EMERALD HILLS
DRAINAGE STUDY

VTM-PMT-326907 / SDP-PMT-3262906/NDP/NUP (PRJ-1107880)

City of San Diego, CA
APN. 543-340-02-00

Prepared by:
Hunsaker & Associates - San Diego, Inc.
9707 Waples Street
San Diego, CA 92121
Telephone: (858) 558-4500

Prepared for:
D.R. Horton
2280 Wardlow Circle, Suite 100
Corona, CA 92878
(888) 555-1212

Preparation/Revision Date:
May 31, 2024

Alisa S. Vialpando

05/31/2024

Alisa S. Vialpando, RCE # 47945 Date
Hunsaker & Associates
San Diego, Inc.

Contents

List of Appendices

1 Scope

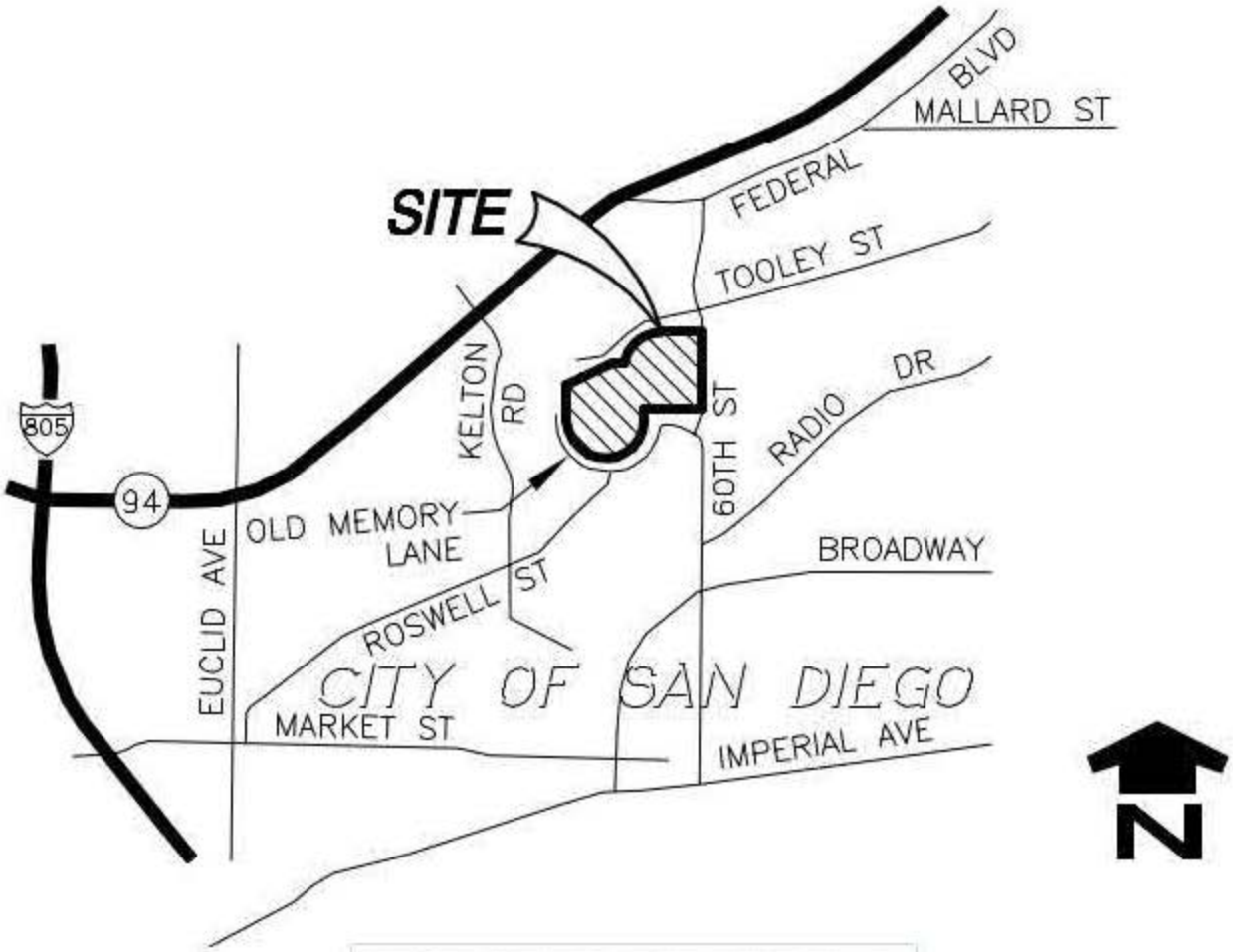
The purpose of this study is to provide hydrologic and hydraulic calculations in support of the Emerald Hills project, a proposed development that will create 123 single-family lots and five (5) private HOA open space lots in the City of San Diego, California. This report aims to quantify the proposed runoff for the 100-year frequency storm event and will present calculations demonstrating that the attenuation of post-developed flows, managed through three onsite biofiltration basins, will not exceed pre-developed flows. Treatment of storm water runoff from the site is addressed in a separate report titled "Priority Development Project Storm Water Quality Management Plan for Emerald Hills," prepared by Hunsaker and Associates, SD, and dated October 2023.

2 Existing Conditions

Emerald Hills is a roughly 31.18-acre site, located in the City of San Diego, California. The property is bounded to the south/southwest by residential property along Old Memory Lane and to the north by Tooley Street, bounded to the east by 60th Street, and bounded along portions of the west by Emerald Hills Park. The site is largely unimproved, however there are two existing transmission towers, a two-story building, and a relatively level pad for equipment (presumably generators and outdoor storage). An approximately 3-4' tall berm, eroded and overgrown with vegetation, exists near the entrance. Please see the vicinity map below.

The site topography is characterized by two broadly sloped knolls located in the northeast and southwest bisected with gorges that trend to northwest and southeast. In its existing conditions, runoff from the property drains to three primary discharge locations. There's no run-on through the site, instead the onsite runoff merges with the offsite runoff outside the project boundary before reaching these discharge points.

The northeastern portion of the property encompasses 24% steep slopes. Surface flows from this area move easterly towards 60th Street and then drain northward to a depression at the northeast corner of the Dippers Street and 60th Street intersection (Node 400). From here, runoff enters an 18" RCP culvert running south beneath Dipper Street. Upon exiting the culvert (Node 401), runoff continues south in an open channel, merging with runoff from the northeastern offsite area. This combined flow then enters a 27" RCP culvert beneath Upland Street (Node 402) and discharges into an open channel (Node 403). This channel proceeds southwesterly to a 30" RCP culvert crossing 60th Street at Node 800. This culvert also gathers runoff from the southern section of the site's eastern boundary, which has steep slopes directing water towards



VICINITY MAP

NOT TO SCALE

60th Street, as well as runoff from Upland Street and the southeastern offsite region. The collected runoff at Node 800 moves in the 30” RCP to Node 250, mingling with flows from the site's southeastern section, an area with steep slopes draining into a brow ditch. This ditch channels flows easterly, discharging onto 60th Street via an 18” culvert at the site’s southeastern corner. From here, flows move south via the 60th Street curb and gutter, joined by offsite flows from Old Memory Ln and existing developments southeast of the site. This combined runoff enters an existing inlet at Node 250 on 60th Street, merging with flows from Node 800. The cumulative runoff then travels through a 36” RCP, discharging into an open channel via a headwall at Node 50. This channel continues for 0.31 miles south before emptying into Chollas Creek.

The southwestern portion of the site features a steep slope and houses a pad for one of the transmission towers. Surface runoff from this section flows south towards an existing browditch, which runs west along the site's southern boundary. This ditch captures runoff, leading it into an 18” RCP via an existing headwall at Node 320. This flow then merges with offsite runoff originating from Old Memory Ln and the residential area situated southwest of the site (Node 300 and 350). The combined flow travels approximately 0.14 miles west through a 24” RCP (from Node 350), eventually discharging into an open channel located 379 feet from Luber St on Kelton Rd. From here, the channel moves in a northwesterly direction, ultimately emptying into the South Chollas Creek Channel.

The northern portion of the site is characterized by a steep slope, a pad for an existing transmission tower, and a two-story building. Runoff from the eastern part of this sub-watershed originates from the steep slope and flows towards an existing headwall. It then enters an 18” RCP at Node 100. This runoff moves approximately 860 ft through the existing storm drain system, merging with offsite runoff along the way, and eventually discharges into an open channel located 260' from Ballina Dr on Tooley St. Concurrently, flows from the remainder of this sub-watershed surface flow in a northern direction, ultimately joining this open channel at Nodes 600 and 700. This channel continues for about 740 feet before it discharges into the South Chollas Creek Channel. Refer to Appendix 1 for the Hydrology Map of Existing Conditions and the associated hydrologic analysis.

The project drains into Chollas Creek and is part of the Pueblo San Diego Hydrologic Unit, within the San Diego Mesa Hydrologic Area and the Chollas Hydrologic Sub-area (908.22). The site is not located within any designated special flood hazard areas according to FIRMette 06073C1902G, effective as of 5/16/2012. Refer to Appendix 4 for FEMA FIRMette and FIRM Panel.

According to the United States Department of Agriculture (USDA) website, the majority of the project site is characterized by soil type "D," with a minor portion being soil type "C". However, for the purpose of this analysis, soil type "D" has been assumed for the entire site in accordance with the "City of San Diego – Drainage Design Manual – Section A.1.2: January 2017 Edition." Type "D" soils are categorized as having a slow infiltration rate when thoroughly wet. Refer to Appendix 3 for Soil Map.

3 Proposed Conditions

The proposed development will create 123 single-family lots and five (5) private HOA open space lots, along with private roads, sidewalks, and public & private utility improvements. All existing broadcast towers and outbuildings on site will be removed as part of the development proposal. The project proposes widening and street improvements on 60th Street east of the site.

Onsite drainage improvements will include three on site water quality/hydromodification basins with a storm drain system to safely convey runoff through the project to the biofiltration basins to address water quality, hydromodification and peak flow mitigation before discharging into the existing drainage system similar to existing conditions.

Drainage Routing and Improvements:

In the proposed conditions, the site consists of three drainage areas. Each of these areas will have its runoff collected by proposed storm drain inlets and subsequently routed through the on-site storm drain system, leading to its associated biofiltration basin.

Runoff from the proposed graded slope adjacent to the site’s northeastern boundary will flow easterly and will be collected via the proposed brow ditch. This will direct the flow to a proposed catch basin. Subsequently, this drainage will commingle with the drainage stemming from the 60th Street widening, which is set to be gathered by the proposed inlet at Node 450. This combined flow will be directed northeasterly through a proposed storm drainpipe, entering the existing 18” RCP culvert beneath Dipper Street. Here, it will merge with the offsite runoff that enters the existing 18” RCP culvert from the depression located northeast of the 60th Street and Dipper Street intersection at Node 400, mirroring the existing condition. The runoff's journey from Node 401 to Node 250 will align with existing flow patterns, detailed in Section 2 of this report.

Runoff from the on-site eastern drainage area (200 Node series) will be collected by the proposed inlets and directed by the proposed storm drain system to the biofiltration/detention basin at Node 20. At this location, flow will be mitigated to a level below that of the existing conditions. This mitigated flow will then be conveyed via the proposed storm drain system to a curb outlet at 60th Street (Node 25), in a manner consistent with existing conditions. The runoff will subsequently travel south along the 60th Street curb and gutter system, eventually reaching the existing inlet at Node 250. From this point, it will commingle with the flows from Node 800 and discharge at Node 50, similar to existing condition.

Runoff from the on-site western drainage area (300 Node series) will be collected by the proposed inlets and directed by the proposed storm drain system to the biofiltration/detention basin at Node 30. At this location, flow will be mitigated to a level below that of the existing conditions. This mitigated flow will then be conveyed via the proposed storm drain system to the existing 18” RCP crossing Old Memory Ln (Node 350), where it will commingle with the slope flows and offsite flows, similar to existing conditions.

Runoff from the on-site northern drainage area (100 Node series) will be collected by the proposed inlets and directed by the proposed storm drain system to the biofiltration/detention basin at Node 10. At this location, flow will be mitigated to a level below that of the existing conditions. This mitigated flow will then be conveyed via the proposed storm drain system to discharge into the existing depression area at node 150 (Node 100 in existing condition).

In the proposed conditions, the flow patterns will remain similar, and the flows from the developed area will connect to the same existing offsite storm drainage network. The proposed biofiltration/detention basins will mitigate the impact of minor area diversion due to the proposed development and the increase in impervious areas on site. According to calculations, the attenuated peak discharge in the proposed conditions will be less than the peak discharge in the existing conditions.

Pollution Control and Hydromodification Flow Control of the overall site will be addressed in the separate report ‘The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Emerald Hills’ dated October 2023 prepared by Hunsaker & Associates San Diego Inc.

The Emerald Hills project will not necessitate seeking regulatory permits from the U.S. Army Corps of Engineers (USACE) under Section 404 of the federal Clean Water Act (CWA) or the Section 401 Water Quality Certification.

4 Methodology

4.1 Hydrology

The City of San Diego Drainage Design Manual, dated January 2017, requires that the Modified Rational Method be used for hydrologic analysis of a watershed up to, but not exceeding, 1.0 square-mile (640 acres). The 100-year storm event peak flow rates have been computed in this report to meet the City of San Diego's criteria.

The Rational Method computer program developed by Advanced Engineering Software (AES 2015) was used for this study because it satisfies the City of San Diego's design criteria Computer Software Package – AES-2015

Design Storm –100-Year for detention

Land Use – Single Family

Soil Type - Hydrologic soil group D was assumed for all areas. Group D soils have very slow infiltration rates when thoroughly wetted. Consisting chiefly of clay soils with a high swelling potential, soils with a high permanent water table, soils with clay pan or clay layer at or near the surface, and shallow soils over nearly impervious materials, Group D soils have a very slow rate of water transmission.

