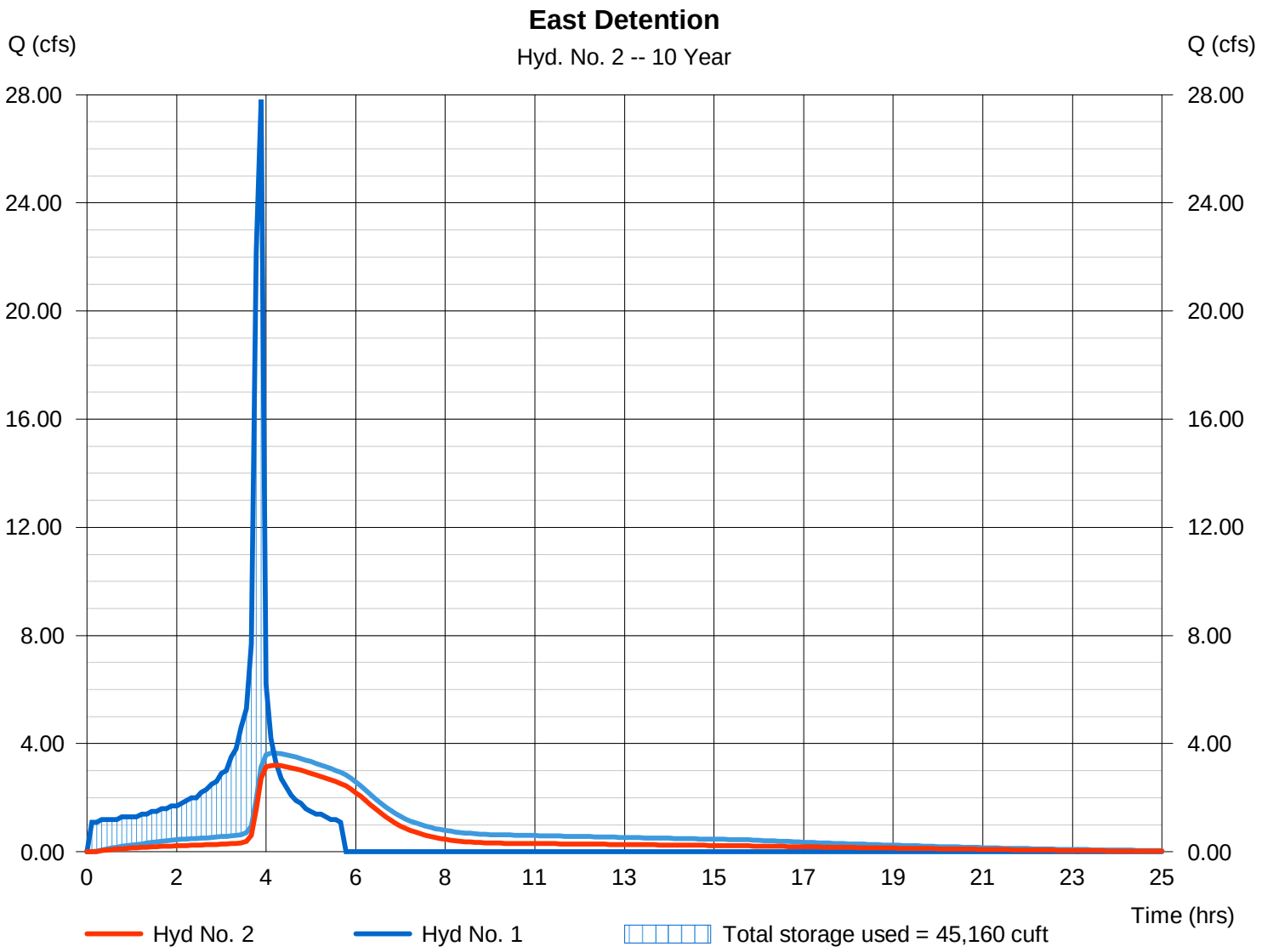
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 2

East Detention

Hydrograph type	= Reservoir	Peak discharge	= 3.196 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.43 hrs
Time interval	= 7 min	Hyd. volume	= 46,681 cuft
Inflow hyd. No.	= 1 - East Detention	Max. Elevation	= 167.53 ft
Reservoir name	= East Detention	Max. Storage	= 45,160 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Pond No. 1 - East Detention

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 164.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	164.00	6,100	0	0
1.00	165.00	9,700	7,900	7,900
2.00	166.00	13,600	11,650	19,550
3.00	167.00	17,400	15,500	35,050
4.00	168.00	21,300	19,350	54,400
5.00	169.00	25,300	23,300	77,700
6.00	170.00	29,300	27,300	105,000

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	10.00	0.00
Span (in)	= 18.00	3.00	10.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 161.00	164.01	166.00	0.00
Length (ft)	= 550.00	0.01	0.01	0.00
Slope (%)	= 0.50	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

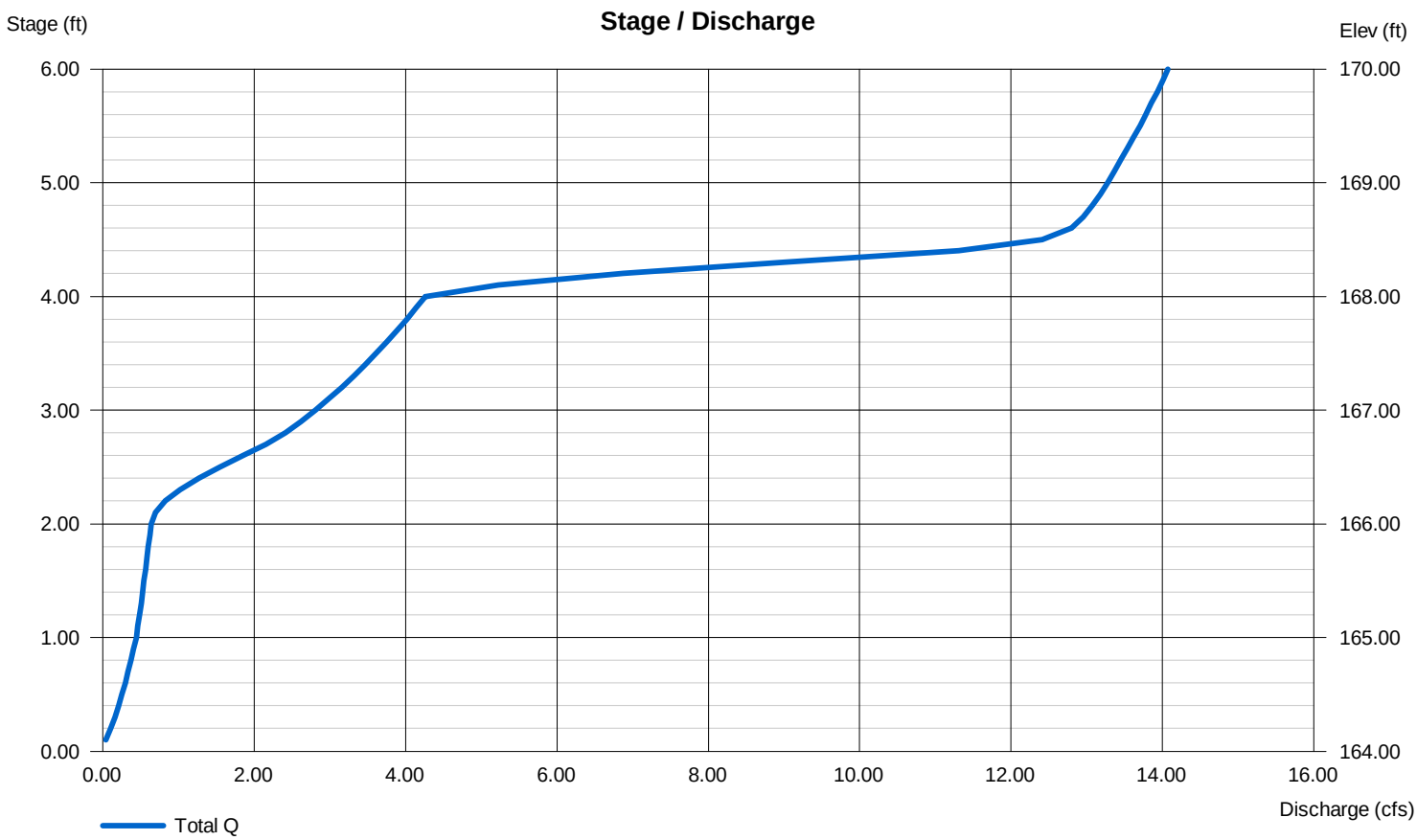
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 168.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Pond No. 1 - East Detention

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 164.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	164.00	6,100	0	0
1.00	165.00	9,700	7,900	7,900
2.00	166.00	13,600	11,650	19,550
3.00	167.00	17,400	15,500	35,050
4.00	168.00	21,300	19,350	54,400
5.00	169.00	25,300	23,300	77,700
6.00	170.00	29,300	27,300	105,000

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	10.00	0.00
Span (in)	= 18.00	3.00	10.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 161.00	164.01	166.00	0.00
Length (ft)	= 550.00	0.01	0.01	0.00
Slope (%)	= 0.50	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

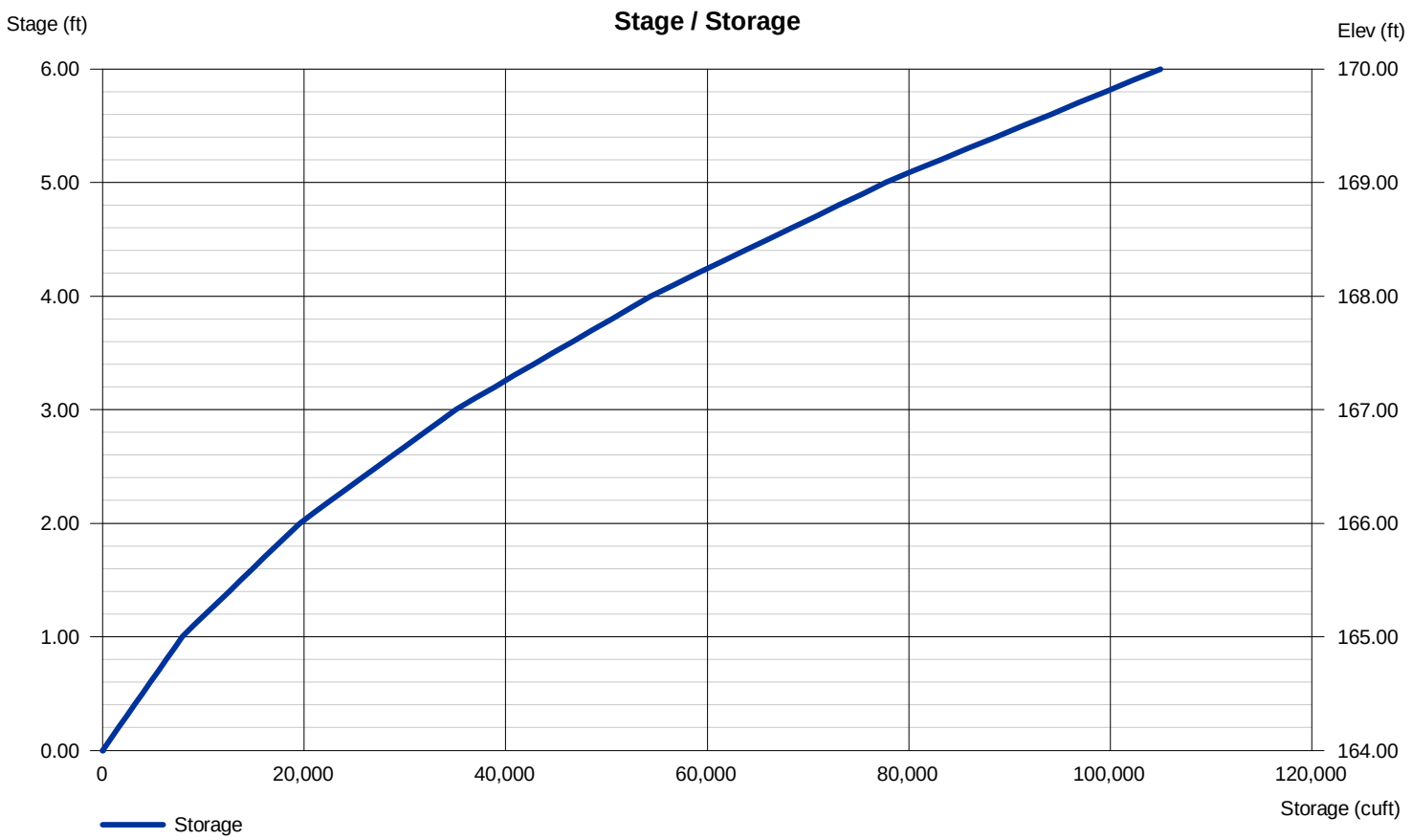
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 168.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

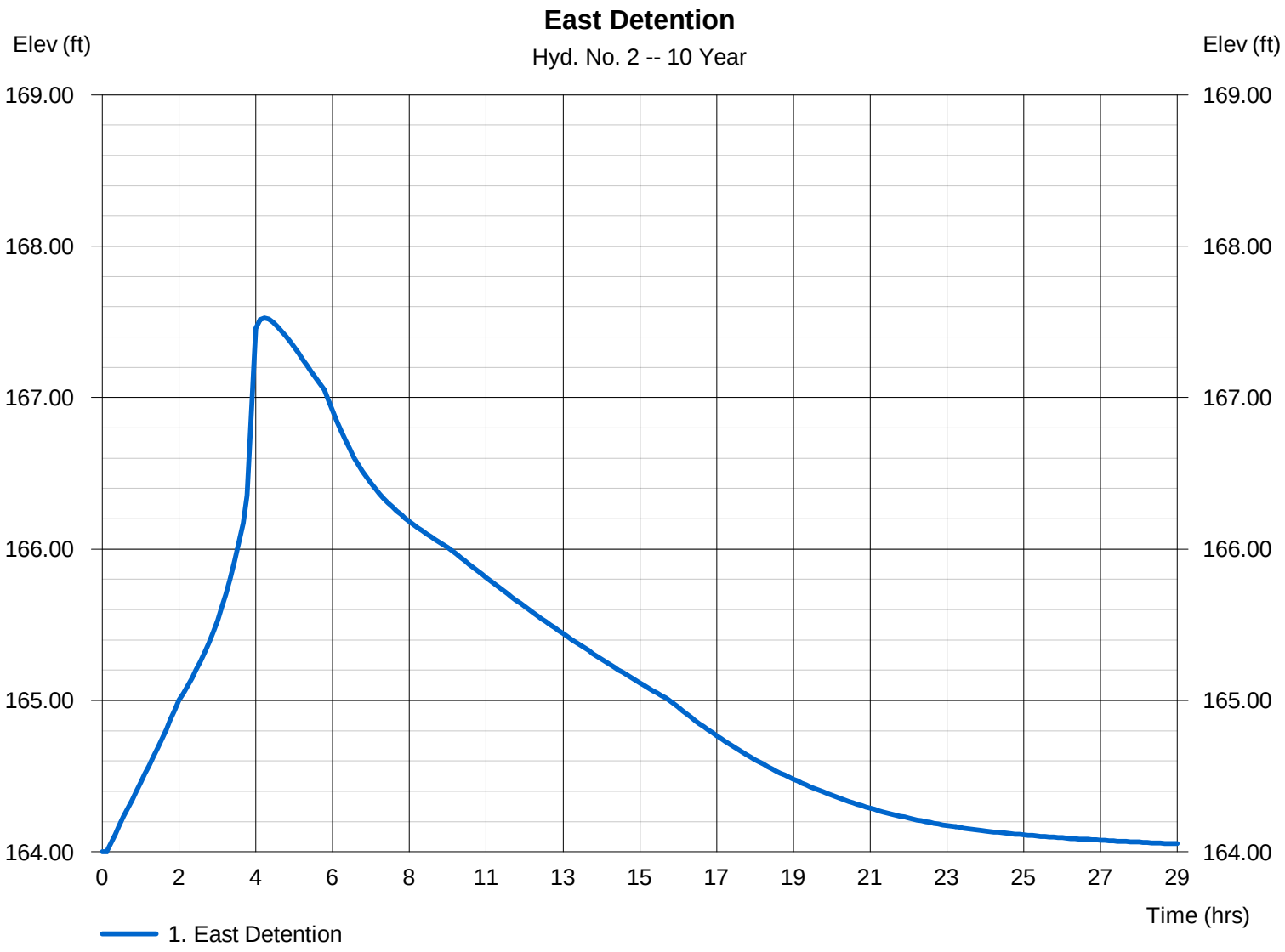
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