Runoff Coefficient – In accordance with the City of San Diego design criteria, a runoff coefficient of 0.55 was used for Single Family area, 0.45 for the pervious areas, 0.90 for the roads.

Rainfall Intensity - Based on time-intensity criteria per City of San Diego

Method of Analysis – 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 1.0 square mile, 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 subareas which discharge at designated nodes.

The procedure for the subarea summation model is as follows:

(1) Subdivide the watershed into an initial subarea (generally 1 lot) and subsequent subareas, which are generally less than 10 acres in size. Assign upstream and downstream node numbers to each subarea.

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

(3) Using the initial T_c, determine the corresponding values of I. Then Q = C I A.

(4) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to the 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-2015 computer subarea menu is as follows:

SUBAREA HYDROLOGIC PROCESS (Codes)

1. Confluence analysis at node.
2. Initial subarea 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

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 the ratio of rainfall intensities.

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

(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.

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

4.2 Detention

To ensure effective flood control, we have addressed the increased peak flow rates at the site's outfall location by designing three proposed basins. These basins' mitigation processes were modeled using RickRatHydro as input for EPA SWMM 5.1.

The hydrology calculations discussed in Section 4.1 have provided us with peak flow rates, time of concentration, watershed area, and average runoff factor.100 Yr- 6 Hour rainfall depth has been determined using the County Isopluvial maps. These parameters were input into a separate program called RickRatHydro, which generated inflow hydrographs for each basin. Subsequently, these hydrographs were imported into EPA SWMM 5.1 and routed through the proposed basins using an iterative approach that involved outlet structures.

This process continued until the resulting flow rate at the outfall matched or was less than that of the existing conditions, and the water surface elevation remained at least 1 foot below the top of the basin. The proposed biofiltration systems BF-2-1, BF-2-2 and BF-2-3 are designed to serve multiple purposes, including pollutant control, hydromodification control, and detention of the 100-year storm event flows.

The detention basin routing calculations adhere to the San Diego County guidelines for conjunctive use facilities dated January 2020. It's important to note that the storage volume for flood control is separate from the volume provided for pollutant control, and volume infiltrated is not considered as part of the volume for flood control.

5 Results and Conclusions

The following tabulates the proposed peak flow rates and attenuated flow rates for the project hydrology.

TABLE 1 - Summary of Rational Method Hydrologic Analysis Results

Existing				Proposed					
Node (EX)	Area (Ac)	Q (cfs)	TC (min)	Node (PR)	Area (Ac)	Q (cfs)^	Q (cfs)*	TC (min) Mitigated	Peak flow difference (EX-PR*) (CFS)
100	5.1	7.10	13.30	150	5.0	9.15	2.50	6.97	4.60
600	2.1	3.68	7.77	600	1.2	2.33	2.33	5.43	1.35
700	1.6	3.18	5.61	700	1.4	2.34	2.374	9.00	0.84
TOTAL to POC 1	8.8	13.96		TOTAL to POC 1	7.6	13.82	7.204	-	6.79
401 (POC 2*)	25.7	48.82	9.88	401 (POC *)	23.4	45.40	45.40	10.89	3.42
50 (POC 2)	62.0	104.00	12.46	50 (POC 2)	62.9	110.67	92.10	12.50	11.90
350 (POC3)	15.5	24.07	12.93	350 (POC3)	17.4	29.51	16.54	8.79	7.53
Ttoal	112	190.85			111.3	199.4	161.24		29.61

^ Runoff rates before flood attenuation

* Runoff rates after flood attenuation

Please note that the discrepancy of 0.7 acres in the studied area is attributed to the rounding done by AES

As illustrated above, due to the attenuation provided by the three basins, the peak flow to each discharge point is reduced, resulting in a total reduction of 29.61 cfs to Chollas Creek compared to existing conditions.

Final storm drain, inlets and rip rap design details will be provided in the final engineering stage of development.

Conclusions

The project does not increase runoff in the 100-year storm event when utilizing onsite flood attenuation.

Since there will be no increase in runoff, there will be no negative impacts to downstream drainage facilities.

Please see our separate Storm Water Quality Management Report that provides mitigation for all onsite stormwater quality impacts, as well as hydromodification management.

6 Appendices

Appendix 1 - Hydrology Calculations and Exhibits

Appendix A

Rational Method and Modified Rational Method

A.1. Rational Method (RM)

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and drainage structures. The RM is recommended for analyzing the runoff response from drainage areas for watersheds less than 0.5 square miles. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 0.5 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section A.2); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Appendix B).

A.1.1. Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed in Equation A-1.

Equation A-1. RM Formula Expression

$$Q = C\ I\ A$$

where:

Q	=	peak discharge, in cubic feet per second (cfs)
C	=	runoff coefficient expressed as that percentage of rainfall which becomes surface runoff (no units); Refer to Appendix A.1.2
I	=	average rainfall intensity for a storm duration equal to the time of concetrnatation (T_c) of the contributing draiange area, in inches per hour; Refer to Appendix A.1.3 and Appendix A.1.4
A	=	drainage area contributing to the design location, in acres

Combining the units for the expression CIA yields:

$$\left(\frac{1\,\text{acre}\times\text{inch}}{\text{hour}}\right)\left(\frac{43{,}560\,\text{ft}^2}{\text{acre}}\right)\left(\frac{1\,\text{foot}}{12\,\text{inches}}\right)\left(\frac{1\,\text{hour}}{3{,}600\,\text{seconds}}\right) \Rightarrow 1.008\,\text{cfs}$$

For practical purposes, the unit conversion coefficient difference of 0.8% can be ignored.

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Unlike the MRM (discussed in Appendix A.2) or the NRCS hydrologic method (discussed in Appendix B), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

Characteristics of, or assumptions inherent to, the RM are listed below:

1. The discharge resulting from any I is maximum when the I lasts as long as or longer than the T_c.
2. The storm frequency of peak discharges is the same as that of I for the given T_c.
3. The fraction of rainfall that becomes runoff (or the runoff coefficient, C) is independent of I or precipitation zone number (PZN) condition (PZN Condition is discussed in the NRCS method).
4. The peak rate of runoff is the only information produced by using the RM.

A.1.2. Runoff Coefficient

The runoff coefficients are based on land use (see Table A–1). Soil type "D" is used throughout the City of San Diego for storm drain conveyance design. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient (Σ[CA]). Good engineering judgment should be used when applying the values presented in Table A–1, as adjustments to these values may be appropriate based on site-specific characteristics.

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi–Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

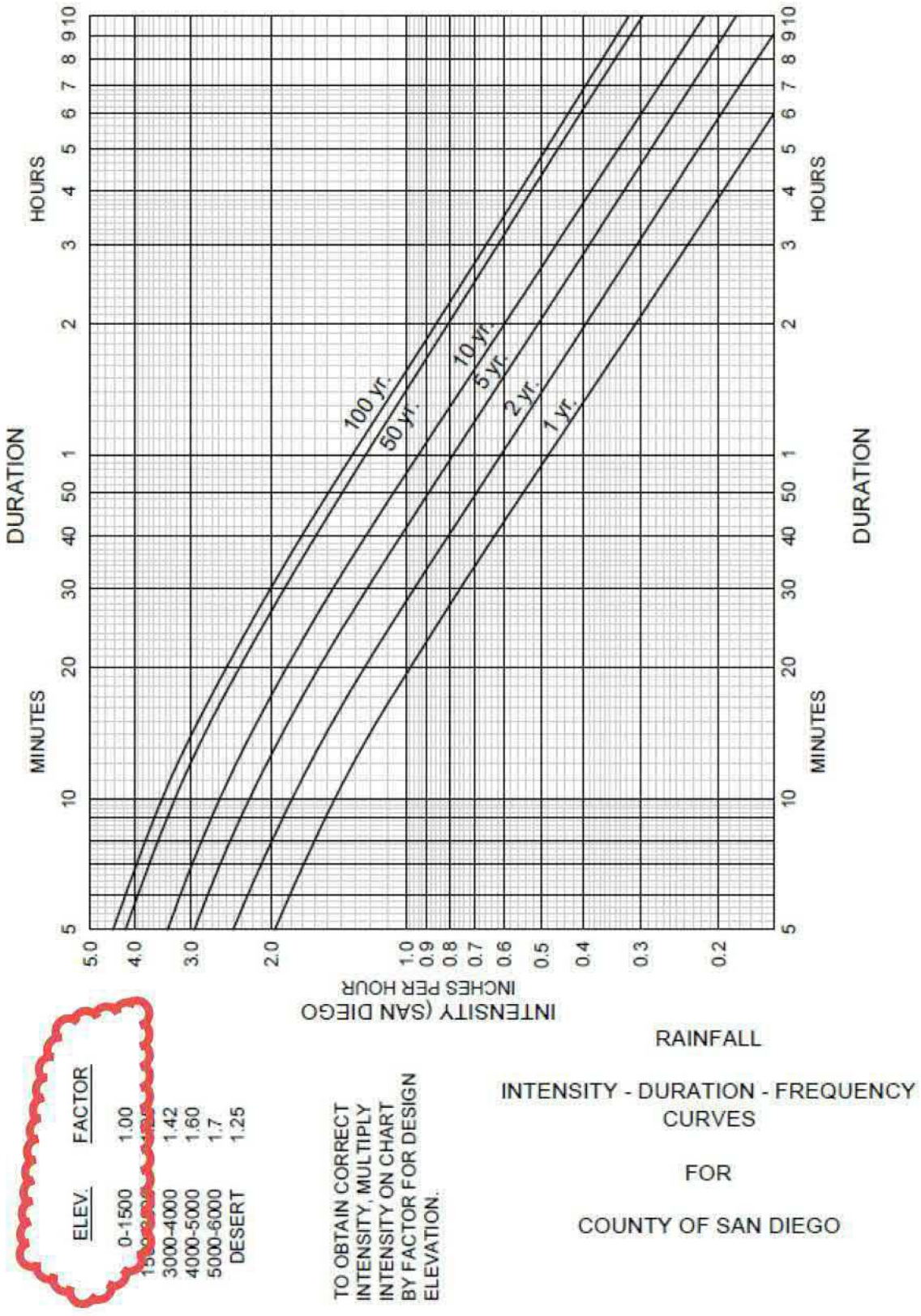


Figure A-1. Intensity-Duration-Frequency Design Chart

A.1.4. Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.

Methods of calculation differ for natural watersheds (non-urbanized) and for urban drainage systems. Also, when designing storm drain systems, the designer must consider the possibility that an existing natural watershed may become urbanized during the useful life of the storm drain system. Future land uses must be used for Tc and runoff calculations, and can be determined from the Community Plans.

a. Natural watersheds: Obtain Tc from Figures A.2 and A.3

b. Urban drainage systems: In the case of urban drainage systems, the time of concentration at any point within the drainage area is given by:

   $T_c = T_i + T_t$ where

   T_i is the inlet time or the time required for the storm water to flow to the first inlet in the system. It is the sum of time in overland flow across lots and in the street gutter.

   T_t is the travel time or the time required for the storm water to flow in the storm drain from the most upstream inlet to the point in question.

   Travel Time, T_t is computed by dividing the length of storm drain by the computed flow velocity. Since the velocity normally changes at each inlet because of changes in flow rate or slope, total travel time must be computed as the sum of the travel times for each section of the storm drain.

   The overland flow component of inlet time, T_i, may be estimated by the use of the chart shown in Figure A-4. Use Figure A-5 to estimate time of travel for street gutter flow.

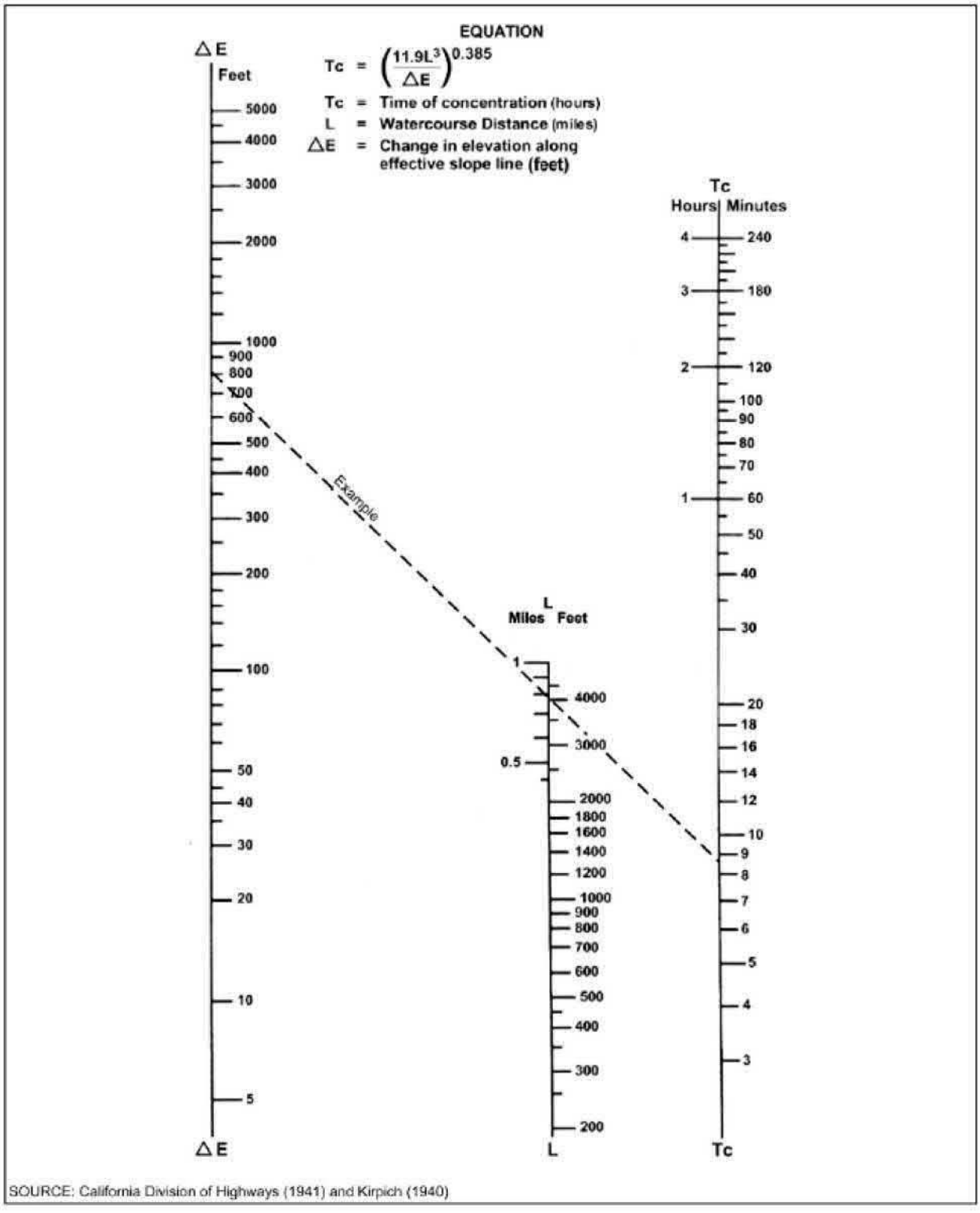


Figure A-2. Nomograph for Determination of T_c for Natural Watersheds

Note: Add ten minutes to the computed time of concentration from Figure A–2.

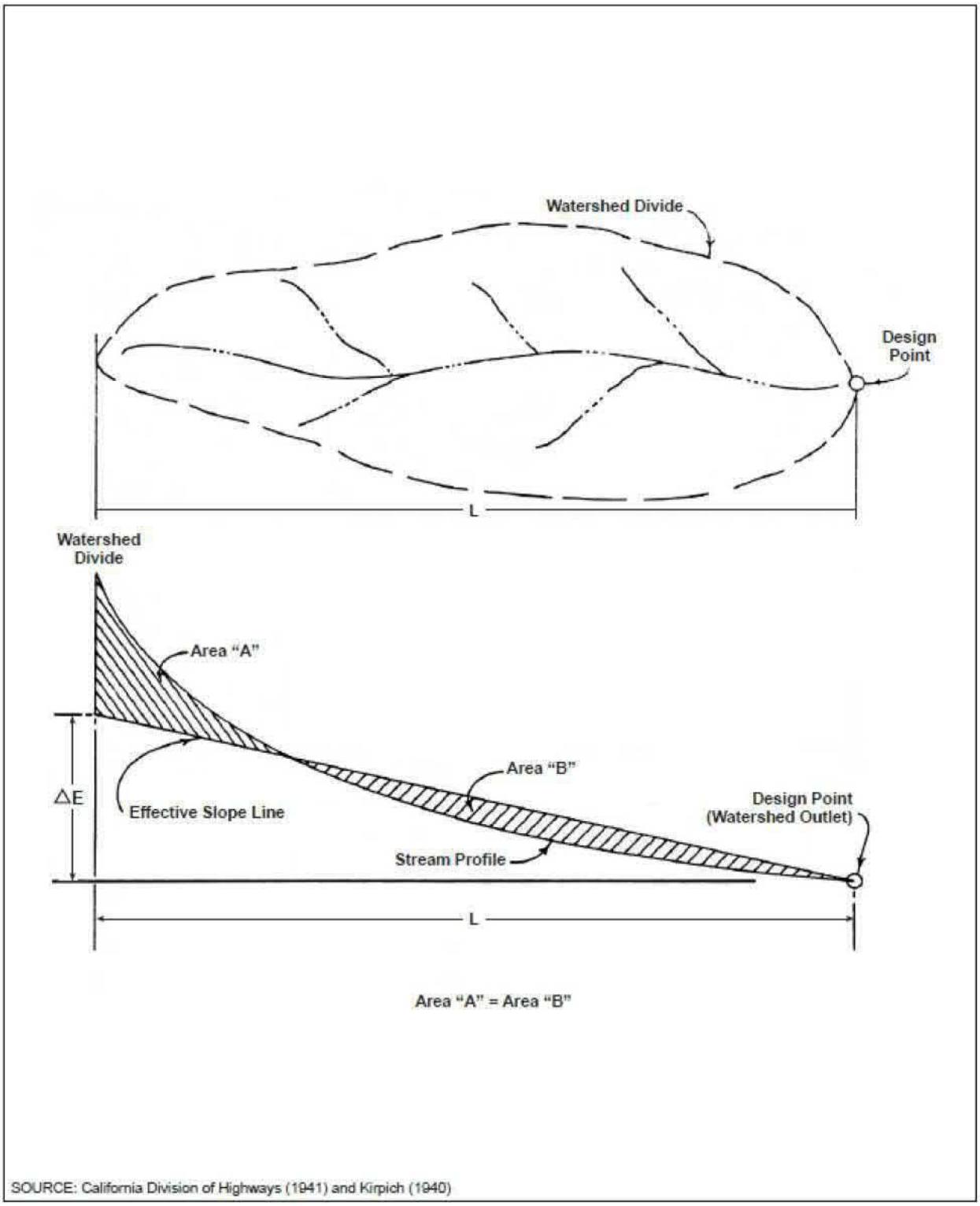


Figure A-3. Computation of Effective Slope for Natural Watersheds

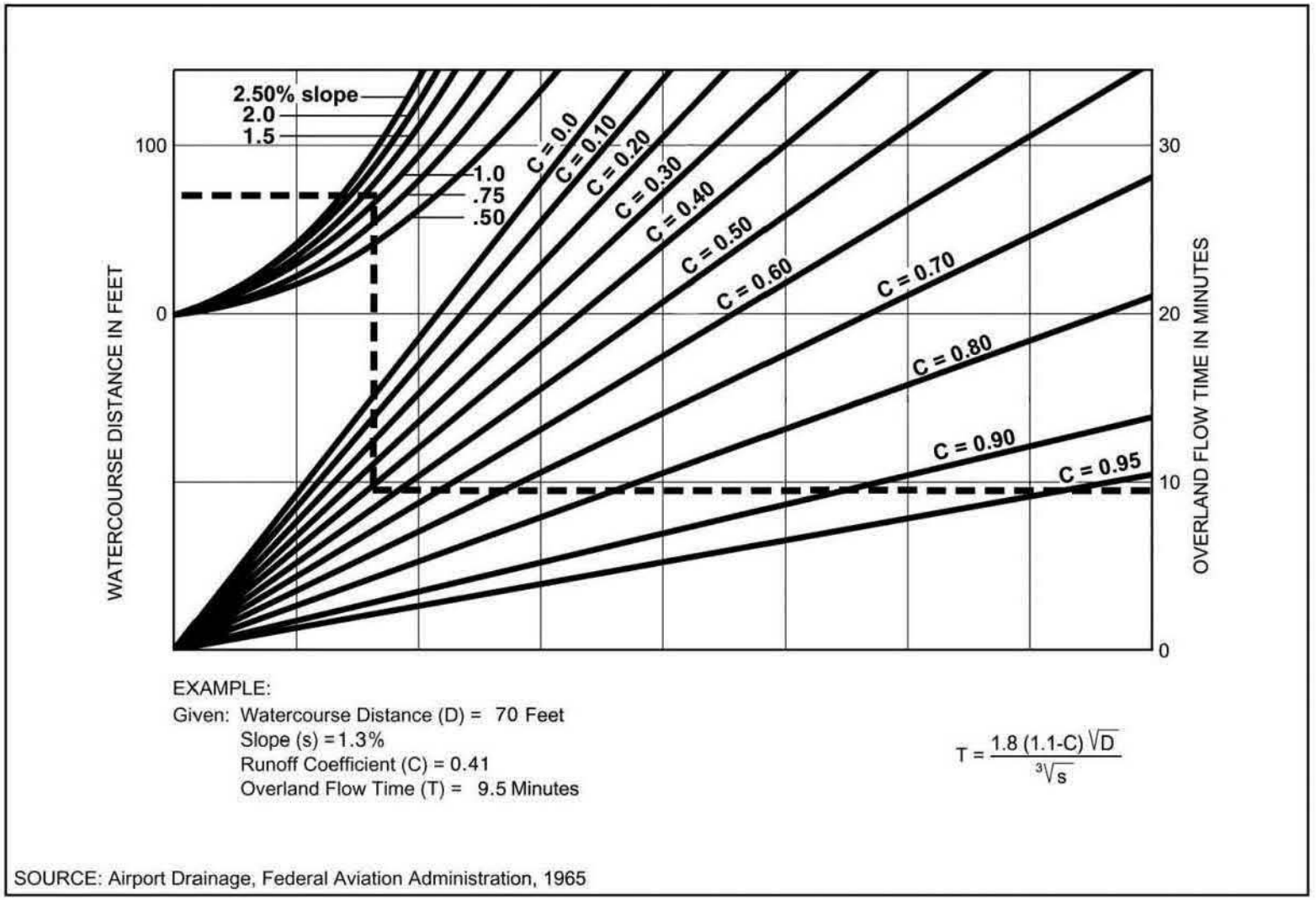
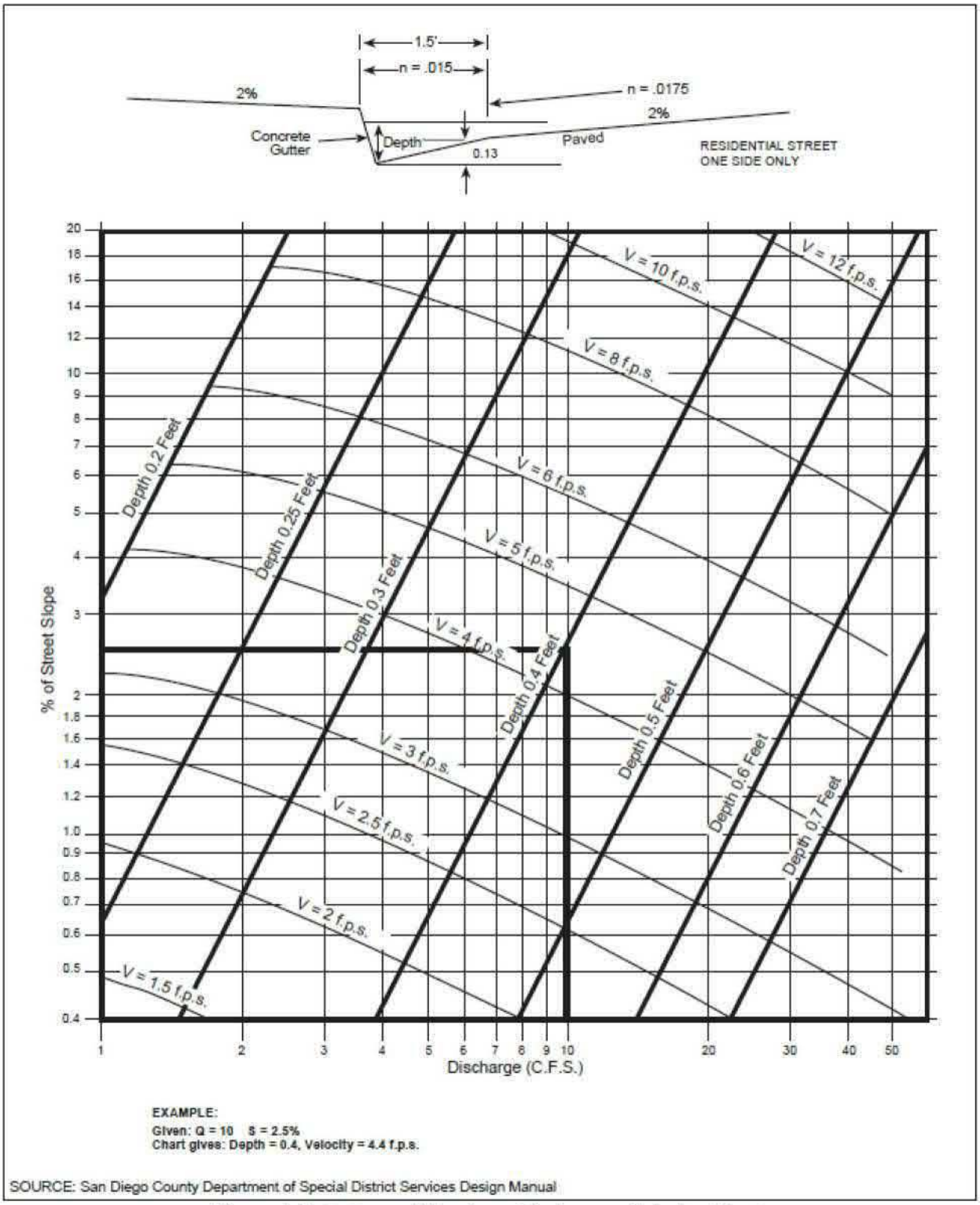


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.



SOURCE: San Diego County Department of Special District Services Design Manual

Figure A-5. Gutter and Roadway Discharge – Velocity Chart

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

A.2. Modified Rational Method (MRM; for Junction Analysis)

The purpose of this section is to describe the steps necessary to develop a hydrology report for a small watershed using the MRM. It is necessary to use the MRM if the watershed contains junctions of independent drainage systems. The process is based on the design manuals of the City/County of San Diego. The general process description for using this method is described below.

The engineer should only use the MRM for drainage areas up to approximately 1 square mile in size. If the watershed will significantly exceed 1 square mile then the NRCS method described in Appendix B should be used.