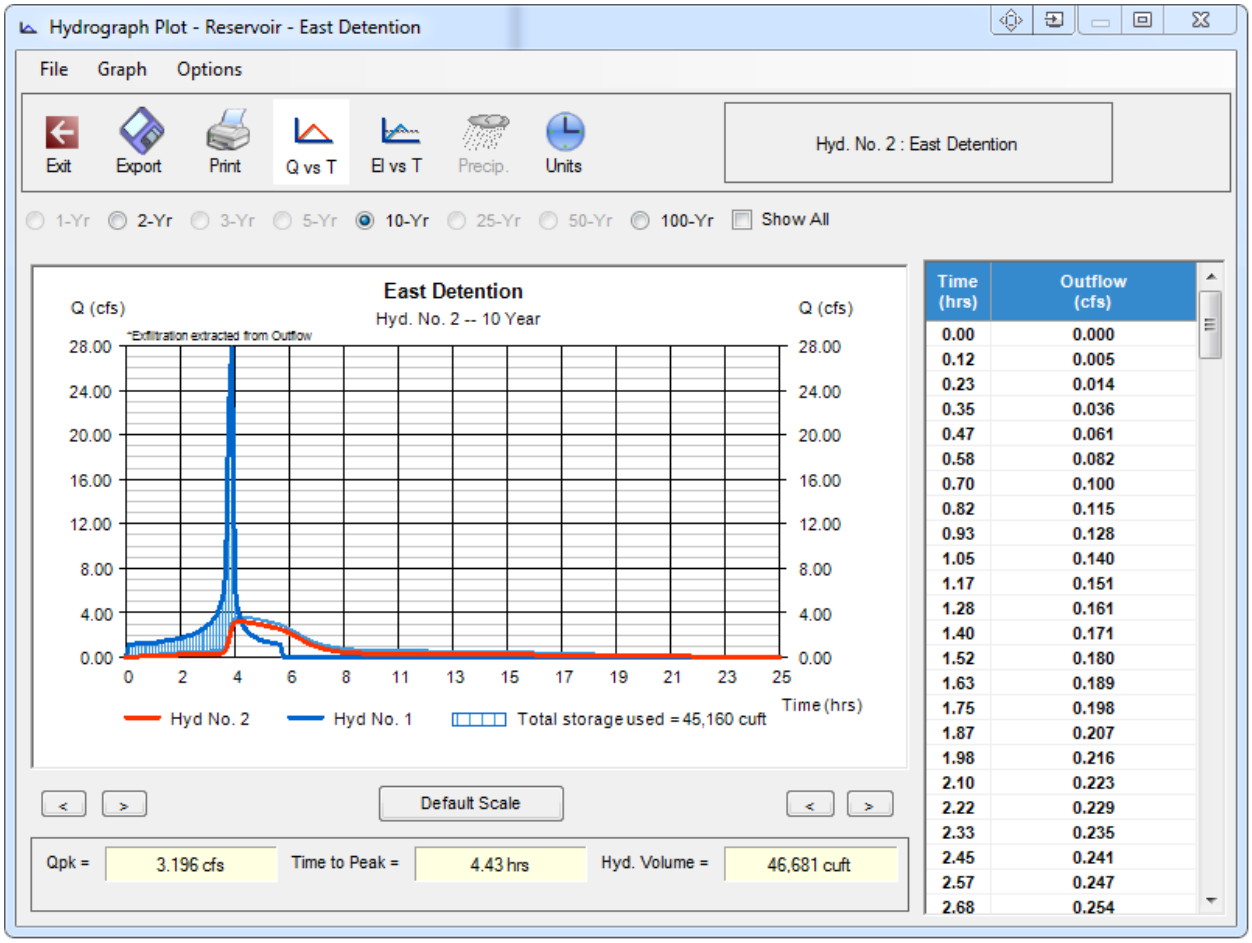
Hyd. No. 2

East Detention

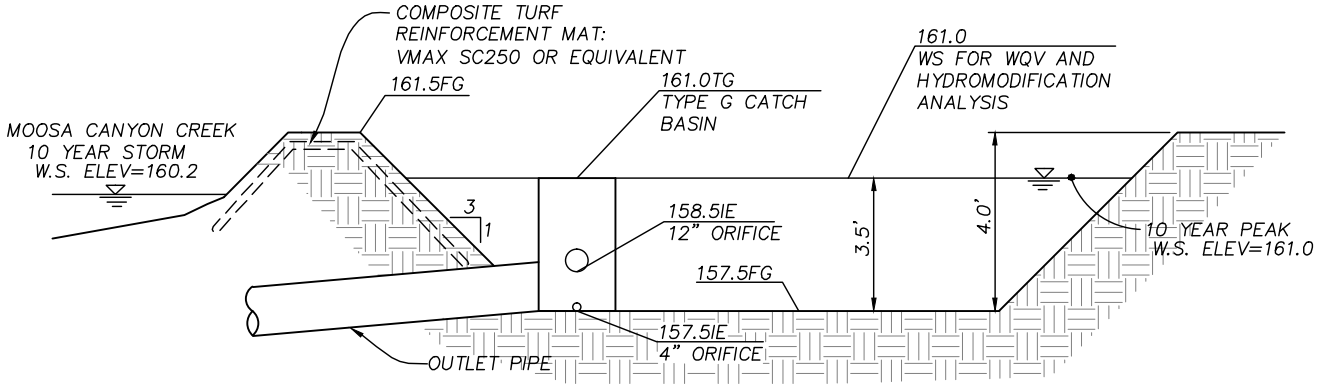
Hydrograph type	= Reservoir	Peak discharge	= 3.196 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.43 hrs
Time interval	= 7 min	Hyd. volume	= 46,681 cuft
Inflow hyd. No.	= 1 - East Detention	Max. Elevation	= 167.53 ft
Reservoir name	= East Detention	Max. Storage	= 45,160 cuft

Storage Indication method used. Exfiltration extracted from Outflow.





Time (hrs)	Outflow (cfs)
0.00	0.000
0.12	0.005
0.23	0.014
0.35	0.036
0.47	0.061
0.58	0.082
0.70	0.100
0.82	0.115
0.93	0.128
1.05	0.140
1.17	0.151
1.28	0.161
1.40	0.171
1.52	0.180
1.63	0.189
1.75	0.198
1.87	0.207
1.98	0.216
2.10	0.223
2.22	0.229
2.33	0.235
2.45	0.241
2.57	0.247
2.68	0.254



EXTENDED DETENTION BASIN 2D

NOT TO SCALE

10 Year Storm

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 2/14/2012

TIME OF CONCENTRATION 11 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 11 ACRES
RUNOFF COEFFICIENT 0.57
PEAK DISCHARGE 25.78 CFS

TIME (MIN) = 0 DISCHARGE (CFS) = 0
TIME (MIN) = 11 DISCHARGE (CFS) = 0.8
TIME (MIN) = 22 DISCHARGE (CFS) = 0.8
TIME (MIN) = 33 DISCHARGE (CFS) = 0.8
TIME (MIN) = 44 DISCHARGE (CFS) = 0.9
TIME (MIN) = 55 DISCHARGE (CFS) = 0.9
TIME (MIN) = 66 DISCHARGE (CFS) = 0.9
TIME (MIN) = 77 DISCHARGE (CFS) = 1
TIME (MIN) = 88 DISCHARGE (CFS) = 1
TIME (MIN) = 99 DISCHARGE (CFS) = 1.1
TIME (MIN) = 110 DISCHARGE (CFS) = 1.1
TIME (MIN) = 121 DISCHARGE (CFS) = 1.2
TIME (MIN) = 132 DISCHARGE (CFS) = 1.2
TIME (MIN) = 143 DISCHARGE (CFS) = 1.3
TIME (MIN) = 154 DISCHARGE (CFS) = 1.4
TIME (MIN) = 165 DISCHARGE (CFS) = 1.5
TIME (MIN) = 176 DISCHARGE (CFS) = 1.6
TIME (MIN) = 187 DISCHARGE (CFS) = 1.9
TIME (MIN) = 198 DISCHARGE (CFS) = 2
TIME (MIN) = 209 DISCHARGE (CFS) = 2.5
TIME (MIN) = 220 DISCHARGE (CFS) = 2.8
TIME (MIN) = 231 DISCHARGE (CFS) = 4.1
TIME (MIN) = 242 DISCHARGE (CFS) = 5.0
TIME (MIN) = 253 DISCHARGE (CFS) = 25.78
TIME (MIN) = 264 DISCHARGE (CFS) = 3.3
TIME (MIN) = 275 DISCHARGE (CFS) = 2.2
TIME (MIN) = 286 DISCHARGE (CFS) = 1.7
TIME (MIN) = 297 DISCHARGE (CFS) = 1.5
TIME (MIN) = 308 DISCHARGE (CFS) = 1.3
TIME (MIN) = 319 DISCHARGE (CFS) = 1.1
TIME (MIN) = 330 DISCHARGE (CFS) = 1
TIME (MIN) = 341 DISCHARGE (CFS) = 0.9
TIME (MIN) = 352 DISCHARGE (CFS) = 0.9
TIME (MIN) = 363 DISCHARGE (CFS) = 0.8
TIME (MIN) = 374 DISCHARGE (CFS) = 0