A.2.1. Modified Rational Method General Process Description

The general process for the MRM differs from the RM only when a junction of independent drainage systems is reached. The peak Q, T_c, and I for each of the independent drainage systems at the point of the junction are calculated by the RM. The independent drainage systems are then combined using the MRM procedure described below. The peak Q, T_c, and I for each of the independent drainage systems at the point of the junction must be calculated prior to using the MRM procedure to combine the independent drainage systems, as these values will be used for the MRM calculations. After the independent drainage systems have been combined, RM calculations are continued to the next point of interest.

A.2.2. Procedure for Combining Independent Drainage Systems at a Junction

1. Calculate the peak Q, T_c, and I for each of the independent drainage systems at the point of the junction. These values will be used for the MRM calculations.
2. At the junction of two or more independent drainage systems, the respective peak flows are combined to obtain the maximum flow out of the junction at T_c. Based on the approximation that total runoff increases directly in proportion to time, a general equation may be written to determine the maximum Q and its corresponding T_c using the peak Q, T_c, and I for each of the independent drainage systems at the point immediately before the junction. The general equation requires that contributing Qs be numbered in order of increasing T_c.
3. Let Q_1, T_1, and I_1 correspond to the tributary area with the shortest T_c. Likewise, let Q_2, T_2, and I_2 correspond to the tributary area with the next longer T_c, Q_3, T_3, and I_3 correspond to the tributary area with the next longer T_c, and so on. When only two independent drainage systems are combined, leave Q_3, T_3, and I_3 out of the equation. Combine the independent drainage systems using the junction equation (see Equation A-2).

Equation A-2. Junction Equation

$$T_1 < T_2 < T_3$$

$$Q_{T1} = Q_1 + \frac{T_1}{T_2} Q_2 + \frac{T_1}{T_3} Q_3$$

$$Q_{T2} = Q_2 + \frac{I_2}{I_1} Q_1 + \frac{T_2}{T_3} Q_3$$

$$Q_{T3} = Q_3 + \frac{I_3}{I_1} Q_1 + \frac{I_3}{I_2} Q_2$$

4. Calculate Q_{T1}, Q_{T2}, and Q_{T3}. Select the largest Q and use the T_c associated with that Q for further calculations (see the three Notes for options). If the largest calculated Q's are equal (e.g., $Q_{T1} = Q_{T2} > Q_{T3}$), use the shorter of the T_cs associated with that Q.
5. This equation may be expanded for a junction of more than three independent drainage systems using the same concept. The concept is that when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a shorter T_c (e.g., Q_1), the Q from the subarea with the shorter T_c is reduced by the ratio of the I's (I_2/I_1); and when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a longer T_c (e.g., Q_3), the Q from the subarea with the longer T_c is reduced by the ratio of the T_cs (T_2/T_3).

The following notes should be considered:

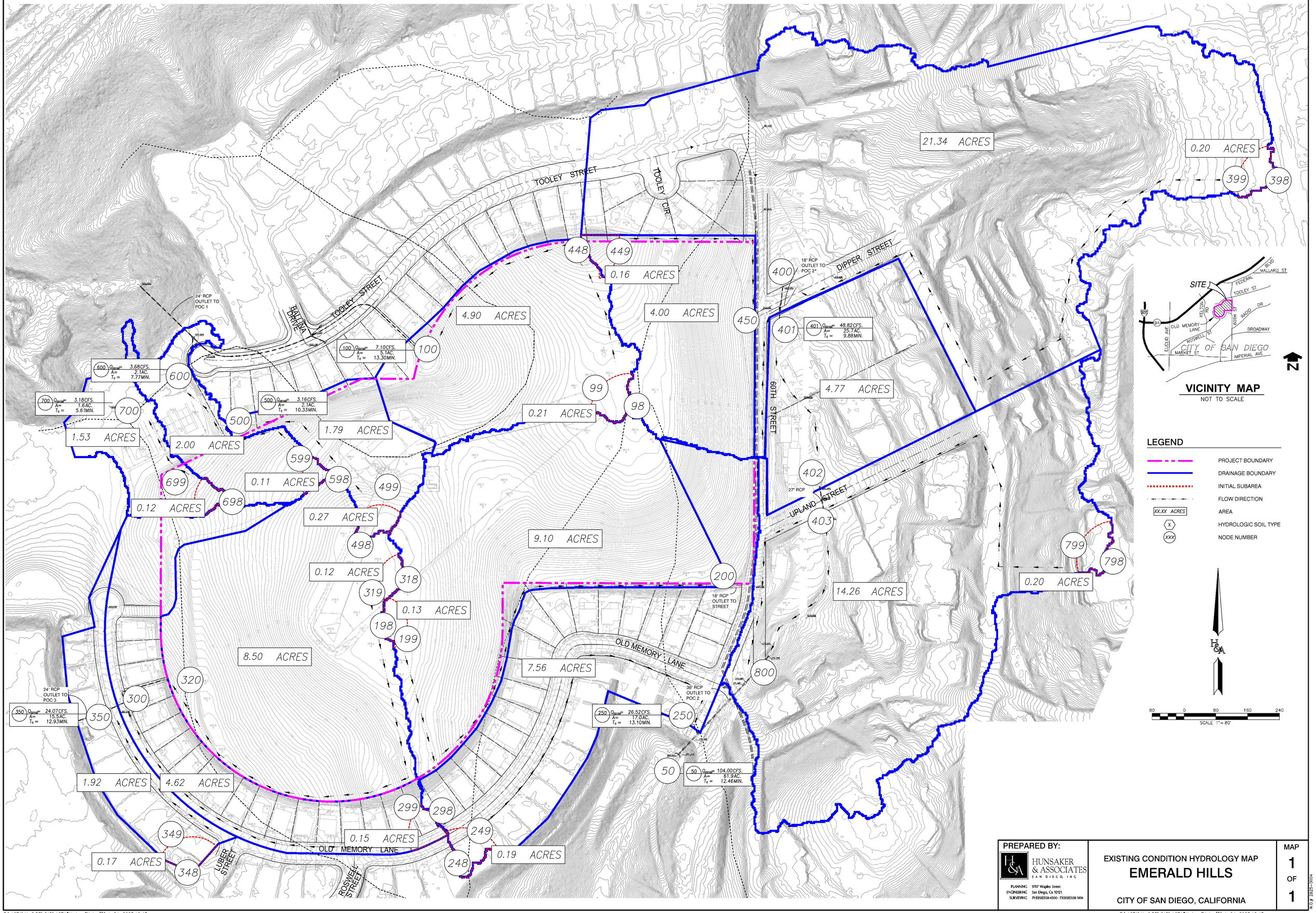
Note #1: At a junction of two independent drainage systems that have the same T_c, the tributary flows may be added to obtain the Q_p.

$$Q_p = Q_1 + Q_2 \text{ ; when } T_1 = T_2 \text{; and } T_c = T_1 = T_2$$

This can be verified by using the junction equation above. Let Q_3, T_3, and $I_3 = 0$. When T_1 and T_2 are the same, I_1 and I_2 are also the same, and T_1/T_2 and $I_2/I_1 = 1$. T_1/T_2 and I_2/I_1 are cancelled from the equations. At this point, $Q_{T1} = Q_{T2} = Q_1 + Q_2$.

Note #2: In the upstream part of a watershed, a conservative computation is acceptable. When the times of concentration are relatively close in magnitude (within 10%), use the shorter T_c for the intensity and the equation $Q = \Sigma(CA)I$.

EXISTING CONDITION



PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC.

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

EXISTING CONDITION HYDROLOGY MAP

EMERALD HILLS

CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 2825-5004

R:\1671\Hyd\DR\CAD\1671$Hydro_EX.dwg[]Oct-24-2023:10:43

R:\1671\Hyd\DR\CAD\1671$Hydro_EX.dwg[]Oct-24-2023:10:43

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                              Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
 * EMERALD HILLS                                                        *
 * 100 YEAR EXISTING CONDIITONS                                         *
 *                                                                      *
 ************************************************************************

  FILE NAME: R:\1671\HYD\DR\CALCS\AES\100EX\EX100.DAT
  TIME/DATE OF STUDY: 10:28 10/20/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
```

```
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    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 =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    382.60
  DOWNSTREAM ELEVATION(FEET) =    381.00
  ELEVATION DIFFERENCE(FEET) =      1.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.605
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.715
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    100.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    379.50  DOWNSTREAM(FEET) =    334.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   797.00   CHANNEL SLOPE =  0.0571
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.086
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.83
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   4.70
  Tc(MIN.) =   13.30
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    6.81
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        5.1         PEAK FLOW RATE(CFS) =       7.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   3.58
  LONGEST FLOWPATH FROM NODE     98.00 TO NODE    100.00 =     897.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    199.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    381.00
  DOWNSTREAM ELEVATION(FEET) =    379.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.593
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.907
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    200.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    379.50  DOWNSTREAM(FEET) =    319.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1310.00   CHANNEL SLOPE =  0.0462
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.215
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.80
  AVERAGE FLOW DEPTH(FEET) =   0.38   TRAVEL TIME(MIN.) =   4.55
  Tc(MIN.) =   12.14
  SUBAREA AREA(ACRES) =     9.04       SUBAREA RUNOFF(CFS) =   13.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =      13.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   5.93
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    200.00 =    1380.00 FEET.

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

```
  FLOW PROCESS FROM NODE    200.00 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  309.00  DOWNSTREAM ELEVATION(FEET) =  292.00
  STREET LENGTH(FEET) =   380.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.65
  STREET FLOW TRAVEL TIME(MIN.) =   0.96   Tc(MIN.) =   13.10
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.109
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.455
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =        9.3        PEAK FLOW RATE(CFS) =      13.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.80
  FLOW VELOCITY(FEET/SEC.) =  6.56   DEPTH*VELOCITY(FT*FT/SEC.) =   2.64
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    250.00 =    1760.00 FEET.

****************************************************************************
  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.) =   13.10
  RAINFALL INTENSITY(INCH/HR) =   3.11
  TOTAL STREAM AREA(ACRES) =     9.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.26

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

```
 FLOW PROCESS FROM NODE    248.00 TO NODE    249.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    348.00
 DOWNSTREAM ELEVATION(FEET) =    346.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.028
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.015
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  346.00  DOWNSTREAM ELEVATION(FEET) =  292.00
 STREET LENGTH(FEET) =   840.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.95
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.34
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.70
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.23
 STREET FLOW TRAVEL TIME(MIN.) =   2.09   Tc(MIN.) =    9.12
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.617
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
```

```
  SUBAREA AREA(ACRES) =    7.56      SUBAREA RUNOFF(CFS) =   15.04
  TOTAL AREA(ACRES) =        7.8        PEAK FLOW RATE(CFS) =      15.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.62
  FLOW VELOCITY(FEET/SEC.) =  7.81   DEPTH*VELOCITY(FT*FT/SEC.) =   3.11
  LONGEST FLOWPATH FROM NODE    248.00 TO NODE    250.00 =     940.00 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.) =    9.12
  RAINFALL INTENSITY(INCH/HR) =   3.62
  TOTAL STREAM AREA(ACRES) =     7.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.26    13.10        3.109          9.27
      2       15.42     9.12        3.617          7.75

  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       24.65     9.12       3.617
      2       26.52    13.10       3.109

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.52   Tc(MIN.) =   13.10
  TOTAL AREA(ACRES) =       17.0
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    250.00 =    1760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   292.00  DOWNSTREAM(FEET) =   269.05
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.52
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   13.17
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE     50.00 =    1870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    318.00 TO NODE    319.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    380.00
  DOWNSTREAM ELEVATION(FEET) =    379.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.692
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.699
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    320.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    379.00  DOWNSTREAM(FEET) =    311.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1215.00   CHANNEL SLOPE =  0.0560
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.148
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.00
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   4.05
  Tc(MIN.) =   12.75
  SUBAREA AREA(ACRES) =     8.50       SUBAREA RUNOFF(CFS) =   12.04
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =      12.21
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   6.12
  LONGEST FLOWPATH FROM NODE    318.00 TO NODE    320.00 =    1285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   309.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.21
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   12.93
  LONGEST FLOWPATH FROM NODE    318.00 TO NODE    350.00 =    1472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =   12.93
  RAINFALL INTENSITY(INCH/HR) =   3.13
  TOTAL STREAM AREA(ACRES) =     8.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.21

****************************************************************************
  FLOW PROCESS FROM NODE    298.00 TO NODE    299.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    348.00
  DOWNSTREAM ELEVATION(FEET) =    344.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.079
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.195
  SUBAREA RUNOFF(CFS) =      0.35
```

```
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    299.00 TO NODE    300.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  344.00  DOWNSTREAM ELEVATION(FEET) =  297.00
  STREET LENGTH(FEET) =   875.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   2.58   Tc(MIN.) =    8.66
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.705
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    4.62      SUBAREA RUNOFF(CFS) =    9.41
  TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =       9.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.69
  FLOW VELOCITY(FEET/SEC.) =  6.55   DEPTH*VELOCITY(FT*FT/SEC.) =   2.36
  LONGEST FLOWPATH FROM NODE    298.00 TO NODE    300.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   290.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.43
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.72
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    298.00 TO NODE    350.00 =    1025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =    8.79
  RAINFALL INTENSITY(INCH/HR) =   3.68
  TOTAL STREAM AREA(ACRES) =     4.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.72

****************************************************************************
  FLOW PROCESS FROM NODE    348.00 TO NODE    349.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    315.00
  DOWNSTREAM ELEVATION(FEET) =    313.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.028
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.015
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    350.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  313.00  DOWNSTREAM ELEVATION(FEET) =  297.00
  STREET LENGTH(FEET) =   441.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    8.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.672
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    1.92      SUBAREA RUNOFF(CFS) =    3.88
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.88
  FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    348.00 TO NODE    350.00 =     541.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =    8.83
  RAINFALL INTENSITY(INCH/HR) =   3.67
  TOTAL STREAM AREA(ACRES) =     2.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.22