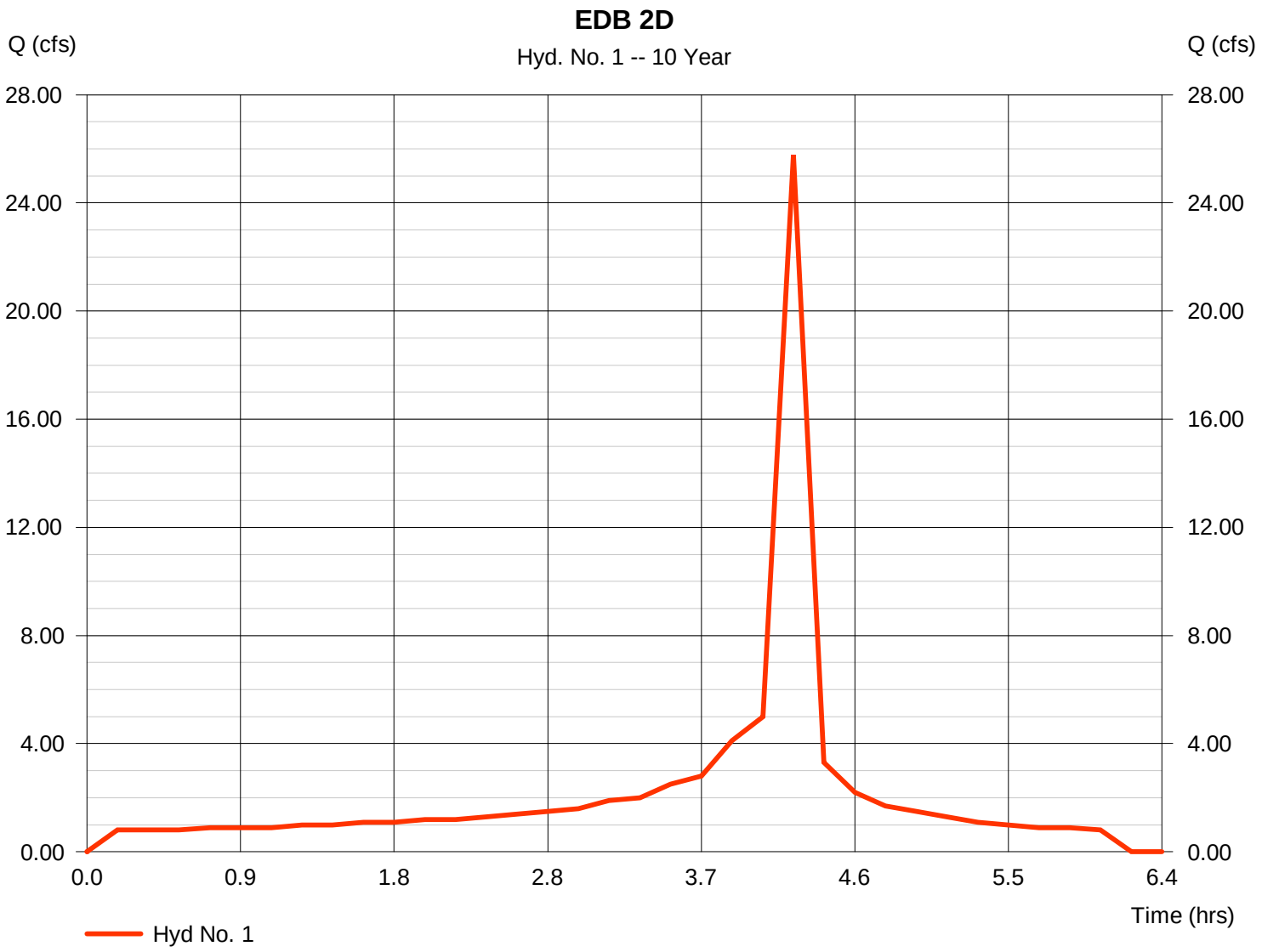
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 1

EDB 2D

Hydrograph type	= Manual	Peak discharge	= 25.78 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.22 hrs
Time interval	= 11 min	Hyd. volume	= 50,345 cuft



Hydrograph Report

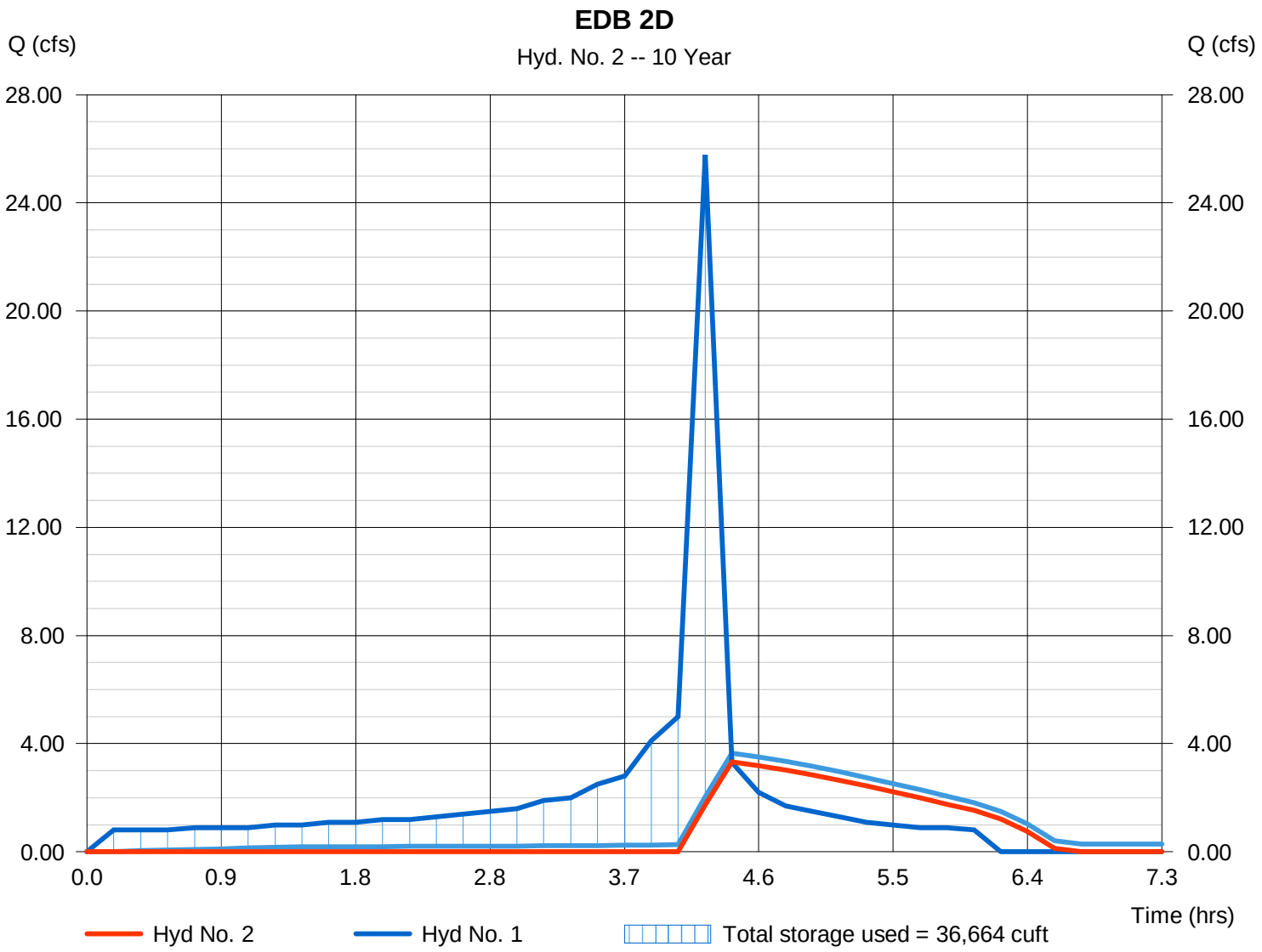
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 2

EDB 2D

Hydrograph type	= Reservoir	Peak discharge	= 3.321 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.40 hrs
Time interval	= 11 min	Hyd. volume	= 19,007 cuft
Inflow hyd. No.	= 1 - EDB 2D	Max. Elevation	= 161.02 ft
Reservoir name	= EDB 2D	Max. Storage	= 36,664 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Pond No. 1 - EDB 2D

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 157.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	157.50	7,075	0	0
0.50	158.00	8,000	3,769	3,769
1.00	158.50	8,944	4,236	8,005
1.50	159.00	9,900	4,711	12,716
2.00	159.50	10,875	5,194	17,910
2.50	160.00	11,860	5,684	23,593
3.00	160.50	12,860	6,180	29,773
3.50	161.00	13,874	6,684	36,457
4.00	161.50	14,900	7,194	43,650
4.50	162.00	14,900	7,450	51,100

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	12.00	0.00	0.00
Span (in)	= 4.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 157.50	158.50	0.00	0.00
Length (ft)	= 50.00	50.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

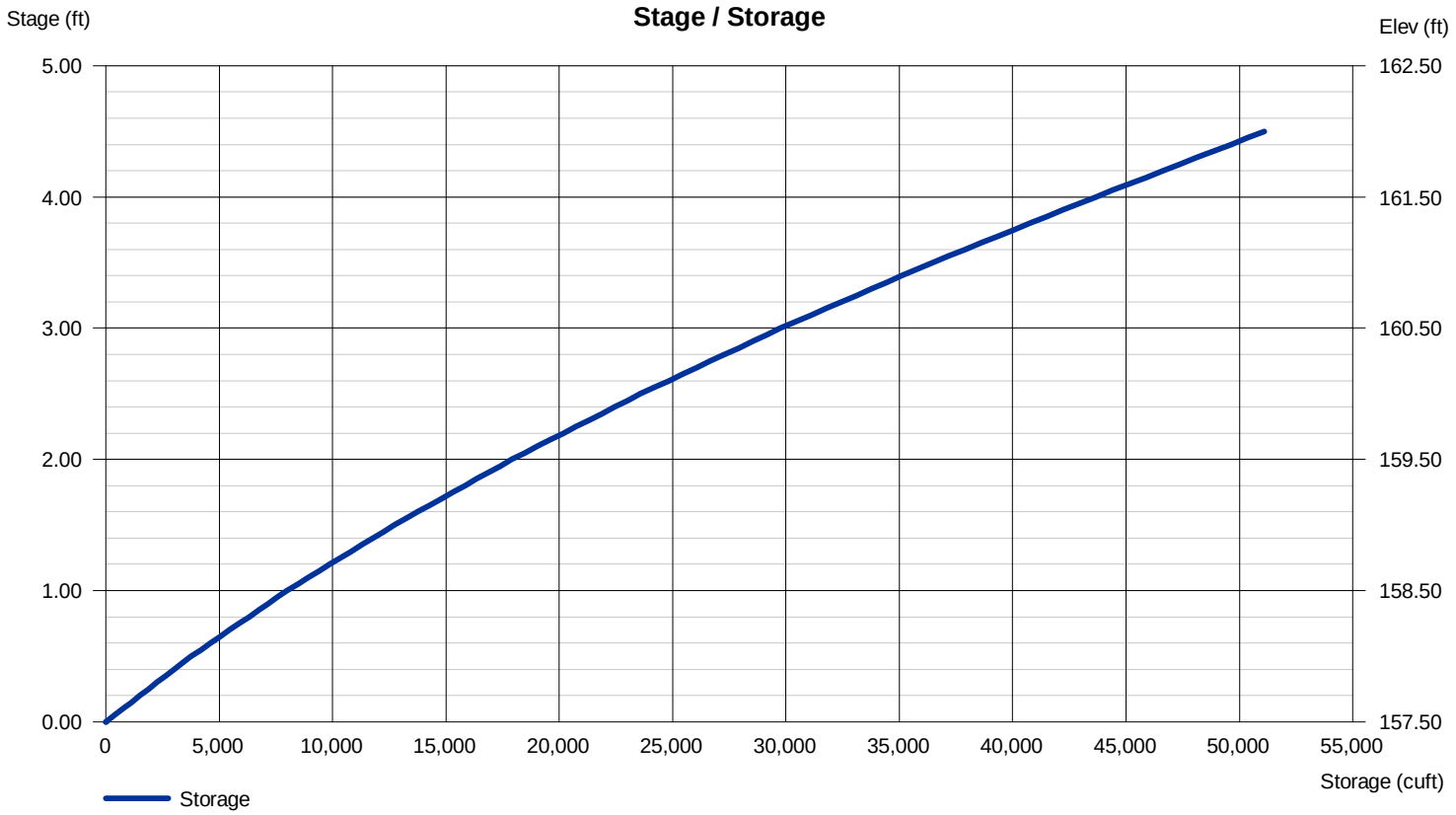
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 161.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 160.20

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Pond No. 1 - EDB 2D

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 157.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	157.50	7,075	0	0
0.50	158.00	8,000	3,769	3,769
1.00	158.50	8,944	4,236	8,005
1.50	159.00	9,900	4,711	12,716
2.00	159.50	10,875	5,194	17,910
2.50	160.00	11,860	5,684	23,593
3.00	160.50	12,860	6,180	29,773
3.50	161.00	13,874	6,684	36,457
4.00	161.50	14,900	7,194	43,650
4.50	162.00	14,900	7,450	51,100

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	12.00	0.00	0.00
Span (in)	= 4.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 157.50	158.50	0.00	0.00
Length (ft)	= 50.00	50.00	0.00	0.00
Slope (%)	= 2.00	2.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

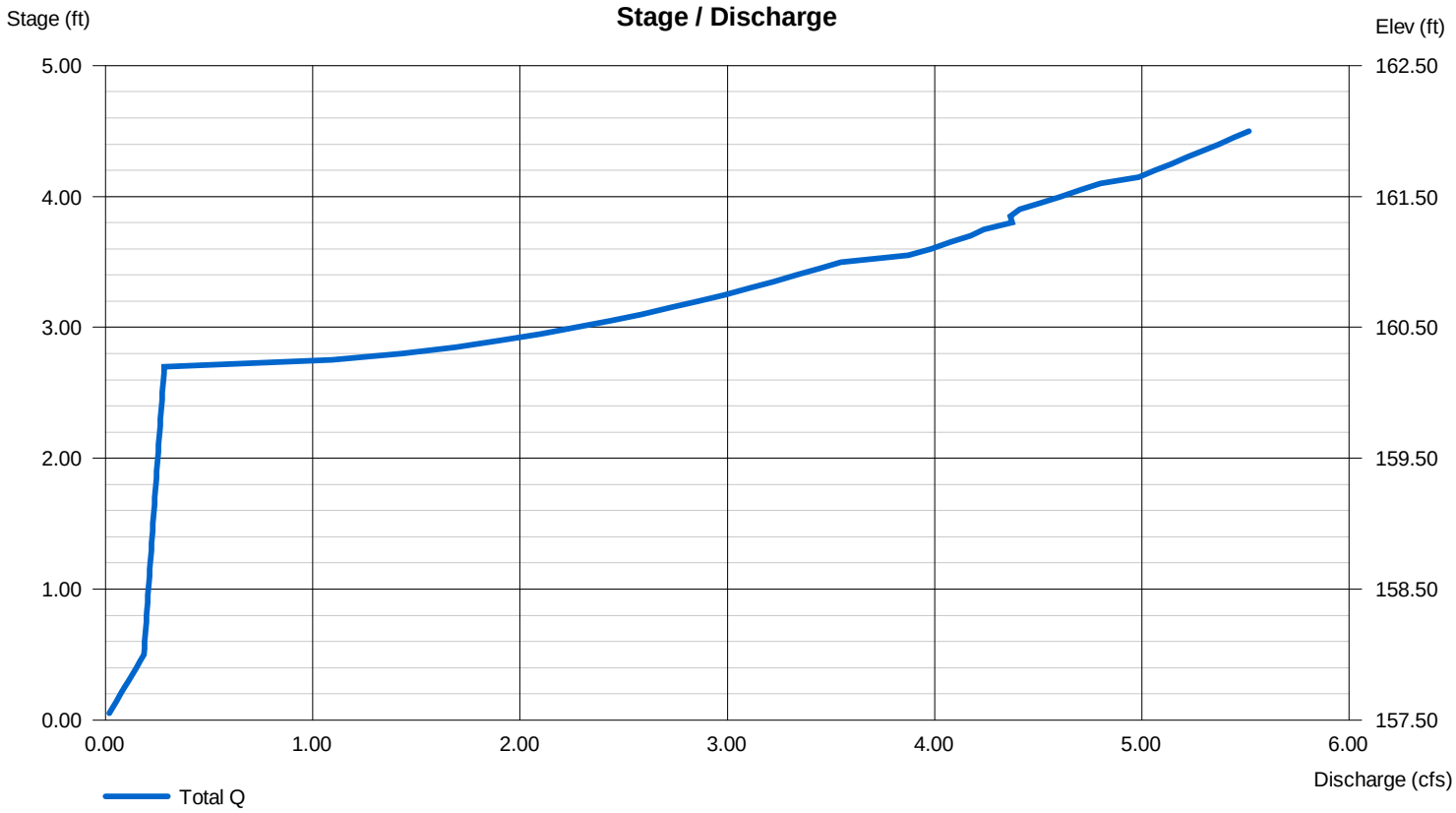
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 161.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.000 (by Contour)