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.21    12.93        3.128          8.62
      2        9.72     8.79        3.681          4.77
      3        4.22     8.83        3.672          2.09

  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       22.22     8.79       3.681
      2       22.26     8.83       3.672
      3       24.07    12.93       3.128

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.07   Tc(MIN.) =   12.93
  TOTAL AREA(ACRES) =       15.5
  LONGEST FLOWPATH FROM NODE    318.00 TO NODE    350.00 =    1472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    398.00 TO NODE    399.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    462.00
  DOWNSTREAM ELEVATION(FEET) =    459.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.512
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    90.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.113
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    399.00 TO NODE    400.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  459.00  DOWNSTREAM ELEVATION(FEET) =  321.12
  STREET LENGTH(FEET) =  1626.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     21.42
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.88   Tc(MIN.) =    9.39
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.566
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =   21.34      SUBAREA RUNOFF(CFS) =   41.86
  TOTAL AREA(ACRES) =       21.5        PEAK FLOW RATE(CFS) =      42.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  9.53   DEPTH*VELOCITY(FT*FT/SEC.) =   4.06
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    400.00 =    1726.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   321.12  DOWNSTREAM(FEET) =   315.70
  FLOW LENGTH(FEET) =   333.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.25
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    401.00 =    2059.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   3.47
  TOTAL STREAM AREA(ACRES) =    21.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     42.25

****************************************************************************
  FLOW PROCESS FROM NODE    448.00 TO NODE    449.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    402.70
  DOWNSTREAM ELEVATION(FEET) =    394.00
  ELEVATION DIFFERENCE(FEET) =      8.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.689
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.269
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE    449.00 TO NODE    450.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    394.00  DOWNSTREAM(FEET) =    328.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   511.00   CHANNEL SLOPE =  0.1286
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.833
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.71
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.29
  Tc(MIN.) =    7.98
  SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    6.90
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =       7.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   4.65
  LONGEST FLOWPATH FROM NODE    448.00 TO NODE    450.00 =     611.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    450.00 TO NODE    401.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.30  DOWNSTREAM ELEVATION(FEET) =  315.70
  STREET LENGTH(FEET) =   105.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    8.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.49
  STREET FLOW TRAVEL TIME(MIN.) =   0.21   Tc(MIN.) =    8.19
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.793
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.451
  SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.03
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =       7.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.64
  FLOW VELOCITY(FEET/SEC.) =  8.29   DEPTH*VELOCITY(FT*FT/SEC.) =   2.48
  LONGEST FLOWPATH FROM NODE    448.00 TO NODE    401.00 =     716.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =    8.19
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =     4.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.18

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       42.25     9.88        3.473         21.54
      2        7.18     8.19        3.793          4.17

  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       42.23     8.19       3.793
      2       48.82     9.88       3.473

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.82   Tc(MIN.) =    9.88
  TOTAL AREA(ACRES) =       25.7
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    401.00 =    2059.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    315.70  DOWNSTREAM(FEET) =    295.34
  CHANNEL LENGTH THRU SUBAREA(FEET) =   383.00   CHANNEL SLOPE =  0.0532
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.354
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      48.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.40
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   1.00
  Tc(MIN.) =   10.87
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.534
  TOTAL AREA(ACRES) =       25.7         PEAK FLOW RATE(CFS) =      48.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   6.40
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    402.00 =    2442.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.354
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5208
  SUBAREA AREA(ACRES) =    4.77   SUBAREA RUNOFF(CFS) =    7.20
  TOTAL AREA(ACRES) =       30.5   TOTAL RUNOFF(CFS) =      53.26
  TC(MIN.) =   10.87

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   295.34  DOWNSTREAM(FEET) =   292.76
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.68
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.26
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    403.00 =    2507.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    800.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    292.76  DOWNSTREAM(FEET) =    272.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0494
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.227
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      53.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.42
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   1.09
  Tc(MIN.) =   12.03
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.521
  TOTAL AREA(ACRES) =       30.5         PEAK FLOW RATE(CFS) =      53.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   6.42
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    800.00 =    2927.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    800.00 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.) =   12.03
  RAINFALL INTENSITY(INCH/HR) =   3.23
  TOTAL STREAM AREA(ACRES) =    30.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     53.26

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

```
 FLOW PROCESS FROM NODE    798.00 TO NODE    799.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    440.00
 DOWNSTREAM ELEVATION(FEET) =    435.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.790
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.250
 SUBAREA RUNOFF(CFS) =      0.47
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
 FLOW PROCESS FROM NODE    799.00 TO NODE    800.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  435.00  DOWNSTREAM ELEVATION(FEET) =  292.00
 STREET LENGTH(FEET) =  1489.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.16
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.08
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.41
 STREET FLOW TRAVEL TIME(MIN.) =   2.73   Tc(MIN.) =    8.52
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.731
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
 SUBAREA AREA(ACRES) =   14.26      SUBAREA RUNOFF(CFS) =   29.26
 TOTAL AREA(ACRES) =       14.5        PEAK FLOW RATE(CFS) =      29.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) = 10.14   DEPTH*VELOCITY(FT*FT/SEC.) =   4.32
 LONGEST FLOWPATH FROM NODE    798.00 TO NODE    800.00 =    1589.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    800.00 TO NODE    800.00 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.) =    8.52
 RAINFALL INTENSITY(INCH/HR) =   3.73
 TOTAL STREAM AREA(ACRES) =    14.46
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.67

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       53.26    12.03        3.227         30.50
     2       29.67     8.52        3.731         14.46

 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       75.73     8.52       3.731
     2       78.92    12.03       3.227

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      78.92   Tc(MIN.) =   12.03
 TOTAL AREA(ACRES) =       45.0
 LONGEST FLOWPATH FROM NODE    398.00 TO NODE    800.00 =    2927.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    800.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   272.00  DOWNSTREAM(FEET) =   269.05
 FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.97
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      78.92
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   12.46
 LONGEST FLOWPATH FROM NODE    398.00 TO NODE     50.00 =    3211.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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       78.92    12.46       3.179       44.96
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE     50.00 =    3211.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       26.52    13.17       3.101       17.02
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE     50.00 =    1870.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     104.00      12.46        3.179
      2     103.49      13.17        3.101

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     104.00   Tc(MIN.) =   12.46
  TOTAL AREA(ACRES) =       62.0

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    498.00 TO NODE    499.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    379.00
  DOWNSTREAM ELEVATION(FEET) =    378.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.692
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.699
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      0.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    499.00 TO NODE    500.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   390.00   CHANNEL SLOPE =  0.1051
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.414
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =   10.33
  SUBAREA AREA(ACRES) =     1.79       SUBAREA RUNOFF(CFS) =    2.75
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       3.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   4.83
  LONGEST FLOWPATH FROM NODE    498.00 TO NODE    500.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    598.00 TO NODE    599.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    366.00
  DOWNSTREAM ELEVATION(FEET) =    363.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.027
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.205
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    599.00 TO NODE    600.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.00  DOWNSTREAM(FEET) =    324.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   415.00   CHANNEL SLOPE =  0.0940
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.873
  *USER SPECIFIED(SUBAREA):
  ANNUAL GRASS (DRYLAND) POOR COVER RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.96
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.75
  Tc(MIN.) =    7.77
  SUBAREA AREA(ACRES) =     2.00       SUBAREA RUNOFF(CFS) =    3.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       3.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   4.95
  LONGEST FLOWPATH FROM NODE    598.00 TO NODE    600.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    698.00 TO NODE    699.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    350.00
  DOWNSTREAM ELEVATION(FEET) =    341.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.544
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    699.00 TO NODE    700.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    341.00  DOWNSTREAM(FEET) =    324.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   225.00   CHANNEL SLOPE =  0.0756
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.284
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.52
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =    5.61
  SUBAREA AREA(ACRES) =     1.53       SUBAREA RUNOFF(CFS) =    2.95
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       3.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   4.41
  LONGEST FLOWPATH FROM NODE    698.00 TO NODE    700.00 =     295.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.6  TC(MIN.) =      5.61
  PEAK FLOW RATE(CFS)   =       3.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

PROPOSED CONDITION

TOOLEY STREET
TOOLEY CIR.
DIPPER STREET
60TH STREET
UPLAND STREET
OLD MEMORY LANE
LUBER STREET
ROSWELL STREET
BALTIMA DRIVE
STREET "A"
STREET "B"
STREET "C"
STREET "D"
STREET "E"
24" RCP OUTLET TO POC 1
18" RCP OUTLET TO POC 2*
36" RCP OUTLET TO POC 2
24" RCP OUTLET TO POC 3
18" RCP OUTLET TO STREET
27" RCP
MAP 8712
MAP 7629
MAP 1254
APN 543-340-16 EMERALD HILLS PARK
APN 543-340-19 CHOLLAS CREEK OPEN SPACE
HOA OPEN SPACE
10' DRAINAGE EASEMENT GRANTED PER MAP 8712
10' DRAINAGE EASEMENT GRANTED PER MAP 7629
PROP. BROW DITCH
EXIST. BROW DITCH
0.20 ACRES
21.72 ACRES
4.77 ACRES
14.37 ACRES
0.07 ACRES
0.12 ACRES
0.09 ACRES
1.43 ACRES
2.09 ACRES
1.00 ACRES
0.05 ACRES
1.19 ACRES
0.43 ACRES
3.94 ACRES
0.73 ACRES
0.11 ACRES
1.01 ACRES
0.36 ACRES
0.11 ACRES
1.24 ACRES
0.19 ACRES
2.75 ACRES
0.08 ACRES
0.19 ACRES
1.31 ACRES
0.08 ACRES
0.60 ACRES
0.66 ACRES
0.07 ACRES
1.05 ACRES
0.08 ACRES
0.60 ACRES
2.64 ACRES
1.26 ACRES
0.16 ACRES
2.03 ACRES
0.11 ACRES
2.69 ACRES
8.55 ACRES
0.98 ACRES
2.28 ACRES
4.15 ACRES
0.09 ACRES
0.19 ACRES
0.17 ACRES
0.16 ACRES
0.20 ACRES
Q100 = 2.34 CFS A = 1.4 AC. T_c = 9.02 MIN.
Q50 = 1.18 CFS A = 1.4 AC. T_c = 5.61 MIN.
Q100 = 2.33 CFS A = 1.2 AC. T_c = 5.43 MIN.
Q50 = 1.08 CFS A = 1.2 AC. T_c = 7.77 MIN.
Q100 = 0.68 CFS A = 0.4 AC. T_c = 5.12 MIN.
Q50 = 0.32 CFS A = 0.4 AC. T_c = 10.33 MIN.
Q100 = 9.15 CFS A = 5.0 AC. T_c = 9.65 MIN.
Q50 = 4.07 CFS A = 5.0 AC. T_c = 12.30 MIN.
Q100 = 7.10 CFS A = 5.1 AC. T_c = 13.30 MIN.
Q50 = 2.50 CFS A = 5.0 AC. T_c = 6.97 MIN.
Q100 = 29.51 CFS A = 17.4 AC. T_c = 13.22 MIN.
Q50 = 14.07 CFS A = 17.4 AC. T_c = 12.93 MIN.
Q100 = 16.54 CFS A = 9.7 AC. T_c = 8.79 MIN.
Q100 = 45.40 CFS A = 23.7 AC. T_c = 8.62 MIN.
Q50 = 21.63 CFS A = 23.7 AC. T_c = 9.88 MIN.
Q100 = 33.46 CFS A = 20.2 AC. T_c = 12.63 MIN.
Q50 = 15.94 CFS A = 20.2 AC. T_c = 13.10 MIN.
Q100 = 17.79 CFS A = 20.2 AC. T_c = 9.94 MIN.
Q100 = 110.67 CFS A = 62.9 AC. T_c = 10.93 MIN.
Q50 = 52.75 CFS A = 62.9 AC. T_c = 12.46 MIN.
Q100 = 92.10 CFS A = 62.9 AC. T_c = 12.50 MIN.

SITE
BLVD
MALLARD ST
FEDERAL
TOOLEY ST
KELTON RD
RADIO DR
60TH ST
OLD MEMORY LANE
BROADWAY
ROSWELL ST
EUCLID AVE
MARKET ST
IMPERIAL AVE
CITY OF SAN DIEGO
805
94
N

VICINITY MAP
NOT TO SCALE

LEGEND
- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- SOIL GROUP BOUNDARY
- 00.00 ACRES — AREA
- D — HYDROLOGIC SOIL TYPE
- 406 — NODE NUMBER
- AREA TO BASIN 1
- AREA TO BASIN 2
- AREA TO BASIN 3

H&A
80 0 80 160 240
SCALE 1"= 80'

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

DEVELOPED CONDITION HYDROLOGY MAP
EMERALD HILLS
CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 2825-0004

R:\1671\Hyd\DR\CAD\1671$Hydro_PR.dwg[]Oct-24-2023:13:27

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* EMERALD HILLS                                                        *
* 100 YEAR PROPOSED CONDITIONS                                         *
*                                                                      *
 ************************************************************************

  FILE NAME: R:\1671\HYD\DR\CALCS\AES\100PR\PR100.DAT
  TIME/DATE OF STUDY: 10:07 10/20/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    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 =  5.0 (FT*FT/S)
```

```
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    389.60
  DOWNSTREAM ELEVATION(FEET) =    388.00
  ELEVATION DIFFERENCE(FEET) =      1.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.028
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.015
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  388.00  DOWNSTREAM ELEVATION(FEET) =  366.50
  STREET LENGTH(FEET) =   558.82   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =    9.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.594
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    2.09      SUBAREA RUNOFF(CFS) =    4.13
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       4.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.94
  FLOW VELOCITY(FEET/SEC.) =  4.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     638.82 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   362.60  DOWNSTREAM(FEET) =   360.50
  FLOW LENGTH(FEET) =    65.00   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.) =   8.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.37
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE     10.00 =     703.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 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.) =    9.37
  RAINFALL INTENSITY(INCH/HR) =   3.57
  TOTAL STREAM AREA(ACRES) =     2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.37

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    386.50
  DOWNSTREAM ELEVATION(FEET) =    384.80
  ELEVATION DIFFERENCE(FEET) =      1.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.888
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.041
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    114.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  386.50  DOWNSTREAM ELEVATION(FEET) =  384.80
  STREET LENGTH(FEET) =    80.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   0.47   Tc(MIN.) =    7.35
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.953
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.17
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.59
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =     160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.50  DOWNSTREAM(FEET) =   360.50
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.28
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.43
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE     10.00 =     191.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 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.) =    7.43
  RAINFALL INTENSITY(INCH/HR) =   3.94
  TOTAL STREAM AREA(ACRES) =     1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.37     9.37        3.569          2.21
      2        2.28     7.43        3.939          1.05
```

```
  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        5.74     7.43       3.939
      2        6.44     9.37       3.569

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.44   Tc(MIN.) =    9.37
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE     10.00 =     703.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.569
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5383
  SUBAREA AREA(ACRES) =    0.43   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       7.09
  TC(MIN.) =    9.37

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 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) =   360.50  DOWNSTREAM(FEET) =   335.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.09
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    150.00 =     943.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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) =   3.52
  TOTAL STREAM AREA(ACRES) =     3.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.09

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    362.00
  DOWNSTREAM ELEVATION(FEET) =    350.00
  ELEVATION DIFFERENCE(FEET) =     12.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   271.00   CHANNEL SLOPE =  0.0554
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   1.54
  Tc(MIN.) =    6.97
  SUBAREA AREA(ACRES) =     1.19       SUBAREA RUNOFF(CFS) =    2.16
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   3.59
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    150.00 =     371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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.) =    6.97
  RAINFALL INTENSITY(INCH/HR) =   4.03
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.36

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.09     9.65        3.517          3.69
```

```
     2        2.36     6.97        4.026          1.30

  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        8.55     6.97       4.026
      2        9.15     9.65       3.517

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.15   Tc(MIN.) =    9.65
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    150.00 =     943.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    389.60
  DOWNSTREAM ELEVATION(FEET) =    388.00
  ELEVATION DIFFERENCE(FEET) =      1.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.028
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.015
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  388.00  DOWNSTREAM ELEVATION(FEET) =  362.00
  STREET LENGTH(FEET) =   658.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.42
  STREET FLOW TRAVEL TIME(MIN.) =   2.29   Tc(MIN.) =    9.32
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.579
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
 SUBAREA AREA(ACRES) =    3.94      SUBAREA RUNOFF(CFS) =    7.76
 TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =       7.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.46
 FLOW VELOCITY(FEET/SEC.) =  5.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.97
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 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) =   350.50  DOWNSTREAM(FEET) =   350.00
 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   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.93
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.34
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.34
 RAINFALL INTENSITY(INCH/HR) =   3.58
 TOTAL STREAM AREA(ACRES) =     4.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.93

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    366.70
 DOWNSTREAM ELEVATION(FEET) =    366.00
 ELEVATION DIFFERENCE(FEET) =      0.70
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.787
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.870
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.15

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