TW Elev. (ft) = 160.20

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

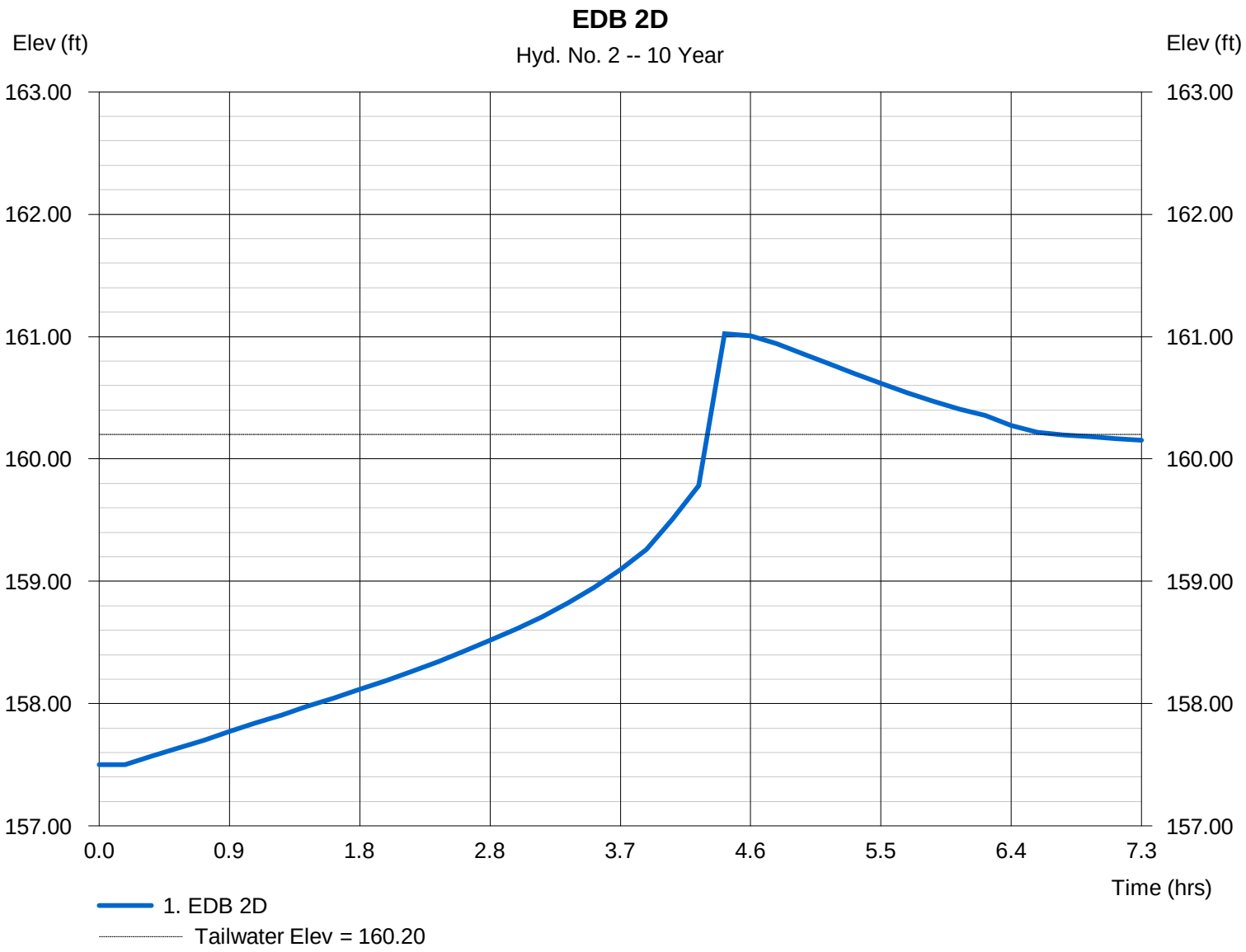
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. v9 Tuesday, 00 14, 2012

Hyd. No. 2

EDB 2D

Hydrograph type	= Reservoir	Peak discharge	= 3.321 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.40 hrs
Time interval	= 11 min	Hyd. volume	= 19,007 cuft
Inflow hyd. No.	= 1 - EDB 2D	Max. Elevation	= 161.02 ft
Reservoir name	= EDB 2D	Max. Storage	= 36,664 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



APPENDIX J

<u>Detention Basin Analysis</u>
100 Year Storm – Basin 2C
10 Year Storm – Basin 2A
10 Year Storm – Basin 2B
10 Year Storm – Basin 2C
10 Year Storm – Basin 2D

APPENDIX K

Vmax SC250 Fiber Reinforcement Map Specifications

Tensar International Corporation
5401 St. Wendel-Cynthiana Road
Poseyville, Indiana 47633
Tel. 800.772.2040
Fax 812.867.0247
www.nagreen.com

Material and Performance Specification
SC250 Turf Reinforcement Mat

Description
The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats. The SC250 shall meet Type 5A, B, and C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) *FP-03 Section 713.18*

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.72 in (18.3 mm)
Resiliency	ASTM 6524	95.2%
Density	ASTM D792	0.53 oz/in^3
Mass/Unit Area	ASTM 6566	17.88oz/yd^2 (606 g/m^2)
UV Stability	ASTM D4355 /1000 hr	100%
Porosity	ECTC Guidelines	99%
Stiffness	ASTM D1388	222.65 oz-in
Light Penetration	ECTC Guidelines	8.9%
Tensile Strength –MD	ASTM D6818	620 lbs/ft (9.05 kN/m)
Elongation – MD	ASTM D6818	35%
Tensile Strength – TD	ASTM D6818	737 lbs/ft (10.75 kN/m)
Elongation – TD	ASTM D6818	16%

Material Content		
Matrix	70% Straw Fiber 30% Coconut Fiber	0.35 lbs/yd^2 (0.27 kg/m^2) 0.15 lbs/yd^2 (0.08 kg/m^2)
Netting	Top and Bottom, UV stabilized Polypropylene Middle, Corrugated UV stabilized Polypropylene	5 lb/1000 ft^2 (2.44 kg/100 m^2) 24 lb/1000 ft^2 (11.7 kg/100m^2)
Thread	Polypropylene, UV stable	

Maximum Permissible Shear Stress		
	Short Duration	Long Duration
Phase 1 Unvegetated	3.0 lbs/ft^2 (144 Pa)	2.5 lbs/ft^2 (120Pa)
Phase 2 Partially Veg.	8.0 lbs/ ft^2 (383 Pa)	8.0 lbs/ft^2 (383 Pa)
Phase 3 Fully Veg.	10.0 lbs/ft^2 (480 Pa)	8.0 lbs/ ft^2 (383 Pa)
Unvegetated Velocity	9.5 ft/s (2.9 m/s)	
Vegetated Velocity	15 ft/s (4.6 m/s)	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 ft (16.9 m)
Weight ± 10%	34 lbs (15.42 kg)
Area	40 yd^2 (33.4 m^2)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.0010	0.0209	0.0507
20-50 ft	0.0081	0.0266	0.0574
≥ 50 ft (15.2 m)	0.0455	0.0555	0.081

Bench Scale Testing (NTPEP)		
Test Method	Parameters	Results
ECTC 2 Rainfall	50 mm (2 in)/hr-30 min 100mm (4 in)/hr-30 min 150 mm (6 in)/hr-30 min	SLR** = 18.25 SLR** = 20.97 SLR** = 22.74
ECTC 3 Shear Res.	Shear at 0.50 inch soil loss	7.7 lbs/ft^2
ECTC 4 Germination	Top Soil, Fescue, 21 day incubation	523% improvement of biomass

* Bench Scale tests should not be used for design purposes
** Soil Loss Ratio = Soil Loss Bare Soil/Soil Loss with RECP

Roughness Coefficients- Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.040
0.50 – 2.0 ft	0.040-0.012
≥ 2.0 ft (0.60 m)	0.011

Proud Participant of:

Tensar International Corporation warrants that at the time of delivery the product furnished hereunder shall conform to the specification stated herein. Any other warranty including merchantability and fitness for a particular purpose, are hereby executed. If the product does not meet specifications on this page and Tensar is notified prior to installation, Tensar will replace the product at no cost to the customer. **This product specification supersedes all prior specifications for the product described above is and is not applicable to any products shipped prior to January 1, 2011.**

Why Use Vmax³® Reinforced Vegetation in Place of Hard Armor?

- Much more economical than rock or concrete, at less than 1/3 the installed cost
- Easier to install than rock or concrete and requires no heavy equipment for installation
- Recognized and emphasized by the U.S. EPA as a preferred Best Management Practice (BMP) in meeting National Pollutant Discharge Elimination System (NPDES) regulations
- Unlike rock, poured concrete, and articulated concrete blocks (ACBs), poses no threat to pedestrians or automobiles when used near travel routes
- Provides a natural filter for runoff water by allowing infiltration, entrapping sediments, and absorbing harmful pollutants; while hard armor enables little or no water infiltration or pollutant removal
- Requires next to no maintenance, other than periodic mowing; whereas rock rip rap collects trash, supports weed growth, and requires special attention when mowed around
- Offers a flexible lining that won't crack and deteriorate like concrete can
- Provides an aesthetically pleasing landscape

Why Use Vmax³ Composite TRMs Instead of Conventional TRMs?

1 Maximum Erosion Protection

- Vmax³ TRMs are surface-applied to provide the highest level of erosion protection at the lowest cost. Many conventional TRMs require costly soil in-filling, which is extremely vulnerable to erosion.
- The unique, corrugated permanent matting structure of Vmax³ forms a shear plane perpendicular to water flow that deflects erosive hydraulic forces away from the soil surface.
- Unlike conventional, open-structured TRMs, the Vmax³ natural or synthetic fiber matrix shields soil from the erosive forces of raindrop impact and prevents shear stress extraction of soil particles from or through the matting structure.

2 Maximum Vegetation Establishment

- Unlike conventional, open-structured TRMs, the fiber matrix of Vmax³ better regulates moisture and temperature for maximum seed germination and plant development.
- The Vmax³ corrugated matting structure deflects shear forces away from newly planted seed and structurally reinforces seedlings.

3 Maximum Vegetation Reinforcement

- The high-strength, 3-D matting structure of Vmax³ fortifies both stem and root systems for the ultimate in vegetation reinforcement.
- Its UV-stabilized, synthetic matting structure maintains strength and integrity even under long-term exposure to sunlight.
- The high-strength matting structure resists damages from natural forces—and from man-made forces, such as heavy foot traffic, maintenance equipment, and vehicular traffic.
- The permanent matting structure of all three Vmax³ products exceeds FHWA FP-03 standards for TRMs.

Vmax³ Composite Reinforcement Series — Product Application Guide

All Vmax³ rolls have standard dimensions of 6.5 ft. (2 m) x 55.5 ft. (16.9 m).

Product	Product Description	Typical Applications	Limiting Shear Stress Flow Duration lbs./ft.² (Pascal)				Permissible Velocity ft./s (m/s)		FHWA FP-03 Category	ECTC Category	Typical Projects
			Bare Soil		Vegetated						
			0.5 hrs	50 hrs	0.5 hrs	50 hrs	Unvegetated	Vegetated			
SC250	5.0-lb. UV-stable polypropylene top and bottom nets 24.0-lb. UV-stable polypropylene corrugated center net 70% straw/30% coconut fiber matrix	1:1 & greater slopes Medium- to high-flow channels Stream banks	3.0 (144)	2.5 (120)	10.0 (480)	8.0 (383)	9.5 (2.9)	15.0 (4.6)	Type 5.A, B, and C	Type 5.A, B, and C	Roadside ditches, golf course swales, steep slopes, stream banks
C350	8.0-lb. UV-stable polypropylene top and bottom nets 24.0-lb. UV-stable polypropylene corrugated center net 100% coconut fiber matrix	1:1 & greater slopes High-flow channels Shorelines	3.2 (153)	3.0 (144)	12.0 (576)	10.0 (480)	10.5 (3.2)	20.0 (6.0)	Type 5.A, B, and C	Type 5.A, B, and C	Severe slopes, drainage areas, high-flow areas, stream banks, shorelines
P550	24.0-lb. UV-stable polypropylene top and bottom nets 24.0-lb. UV-stable polypropylene corrugated center net 100% polypropylene fiber matrix	1:1 & greater slopes Extreme, high-flow channels Shorelines	4.0 (191)	3.25 (156)	14.0 (672)	12.0 (576)	12.5 (3.8)	25.0 (7.6)	Type 5.A, B, and C	Type 5.A, B, and C	Severe slopes, spillways, swales, high-flow areas, shorelines

Note: This guide is for general purposes only. Actual project design and product selection should be developed using North American Green ECMDS® software, available at www.nagreen.com.

The North American Green Advantage

North American Green's Erosion Solutions *Specialists* are specially trained to provide on-site support and utilize state-of-the-art North American Green Erosion Control Materials Design Software (ECMDS®), to ensure your project design through selection and installation of cost-effective erosion control products.

- As an extra advantage, North American Green's exclusive DOT System® is standard on all Vmax³ products. The DOT System provides installation staple patterns that are clearly marked on the mats. This greatly increases installer accuracy, which ensures proper installation and excellent results in the extremely critical applications for which Vmax³ products are used.
- North American Green products are known for their quality — all blankets and mats produced by North American Green are stitched on 1.5-inch (3.81-cm) centers, adding significantly to field performance capabilities.
- North American Green products are thoroughly tested under field and laboratory conditions to accurately quantify performance.
- North American Green products are backed by our Ultimate Assurance Guarantee. If our products fail to control soil loss to the specified limits, we will upgrade you to the next higher performance product, free. You can be 100% confident in your project design. Contact your North American Green Erosion Solutions *Specialist* for guaranteed solutions to your most critical erosion problems.

NORTH AMERICAN GREEN
EROSION CONTROL Products Guaranteed SOLUTIONS
A tensar. Company

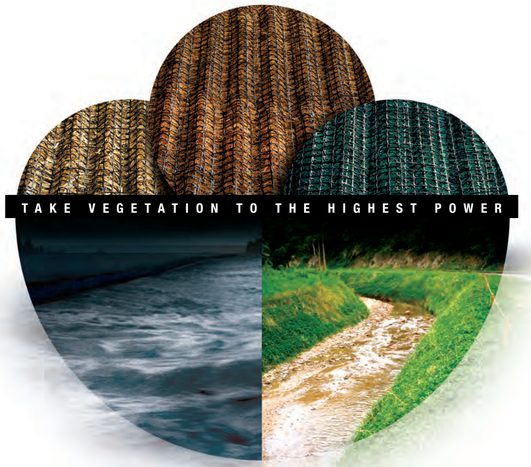
NORTH AMERICAN GREEN
14649 Highway 41 North | Evansville, Indiana 47725
800-772-2040 | 812-867-6632
www.Vmax3.com

North American Green Vmax³ products are protected by one or more of the following: U.S. patents #5,849,645, D456,224S, D456,674S, D466,378S, and other U.S. and foreign patents pending.

© 2009 North American Green

All Vmax³ products have been tested by AASHTO's National Transportation Product Evaluation Program for RECPs.

NORTH AMERICAN GREEN
A tensar. Company



Vmax³ Composite Reinforcement Series

Vmax³ Composite Reinforcement Series

Save Money and Permanently Control Erosion with Vmax³

You could spend less than 1/3 the installed cost of rock rip rap for permanent erosion control on your next job, with Vmax³.

ROCK RIP RAP – COST FOR 1 ACRE INSTALLED	
Equipment	$1,331
Labor	$484
Rock Rip Rap & Fabric	$54,751
Total Cost for 1 Acre Installed	$56,566
	That's **$11.69** per square yard installed
VMAX³ – COST FOR 1 ACRE INSTALLED	
Equipment	$0
Labor	$242
Vmax³ & Staples	$16,020
Total Cost for 1 Acre Installed	$16,262
	That's **$3.36** per square yard installed

Cost shown in U.S. Dollars.

Earn LEED Green Building Rating System points using Vmax³.

See www.nagreen.com for details.

The Vmax³® Difference

Composite Construction for Complete Erosion Protection

North American Green's Vmax³ Permanent Composite Turf Reinforcement Mats are designed to maximize performance through all of the developmental phases of a reinforced vegetative lining — unvegetated, vegetation establishment, and vegetation maturity. All three Vmax³ TRMs feature a patented composite construction that elevates their erosion control and permanent turf reinforcement capabilities well beyond those of conventional TRMs.

Each Vmax³ product begins with a permanent, three-dimensional corrugated turf reinforcement matting structure incorporated with either natural organic or UV-stabilized synthetic fibers. This specially-designed TRM structure anchors and reinforces the roots and stems of vegetation for long-term stability, and helps create a shear plane that actually deflects the flowing water away from the soil surface — improving its immediate to long-term erosion control capabilities. The fiber matrix further supplements the TRM structure's ground cover and moisture retention properties for dramatically improved erosion control and mulching action. By ensuring effective seed and soil protection immediately after installation, Vmax³ TRMs give you confidence from the start that your reinforced turf designs will develop as planned.
And, with proven vegetation reinforcement capabilities under flow-induced shear stresses of over 14 lbs./ft.² (672 Pa), Vmax³ products give you confidence that your steep slopes, medium-to high-flow channels, stream banks, and shorelines will withstand nature's forces for years to come. Backed by the most comprehensive product performance guarantee in the industry, Vmax³ TRMs give you confidence to design with vegetation instead of rock rip rap or concrete in most critical erosion control applications.