```
 FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  365.00  DOWNSTREAM ELEVATION(FEET) =  362.00
 STREET LENGTH(FEET) =   256.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.78
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.02
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   2.02   Tc(MIN.) =    9.80
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.488
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
 SUBAREA AREA(ACRES) =    0.66      SUBAREA RUNOFF(CFS) =    1.27
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.40

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.89
 FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     321.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 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) =   351.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =    28.00   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.) =   6.25
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.40
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.88
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    208.00 =     349.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   3.47
  TOTAL STREAM AREA(ACRES) =     0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    375.50
  DOWNSTREAM ELEVATION(FEET) =    374.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.096
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    78.12
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.002
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    244.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  374.00  DOWNSTREAM ELEVATION(FEET) =  366.65
  STREET LENGTH(FEET) =   465.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.91   Tc(MIN.) =   10.01
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.449
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
```

```
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       2.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.64
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 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) =   358.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.60
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   11.18
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    208.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.18
  RAINFALL INTENSITY(INCH/HR) =   3.32
  TOTAL STREAM AREA(ACRES) =     1.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.60

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    262.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    374.00
  DOWNSTREAM ELEVATION(FEET) =    372.70
  ELEVATION DIFFERENCE(FEET) =      1.30
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.262
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.37
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.970
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    264.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  372.70  DOWNSTREAM ELEVATION(FEET) =  366.65
  STREET LENGTH(FEET) =   496.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =   10.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.423
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    2.64      SUBAREA RUNOFF(CFS) =    4.97
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.33
  FLOW VELOCITY(FEET/SEC.) =  3.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    264.00 =     576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 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) =   358.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   407.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.27
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    208.00 =     983.00 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 =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.17
  RAINFALL INTENSITY(INCH/HR) =   3.32
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.27

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.93     9.34        3.576          4.03
      2        1.40     9.88        3.473          0.73
      3        2.60    11.18        3.320          1.37
      4        5.27    11.17        3.322          2.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       15.83     9.34       3.576
      2       16.06     9.88       3.473
      3       16.57    11.17       3.322
      4       16.57    11.18       3.320

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.57   Tc(MIN.) =   11.17
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    208.00 =     983.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   318.00
  FLOW LENGTH(FEET) =   472.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.57
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE     20.00 =    1455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 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.) =   11.67
  RAINFALL INTENSITY(INCH/HR) =   3.27
  TOTAL STREAM AREA(ACRES) =     8.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.57

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

```
 FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    362.70
 DOWNSTREAM ELEVATION(FEET) =    361.50
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.506
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.114
 SUBAREA RUNOFF(CFS) =      0.18
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    224.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  361.50  DOWNSTREAM ELEVATION(FEET) =  334.00
 STREET LENGTH(FEET) =   408.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.17
   HALFSTREET FLOOD WIDTH(FEET) =    2.02
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    7.83
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.863
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
 SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.27
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.27
 FLOW VELOCITY(FEET/SEC.) =  4.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    224.00 =     473.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.00  DOWNSTREAM(FEET) =   318.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.44
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.94
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE     20.00 =     533.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 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.) =    7.94
  RAINFALL INTENSITY(INCH/HR) =   3.84
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    361.00
  DOWNSTREAM ELEVATION(FEET) =    358.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.700
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.267
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    234.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  358.00  DOWNSTREAM ELEVATION(FEET) =  334.00
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.18
    HALFSTREET FLOOD WIDTH(FEET) =    2.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    6.56
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.103
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    1.65
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.73
  FLOW VELOCITY(FEET/SEC.) =  5.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    234.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.50  DOWNSTREAM(FEET) =   318.00
  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   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    6.76
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE     20.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 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.) =    6.76
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.90

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       16.57    11.67        3.266          8.93
      2        1.44     7.94        3.842          0.68
      3        1.90     6.76        4.066          0.84

  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       16.44     6.76       4.066
      2       17.33     7.94       3.842
      3       19.33    11.67       3.266

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.33   Tc(MIN.) =   11.67
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE     20.00 =    1455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.266
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5409
  SUBAREA AREA(ACRES) =    1.05   SUBAREA RUNOFF(CFS) =    1.54
  TOTAL AREA(ACRES) =       11.3   TOTAL RUNOFF(CFS) =      20.32
  TC(MIN.) =   11.67

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   315.00  DOWNSTREAM(FEET) =   312.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.32
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.72
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE     25.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  312.00  DOWNSTREAM ELEVATION(FEET) =  292.00
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.33
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.43   FLOOD WIDTH(FEET) =   15.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    7.31
    SPLIT DEPTH(FEET) =    0.27   SPLIT FLOOD WIDTH(FEET) =    7.08
    SPLIT FLOW(CFS) =    3.01   SPLIT VELOCITY(FEET/SEC.) =    4.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.12
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   12.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.161
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.541
  SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.03
  TOTAL AREA(ACRES) =       11.5        PEAK FLOW RATE(CFS) =      20.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  7.31   DEPTH*VELOCITY(FT*FT/SEC.) =   3.12
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    250.00 =    1900.00 FEET.

****************************************************************************
  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.) =   12.63
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =    11.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.32

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    272.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    350.00
  DOWNSTREAM ELEVATION(FEET) =    348.70
  ELEVATION DIFFERENCE(FEET) =      1.30
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.913
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.34
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  348.70  DOWNSTREAM ELEVATION(FEET) =  292.00
  STREET LENGTH(FEET) =   945.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =    9.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.461
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    8.55      SUBAREA RUNOFF(CFS) =   16.27
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      16.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.21
  FLOW VELOCITY(FEET/SEC.) =  7.76   DEPTH*VELOCITY(FT*FT/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    250.00 =    1045.00 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.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   3.46
  TOTAL STREAM AREA(ACRES) =     8.71
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.32    12.63        3.161         11.51
      2       16.58     9.94        3.461          8.71
```

```
  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       35.13     9.94       3.461
      2       35.46    12.63       3.161

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.46   Tc(MIN.) =   12.63
  TOTAL AREA(ACRES) =       20.2
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    250.00 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   292.00  DOWNSTREAM(FEET) =   269.05
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.46
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.69
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE     50.00 =    2010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    368.50
  DOWNSTREAM ELEVATION(FEET) =    367.80
  ELEVATION DIFFERENCE(FEET) =      0.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.787
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.870
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  367.80  DOWNSTREAM ELEVATION(FEET) =  344.00
```

```
  STREET LENGTH(FEET) =   921.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   4.23   Tc(MIN.) =   12.02
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.228
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    2.75      SUBAREA RUNOFF(CFS) =    4.88
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       4.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.28
  FLOW VELOCITY(FEET/SEC.) =  4.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.228
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5500
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    4.78
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =       9.77
  TC(MIN.) =   12.02

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   338.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.77
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   12.53
```

```
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE     30.00 =    1186.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =   12.53
 RAINFALL INTENSITY(INCH/HR) =   3.17
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.77

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    312.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    366.70
 DOWNSTREAM ELEVATION(FEET) =    366.00
 ELEVATION DIFFERENCE(FEET) =      0.70
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.787
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.870
 SUBAREA RUNOFF(CFS) =      0.17
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
 FLOW PROCESS FROM NODE    312.00 TO NODE    314.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  366.00  DOWNSTREAM ELEVATION(FEET) =  344.00
 STREET LENGTH(FEET) =   760.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.36
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.30
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
 STREET FLOW TRAVEL TIME(MIN.) =   3.72   Tc(MIN.) =   11.51
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.284
 *USER SPECIFIED(SUBAREA):
```

```
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    1.31      SUBAREA RUNOFF(CFS) =    2.37
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       2.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.284
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5500
  SUBAREA AREA(ACRES) =    2.03   SUBAREA RUNOFF(CFS) =    3.67
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =       6.18
  TC(MIN.) =   11.51

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.00  DOWNSTREAM(FEET) =   338.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.18
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   12.06
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE     30.00 =    1045.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =   12.06
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =     3.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.18

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.77    12.53        3.171          5.50
      2        6.18    12.06        3.224          3.42
```

```
  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       15.57    12.06       3.224
      2       15.84    12.53       3.171

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.84   Tc(MIN.) =   12.53
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE     30.00 =    1186.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.171
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5437
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        9.5   TOTAL RUNOFF(CFS) =      16.41
  TC(MIN.) =   12.53

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =   663.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.41
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   13.22
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =    1849.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.22
  RAINFALL INTENSITY(INCH/HR) =   3.10
  TOTAL STREAM AREA(ACRES) =     9.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.41

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    328.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    374.00
  DOWNSTREAM ELEVATION(FEET) =    350.00
  ELEVATION DIFFERENCE(FEET) =     24.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    330.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    313.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   598.00   CHANNEL SLOPE =  0.0619
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.324
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.74
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   5.72
  Tc(MIN.) =   11.15
  SUBAREA AREA(ACRES) =     0.98       SUBAREA RUNOFF(CFS) =    1.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    326.00 TO NODE    330.00 =     698.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   309.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =   187.00   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.) =   9.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   11.48
  LONGEST FLOWPATH FROM NODE    326.00 TO NODE    350.00 =     885.00 FEET.

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

```
 FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.48
 RAINFALL INTENSITY(INCH/HR) =   3.29
 TOTAL STREAM AREA(ACRES) =     1.07
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.60

****************************************************************************
 FLOW PROCESS FROM NODE    336.00 TO NODE    338.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    348.00
 DOWNSTREAM ELEVATION(FEET) =    344.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.079
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    95.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.195
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    340.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  344.00  DOWNSTREAM ELEVATION(FEET) =  297.00
 STREET LENGTH(FEET) =   875.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.53
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.53
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.64
 STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =    8.72
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.694
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    4.15      SUBAREA RUNOFF(CFS) =    8.43
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =       8.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.22
  FLOW VELOCITY(FEET/SEC.) =  6.40   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
  LONGEST FLOWPATH FROM NODE    336.00 TO NODE    340.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   290.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.82
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    336.00 TO NODE    350.00 =    1009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.79
  RAINFALL INTENSITY(INCH/HR) =   3.68
  TOTAL STREAM AREA(ACRES) =     4.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.82

****************************************************************************
  FLOW PROCESS FROM NODE    348.00 TO NODE    349.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    315.00
  DOWNSTREAM ELEVATION(FEET) =    313.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.028
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.015
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.38
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    350.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  313.00  DOWNSTREAM ELEVATION(FEET) =  297.00
  STREET LENGTH(FEET) =   441.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    8.76
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.686
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    2.28      SUBAREA RUNOFF(CFS) =    4.62
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       4.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.58
  FLOW VELOCITY(FEET/SEC.) =  4.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE    348.00 TO NODE    350.00 =     541.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.76
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       16.41    13.22        3.095          9.52
      2        1.60    11.48        3.288          1.07
      3        8.82     8.79        3.679          4.34
```

```
     4        4.97     8.76        3.686          2.45

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.75     8.76       3.686
      2       28.81     8.79       3.679
      3       29.36    11.48       3.288
      4       29.51    13.22       3.095

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.51   Tc(MIN.) =   13.22
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =    1849.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    398.00 TO NODE    399.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    462.00
  DOWNSTREAM ELEVATION(FEET) =    459.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.512
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    90.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.113
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    399.00 TO NODE    400.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  459.00  DOWNSTREAM ELEVATION(FEET) =  321.12
  STREET LENGTH(FEET) =  1626.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.79
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.99
  STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =    9.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.567
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =   21.72      SUBAREA RUNOFF(CFS) =   42.62
  TOTAL AREA(ACRES) =       21.9        PEAK FLOW RATE(CFS) =      43.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  9.53   DEPTH*VELOCITY(FT*FT/SEC.) =   4.06
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    400.00 =    1726.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   321.12  DOWNSTREAM(FEET) =   315.70
  FLOW LENGTH(FEET) =   333.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.39
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.01
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.87
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    401.00 =    2059.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   3.47
  TOTAL STREAM AREA(ACRES) =    21.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.01

****************************************************************************
  FLOW PROCESS FROM NODE    448.00 TO NODE    449.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    402.70
  DOWNSTREAM ELEVATION(FEET) =    394.00
  ELEVATION DIFFERENCE(FEET) =      8.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.689
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.269
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    449.00 TO NODE    450.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    394.00  DOWNSTREAM(FEET) =    329.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   529.00   CHANNEL SLOPE =  0.1229
 CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.590
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.57
 Tc(MIN.) =    9.26
 SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    2.31
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
 TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   3.10
 LONGEST FLOWPATH FROM NODE    448.00 TO NODE    450.00 =     629.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    450.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   329.00  DOWNSTREAM(FEET) =   316.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.42
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.58
 LONGEST FLOWPATH FROM NODE    448.00 TO NODE    401.00 =     809.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =    9.58
 RAINFALL INTENSITY(INCH/HR) =   3.53
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.42
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       43.01     9.87        3.475         21.92
      2        2.42     9.58        3.530          1.50

  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       44.17     9.58       3.530
      2       45.40     9.87       3.475

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.40   Tc(MIN.) =    9.87
  TOTAL AREA(ACRES) =       23.4
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    401.00 =    2059.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    315.70  DOWNSTREAM(FEET) =    295.34
  CHANNEL LENGTH THRU SUBAREA(FEET) =   383.00   CHANNEL SLOPE =  0.0532
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.353
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.28
  AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =   10.89
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.544
  TOTAL AREA(ACRES) =       23.4         PEAK FLOW RATE(CFS) =      45.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   6.28
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    402.00 =    2442.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.353
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5277
  SUBAREA AREA(ACRES) =    4.77   SUBAREA RUNOFF(CFS) =    7.20
  TOTAL AREA(ACRES) =       28.2   TOTAL RUNOFF(CFS) =      49.89
  TC(MIN.) =   10.89
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   295.34  DOWNSTREAM(FEET) =   292.76
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.53
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.89
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    403.00 =    2507.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    800.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    292.76  DOWNSTREAM(FEET) =    272.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0494
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.223
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      49.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   1.12
  Tc(MIN.) =   12.07
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.528
  TOTAL AREA(ACRES) =       28.2         PEAK FLOW RATE(CFS) =      49.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   6.27
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    800.00 =    2927.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    800.00 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.) =   12.07
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =    28.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.89

****************************************************************************
  FLOW PROCESS FROM NODE    798.00 TO NODE    799.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    435.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.790
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.250
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE    799.00 TO NODE    800.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  435.00  DOWNSTREAM ELEVATION(FEET) =  292.00
  STREET LENGTH(FEET) =  1489.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.41
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =    8.53
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.730
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =   14.37      SUBAREA RUNOFF(CFS) =   29.48
  TOTAL AREA(ACRES) =       14.6        PEAK FLOW RATE(CFS) =      29.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) = 10.14   DEPTH*VELOCITY(FT*FT/SEC.) =   4.32
  LONGEST FLOWPATH FROM NODE    798.00 TO NODE    800.00 =    1589.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    800.00 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.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   3.73
  TOTAL STREAM AREA(ACRES) =    14.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       49.89    12.07        3.223         28.21
      2       29.89     8.53        3.730         14.57

  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       73.00     8.53       3.730
      2       75.72    12.07       3.223

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      75.72   Tc(MIN.) =   12.07
  TOTAL AREA(ACRES) =       42.8
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    800.00 =    2927.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   272.00  DOWNSTREAM(FEET) =   269.05
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.95
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.72
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   12.50
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE     50.00 =    3211.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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       75.72    12.50       3.175       42.78
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE     50.00 =    3211.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       35.46    12.69       3.154       20.22
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE     50.00 =    2010.00 FEET.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     110.64      12.50        3.175
      2     110.67      12.69        3.154

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     110.67   Tc(MIN.) =   12.69
  TOTAL AREA(ACRES) =       62.9

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    698.00 TO NODE    699.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    349.00
  DOWNSTREAM ELEVATION(FEET) =    327.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    699.00 TO NODE    700.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    327.00  DOWNSTREAM(FEET) =    324.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   258.00   CHANNEL SLOPE =  0.0116
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.639
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.20
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   3.57
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    2.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       2.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    698.00 TO NODE    700.00 =     358.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    598.00 TO NODE    599.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    350.00
  DOWNSTREAM ELEVATION(FEET) =    328.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    599.00 TO NODE    600.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    328.00  DOWNSTREAM(FEET) =    324.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =     1.01   CHANNEL SLOPE =  3.9604
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.36
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   0.00
  Tc(MIN.) =    5.43
  SUBAREA AREA(ACRES) =     1.01       SUBAREA RUNOFF(CFS) =    1.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   9.21
  LONGEST FLOWPATH FROM NODE    598.00 TO NODE    600.00 =     101.01 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    499.00 TO NODE    500.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  UPSTREAM ELEVATION(FEET) =    362.00
  DOWNSTREAM ELEVATION(FEET) =    337.00
  ELEVATION DIFFERENCE(FEET) =     25.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.189
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
```

```
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.174
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.68
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.4  TC(MIN.) =      6.19
  PEAK FLOW RATE(CFS)   =       0.68
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* EMERALD HILLS                                                           *
* 100 YEAR MITIGATED PROPOSED CONDITIONS                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: R:\1671\HYD\DR\CALCS\AES\100PRM\PR100.DAT
  TIME/DATE OF STUDY: 14:02 10/23/2023
-----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    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 =  5.0 (FT*FT/S)
```

```
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  37.37   RAIN INTENSITY(INCH/HOUR) =  1.78
  TOTAL AREA(ACRES) =     3.69   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 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) =   360.50  DOWNSTREAM(FEET) =   335.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.80
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   37.89
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    150.00 =     240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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.) =   37.89
  RAINFALL INTENSITY(INCH/HR) =   1.76
  TOTAL STREAM AREA(ACRES) =     3.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    362.00
  DOWNSTREAM ELEVATION(FEET) =    350.00
  ELEVATION DIFFERENCE(FEET) =     12.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.21

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

```
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    335.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   271.00   CHANNEL SLOPE =  0.0554
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.026
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.94
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   1.54
 Tc(MIN.) =    6.97
 SUBAREA AREA(ACRES) =     1.19       SUBAREA RUNOFF(CFS) =    2.16
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
 TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       2.36

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   3.59
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    150.00 =     371.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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.) =    6.97
 RAINFALL INTENSITY(INCH/HR) =   4.03
 TOTAL STREAM AREA(ACRES) =     1.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.36

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        0.80    37.89        1.763          3.69
     2        2.36     6.97        4.026          1.30

 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        2.50     6.97       4.026
     2        1.83    37.89       1.763

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       2.50   Tc(MIN.) =    6.97
 TOTAL AREA(ACRES) =        5.0
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    150.00 =     371.00 FEET.

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

```
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  27.67   RAIN INTENSITY(INCH/HOUR) =  2.09
 TOTAL AREA(ACRES) =    11.32   TOTAL RUNOFF(CFS) =      3.53

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   315.00  DOWNSTREAM(FEET) =   312.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.21
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.53
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   27.74
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE     25.00 =     416.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  312.00  DOWNSTREAM ELEVATION(FEET) =  292.00
 STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.54
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.65
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.04
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
 STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =   29.07
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.037
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.150
 SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.02
 TOTAL AREA(ACRES) =       11.3        PEAK FLOW RATE(CFS) =       3.53

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.59
  FLOW VELOCITY(FEET/SEC.) =  5.09   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    250.00 =     816.00 FEET.

****************************************************************************
  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.) =   29.07
  RAINFALL INTENSITY(INCH/HR) =   2.04
  TOTAL STREAM AREA(ACRES) =    11.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.53

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    272.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    350.00
  DOWNSTREAM ELEVATION(FEET) =    348.70
  ELEVATION DIFFERENCE(FEET) =      1.30
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.562
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.913
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    250.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  348.70  DOWNSTREAM ELEVATION(FEET) =  292.00
  STREET LENGTH(FEET) =   945.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   10.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =    9.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.461
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    8.55      SUBAREA RUNOFF(CFS) =   16.27
  TOTAL AREA(ACRES) =        8.7        PEAK FLOW RATE(CFS) =      16.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.21
  FLOW VELOCITY(FEET/SEC.) =  7.76   DEPTH*VELOCITY(FT*FT/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    250.00 =    1045.00 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.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   3.46
  TOTAL STREAM AREA(ACRES) =     8.71
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.53    29.07        2.037         11.33
      2       16.58     9.94        3.461          8.71

  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       17.79     9.94       3.461
      2       13.29    29.07       2.037

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.79   Tc(MIN.) =    9.94
  TOTAL AREA(ACRES) =       20.0
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    250.00 =    1045.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   292.00  DOWNSTREAM(FEET) =   269.05
  FLOW LENGTH(FEET) =   110.00   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.) =  24.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE     50.00 =    1155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  24.53   RAIN INTENSITY(INCH/HOUR) =  2.23
  TOTAL AREA(ACRES) =     9.53   TOTAL RUNOFF(CFS) =      4.45

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =   663.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.45
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   25.51
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    350.00 =    1818.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.51
  RAINFALL INTENSITY(INCH/HR) =   2.18
  TOTAL STREAM AREA(ACRES) =     9.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.45

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    328.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
  UPSTREAM ELEVATION(FEET) =    374.00
  DOWNSTREAM ELEVATION(FEET) =    350.00
  ELEVATION DIFFERENCE(FEET) =     24.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    330.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    313.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   598.00   CHANNEL SLOPE =  0.0619
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.324
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.74
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   5.72
  Tc(MIN.) =   11.15
  SUBAREA AREA(ACRES) =     0.98       SUBAREA RUNOFF(CFS) =    1.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    326.00 TO NODE    330.00 =     698.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   309.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =   187.00   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.) =   9.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   11.48
  LONGEST FLOWPATH FROM NODE    326.00 TO NODE    350.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.48
```

```
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =     1.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.60

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    338.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    348.00
  DOWNSTREAM ELEVATION(FEET) =    344.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.079
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.195
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    340.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  344.00  DOWNSTREAM ELEVATION(FEET) =  297.00
  STREET LENGTH(FEET) =   875.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.64
  STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =    8.72
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.694
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    4.15      SUBAREA RUNOFF(CFS) =    8.43
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =       8.82
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.22
  FLOW VELOCITY(FEET/SEC.) =  6.40   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
  LONGEST FLOWPATH FROM NODE    336.00 TO NODE    340.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   290.00  DOWNSTREAM(FEET) =   289.50
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.82
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    336.00 TO NODE    350.00 =    1009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.79
  RAINFALL INTENSITY(INCH/HR) =   3.68
  TOTAL STREAM AREA(ACRES) =     4.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.82

****************************************************************************
  FLOW PROCESS FROM NODE    348.00 TO NODE    349.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    315.00
  DOWNSTREAM ELEVATION(FEET) =    313.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.028
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.015
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    350.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  313.00  DOWNSTREAM ELEVATION(FEET) =  297.00
 STREET LENGTH(FEET) =   441.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.69
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.17
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.25
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
 STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    8.76
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.686
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
 SUBAREA AREA(ACRES) =    2.28      SUBAREA RUNOFF(CFS) =    4.62
 TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       4.97

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.58
 FLOW VELOCITY(FEET/SEC.) =  4.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    350.00 =     541.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.76
 RAINFALL INTENSITY(INCH/HR) =   3.69
 TOTAL STREAM AREA(ACRES) =     2.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.97

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.45    25.51        2.180          9.53
     2        1.60    11.48        3.288          1.07
     3        8.82     8.79        3.679          4.34
     4        4.97     8.76        3.686          2.45

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  4 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       16.50     8.76       3.686
      2       16.54     8.79       3.679
      3       15.91    11.48       3.288
      4       13.67    25.51       2.180

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.54   Tc(MIN.) =    8.79
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE    350.00 =    1818.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    398.00 TO NODE    399.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    462.00
  DOWNSTREAM ELEVATION(FEET) =    459.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.512
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    90.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.113
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    399.00 TO NODE    400.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  459.00  DOWNSTREAM ELEVATION(FEET) =  321.12
  STREET LENGTH(FEET) =  1626.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.99
  STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =    9.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.567
```