Vmax³® SC250® Permanent Turf Reinforcement Mat

1:1 & greater slopes

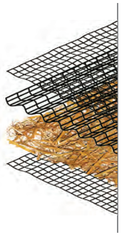
Medium- to high-flow channels

Stream banks

Vmax³ SC250 is constructed of a permanent, high-strength, three-dimensional matting structure that incorporates a straw/coconut fiber matrix. The straw/coconut fiber matrix enhances the permanent matting component's initial mulching and erosion control performance for up to 24 months.

SC250 provides extended-term, pre-vegetated erosion protection and permanent turf reinforcement in a wide range of applications, including severe slopes, medium- to high-flow channels, and stream banks. It is proven in extensive laboratory and field research to increase the shear resistance of vegetation to 10 lbs./ft.² (480 Pa).

With the toughest unreinforced grasses typically failing at shear stress levels of 3.7 lbs./ft.², the high-performance SC250 more than doubles the shear resistance of vegetation. This enables SC250 to be used in applications where rock rip rap and concrete were once specified.



Top Net
Polypropylene
5.0 lbs./1,000 ft.²
(2.44 kg/100 m²) approx. wt.

Center Net
Polypropylene, corrugated
24.0 lbs./1,000 ft.²
(11.7 kg/100 m²) approx. wt.

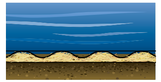
Matrix Material
70% agricultural straw
0.35 lbs./yd.²
(0.19 kg/m²)
30% coconut fiber
0.15 lbs./yd.²
(0.08 kg/m²)

Bottom Net
Polypropylene
5.0 lbs./1,000 ft.²
(2.44 kg/100 m²) approx. wt.

Thread
Permanent

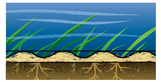
Performance Profile

Phase 1 (Unvegetated)



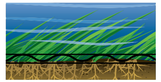
Unprotected seed and soil are highly susceptible to erosion. Upon installation, the SC250's straw/coconut fiber matrix and corrugated matting structure provide a uniform mulch layer and effective erosion protection for seed and soil under flow-induced shear stresses up to 3.0 lbs./ft.² (144 Pa).

Phase 2 (Vegetation Establishment)



The tender stems and undeveloped root systems of immature vegetation provide little protection for the soil surface and are prone to damage or removal at shear stresses of only 0.6 lbs./ft.² (29 Pa).*
The SC250 continues providing erosion protection between, and structural support for, developing plants — increasing the permissible shear stress of new vegetation up to 8 lbs./ft.² (383 Pa).

Phase 3 (Vegetation Maturity)



Under flow-induced shear stress of only 1.0 lb./ft.² (48 Pa), unreinforced mature vegetation may allow significant soil loss and experience physical damage.**

The SC250's corrugated matting structure reinforces soils and anchors vegetation roots and stems — increasing the permissible shear stress of the permanent vegetative stand up to 10 lbs./ft.² (480 Pa).

*Based on FHWA HEC#15 Permissible Shear Stress for Class D Vegetation [2 to 6" tall (5 to 15 cm), fair stand].
**Based on FHWA HEC#15 Permissible Shear Stress for Class C Vegetation [6" tall (15 cm), good stand].

Vmax³® C350® Permanent Turf Reinforcement Mat

1:1 & greater slopes

High-flow channels

Shorelines

Vmax³ C350 is composed of a permanent, high-strength, three-dimensional matting structure, incorporated with a 100% coconut-fiber matrix that supplements the permanent matting structure's initial mulching and erosion control capabilities for up to 36 months.

C350 is designed to provide long-term, pre-vegetated erosion protection and permanent turf reinforcement in a range of applications, including steep slopes, high-flow channels, and shorelines. Proven in extensive laboratory and field research, C350's high-strength, 3-D matting structure boosts the shear resistance of vegetation to an amazing 12 lbs./ft.² (576 Pa).

With permanent erosion protection exceeding that of 30-inch (0.76 m) rock rip rap, C350 provides a cost-effective, environmentally friendly solution to erosion control projects for severe conditions.

Top Net
Polypropylene
8.0 lbs./1,000 ft.²
(3.91 kg/100 m²) approx. wt.

Center Net
Polypropylene, corrugated
24.0 lbs./1,000 ft.²
(11.7 kg/100 m²) approx. wt.

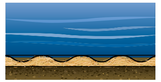
Coconut Fiber
0.50 lbs./yd.²
(0.27 kg/m²)

Bottom Net
Polypropylene
8.0 lbs./1,000 ft.²
(3.91 kg/100 m²) approx. wt.

Thread
Permanent

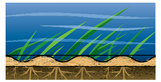
Performance Profile

Phase 1 (Unvegetated)



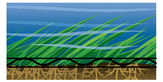
Unprotected seed and soil are highly susceptible to erosion. Upon installation, the C350's coconut fiber matrix and corrugated matting structure provide a uniform mulch layer and effective erosion protection for seed and soil under flow-induced shear stresses up to 3.2 lbs./ft.² (153 Pa).

Phase 2 (Vegetation Establishment)



The tender stems and undeveloped root systems of immature vegetation provide little protection for the soil surface and are prone to damage or removal at shear stresses of only 0.6 lbs./ft.² (29 Pa).*
The C350 continues providing erosion protection between, and structural support for, developing plants — increasing the permissible shear stress of new vegetation up to 10 lbs./ft.² (480 Pa).

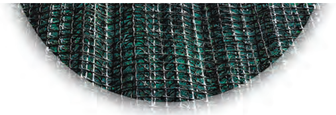
Phase 3 (Vegetation Maturity)



Under flow-induced shear stress of only 1.0 lb./ft.² (48 Pa), unreinforced mature vegetation may allow significant soil loss and experience physical damage.**

The C350's corrugated matting structure reinforces soils and anchors vegetation roots and stems — increasing the permissible shear stress of the permanent vegetative stand up to 12 lbs./ft.² (576 Pa).

*Based on FHWA HEC#15 Permissible Shear Stress for Class D Vegetation [2 to 6" tall (5 to 15 cm), fair stand].
**Based on FHWA HEC#15 Permissible Shear Stress for Class C Vegetation [6" tall (15 cm), good stand].



Vmax³® P550® Permanent Turf Reinforcement Mat

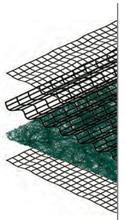
1:1 & greater slopes

Extreme, high-flow channels

Shorelines

North American Green's P550 is made of a permanent, ultra-high-strength, three-dimensional matting structure incorporated with a permanent, 100% polypropylene fiber matrix. The 100% polypropylene fiber matrix enhances the permanent matting structure's initial mulching and erosion control properties, as well as its permanent vegetation reinforcement capabilities.

P550 is designed to provide long-term, pre-vegetated erosion protection and permanent turf reinforcement in an extensive range of severe applications, including steep slopes; extreme, high-flow channels; and shorelines. P550 is proven to drive the shear resistance of vegetation to over 14 lbs./ft.² (672 Pa) — for maximum vegetation reinforcement.



Top Net
Polypropylene
24.0 lbs./1,000 ft.²
(11.7 kg/100 m²) approx. wt.

Center Net
Polypropylene, corrugated
24.0 lbs./1,000 ft.²
(11.7 kg/100 m²) approx. wt.

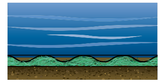
Polypropylene Fiber
0.50 lbs./yd.²
(0.27 kg/m²)

Bottom Net
Polypropylene
24.0 lbs./1,000 ft.²
(11.7 kg/100 m²) approx. wt.

Thread
Permanent

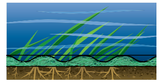
Performance Profile

Phase 1 (Unvegetated)



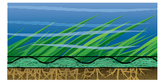
Unprotected seed and soil are highly susceptible to erosion. Upon installation, the P550's polypropylene fiber matrix and corrugated matting structure provide a uniform mulch layer and effective erosion protection for seed and soil under flow-induced shear stresses up to 4.0 lbs./ft.² (191 Pa).

Phase 2 (Vegetation Establishment)



The tender stems and undeveloped root systems of immature vegetation provide little protection for the soil surface and are prone to damage or removal at shear stresses of only 0.6 lbs./ft.² (29 Pa).*
The P550 continues providing erosion protection between, and structural support for, developing plants — increasing the permissible shear stress of new vegetation to 12 lbs./ft.² (576 Pa).

Phase 3 (Vegetation Maturity)



Under flow-induced shear stress of only 1.0 lbs./ft.² (48 Pa), unreinforced mature vegetation may allow significant soil loss and experience physical damage.**

The P550 reinforces soils and anchors vegetation roots and stems — increasing the permissible shear stress of the permanent vegetative stand to 14 lbs./ft.² (672 Pa).

*Based on FHWA HEC#15 Permissible Shear Stress for Class D Vegetation [2 to 6" tall (5 to 15 cm), fair stand].
**Based on FHWA HEC#15 Permissible Shear Stress for Class C Vegetation [6" tall (15 cm), good stand].

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