```
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =   21.72      SUBAREA RUNOFF(CFS) =   42.62
  TOTAL AREA(ACRES) =       21.9        PEAK FLOW RATE(CFS) =      43.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  9.53   DEPTH*VELOCITY(FT*FT/SEC.) =   4.06
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    400.00 =    1726.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   321.12  DOWNSTREAM(FEET) =   315.70
  FLOW LENGTH(FEET) =   333.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.39
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.01
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.87
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    401.00 =    2059.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   3.47
  TOTAL STREAM AREA(ACRES) =    21.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.01

****************************************************************************
  FLOW PROCESS FROM NODE    448.00 TO NODE    449.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    402.70
  DOWNSTREAM ELEVATION(FEET) =    394.00
  ELEVATION DIFFERENCE(FEET) =      8.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.689
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.269
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    449.00 TO NODE    450.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    394.00  DOWNSTREAM(FEET) =    329.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   529.00   CHANNEL SLOPE =  0.1229
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.590
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.57
  Tc(MIN.) =    9.26
  SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    2.31
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   3.10
  LONGEST FLOWPATH FROM NODE    448.00 TO NODE    450.00 =     629.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    450.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.00  DOWNSTREAM(FEET) =   316.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.58
  LONGEST FLOWPATH FROM NODE    448.00 TO NODE    401.00 =     809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 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.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   3.53
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       43.01     9.87        3.475         21.92
      2        2.42     9.58        3.530          1.50

  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       44.17     9.58       3.530
      2       45.40     9.87       3.475

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.40   Tc(MIN.) =    9.87
  TOTAL AREA(ACRES) =       23.4
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    401.00 =    2059.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    315.70  DOWNSTREAM(FEET) =    295.34
  CHANNEL LENGTH THRU SUBAREA(FEET) =   383.00   CHANNEL SLOPE =  0.0532
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.353
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.28
  AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =   10.89
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.02
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.544
  TOTAL AREA(ACRES) =       23.4         PEAK FLOW RATE(CFS) =      45.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   6.28
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    402.00 =    2442.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.353
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5277
  SUBAREA AREA(ACRES) =    4.77   SUBAREA RUNOFF(CFS) =    7.20
  TOTAL AREA(ACRES) =       28.2   TOTAL RUNOFF(CFS) =      49.89
  TC(MIN.) =   10.89

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   295.34  DOWNSTREAM(FEET) =   292.76
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.53
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.89
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    403.00 =    2507.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    800.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    292.76  DOWNSTREAM(FEET) =    272.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0494
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.223
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      49.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   1.12
  Tc(MIN.) =   12.07
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.528
  TOTAL AREA(ACRES) =       28.2         PEAK FLOW RATE(CFS) =      49.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   6.27
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    800.00 =    2927.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    800.00 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.) =   12.07
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =    28.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.89

****************************************************************************
  FLOW PROCESS FROM NODE    798.00 TO NODE    799.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    435.00
  ELEVATION DIFFERENCE(FEET) =      5.00
```

```
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.790
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.250
 SUBAREA RUNOFF(CFS) =      0.47
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
 FLOW PROCESS FROM NODE    799.00 TO NODE    800.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  435.00  DOWNSTREAM ELEVATION(FEET) =  292.00
 STREET LENGTH(FEET) =  1489.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.51
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.07
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.41
 STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =    8.53
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.730
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
 SUBAREA AREA(ACRES) =   14.37      SUBAREA RUNOFF(CFS) =   29.48
 TOTAL AREA(ACRES) =       14.6        PEAK FLOW RATE(CFS) =      29.89

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) = 10.14   DEPTH*VELOCITY(FT*FT/SEC.) =   4.32
 LONGEST FLOWPATH FROM NODE    798.00 TO NODE    800.00 =    1589.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    800.00 TO NODE    800.00 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.) =    8.53
 RAINFALL INTENSITY(INCH/HR) =   3.73
 TOTAL STREAM AREA(ACRES) =    14.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.89

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
```

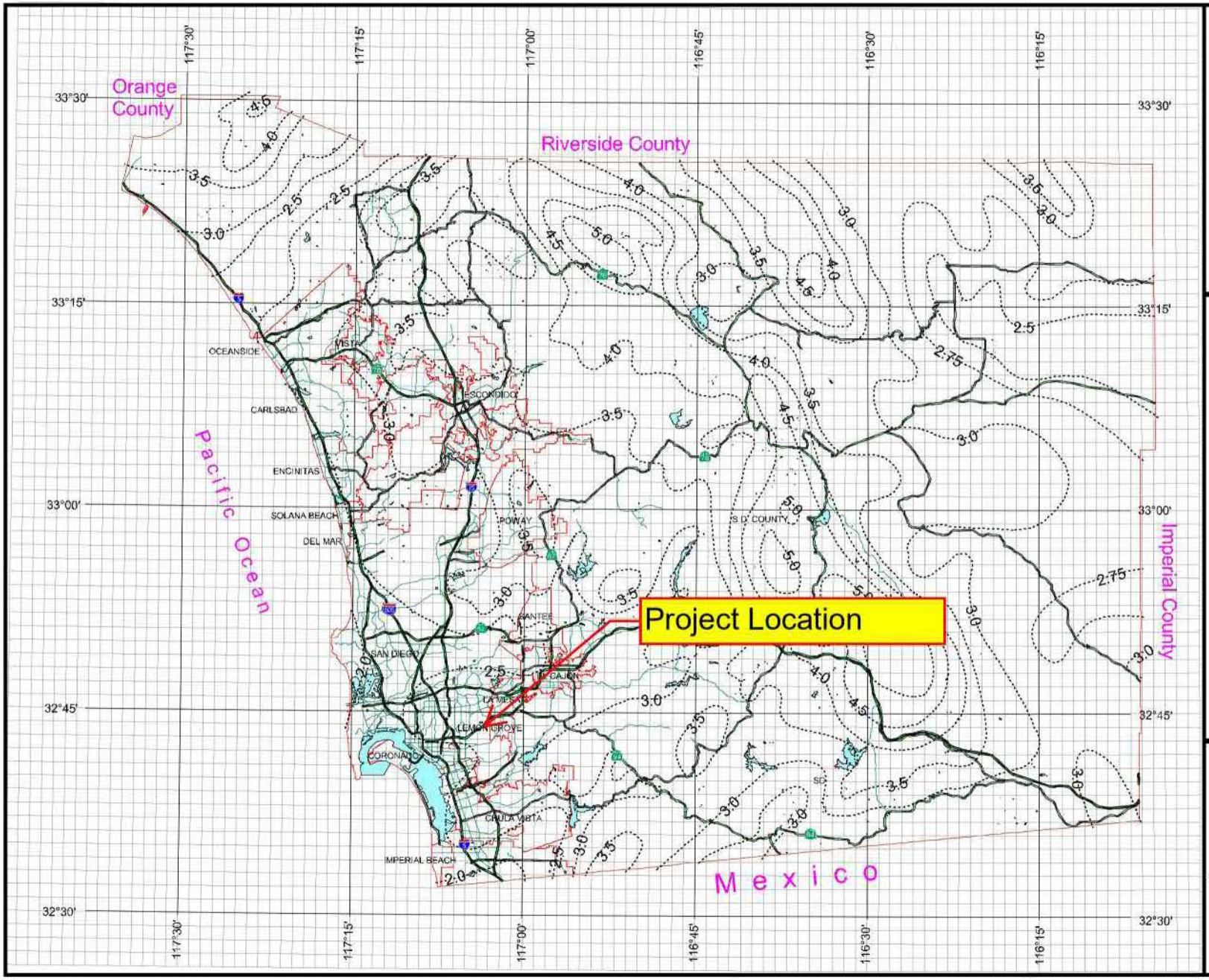
```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       49.89    12.07        3.223         28.21
      2       29.89     8.53        3.730         14.57

  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       73.00     8.53       3.730
      2       75.72    12.07       3.223

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      75.72   Tc(MIN.) =   12.07
  TOTAL AREA(ACRES) =       42.8
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    800.00 =    2927.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   272.00  DOWNSTREAM(FEET) =   269.05
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.95
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.72
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   12.50
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE     50.00 =    3211.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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       75.72    12.50       3.175       42.78
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE     50.00 =    3211.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       17.79    10.02       3.448       20.04
  LONGEST FLOWPATH FROM NODE    270.00 TO NODE     50.00 =    1155.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      78.48      10.02        3.448
      2      92.10      12.50        3.175

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      92.10   Tc(MIN.) =   12.50
```

```
  TOTAL AREA(ACRES) =       62.8

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    698.00 TO NODE    699.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    349.00
  DOWNSTREAM ELEVATION(FEET) =    327.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    699.00 TO NODE    700.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    327.00  DOWNSTREAM(FEET) =    324.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   258.00   CHANNEL SLOPE =  0.0116
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.639
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.20
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   3.57
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    2.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       2.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    698.00 TO NODE    700.00 =     358.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    598.00 TO NODE    599.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    350.00
  DOWNSTREAM ELEVATION(FEET) =    328.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    599.00 TO NODE    600.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    328.00  DOWNSTREAM(FEET) =    324.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =     1.01   CHANNEL SLOPE =  3.9604
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.36
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   0.00
  Tc(MIN.) =    5.43
  SUBAREA AREA(ACRES) =     1.01       SUBAREA RUNOFF(CFS) =    1.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.450
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   9.21
  LONGEST FLOWPATH FROM NODE    598.00 TO NODE    600.00 =     101.01 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    499.00 TO NODE    500.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  UPSTREAM ELEVATION(FEET) =    362.00
  DOWNSTREAM ELEVATION(FEET) =    337.00
  ELEVATION DIFFERENCE(FEET) =     25.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.189
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.174
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.68
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)     =        0.4  TC(MIN.) =      6.19
  PEAK FLOW RATE(CFS)   =       0.68
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix 2 – Detention Analysis (SWMM)



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

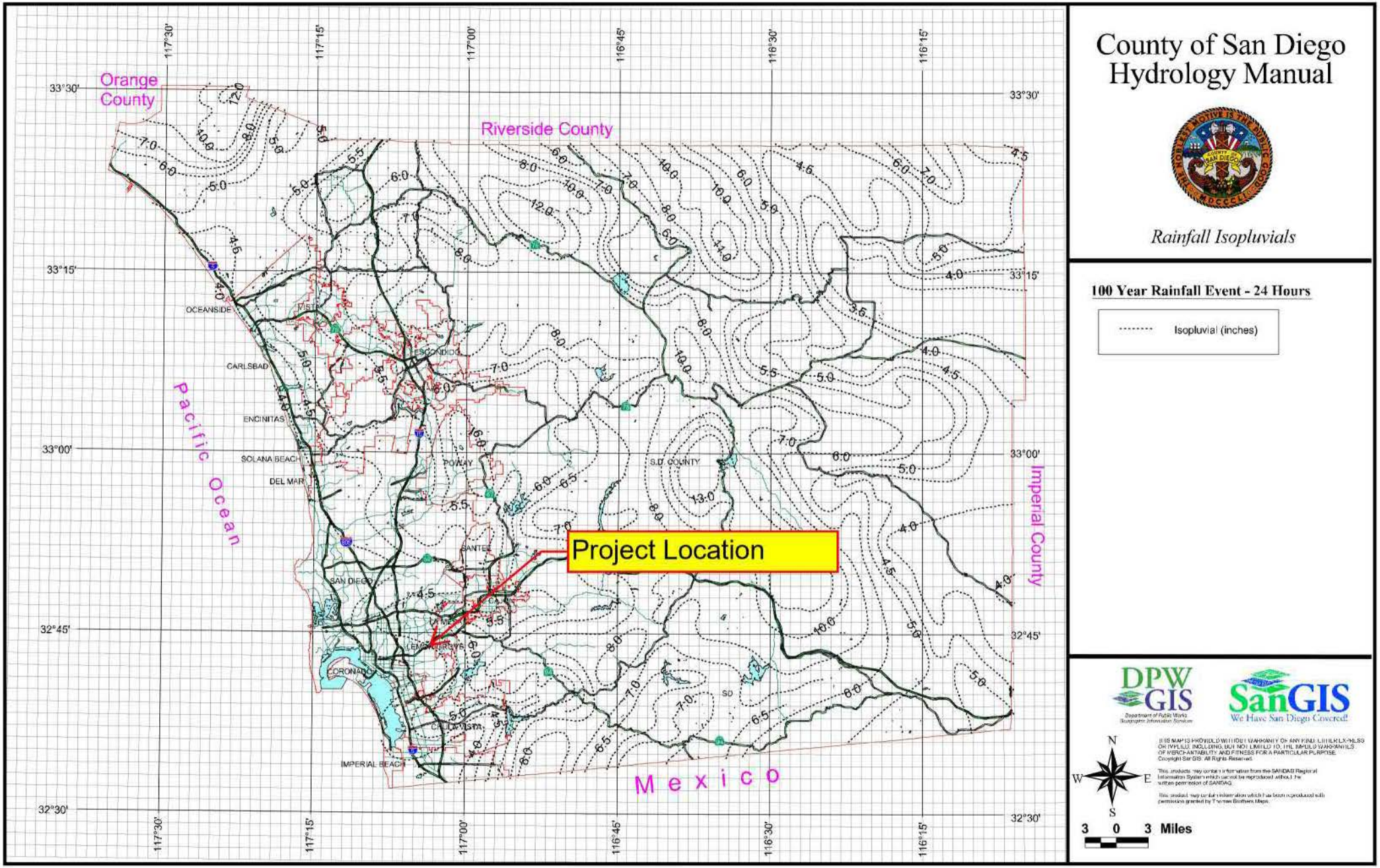
Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

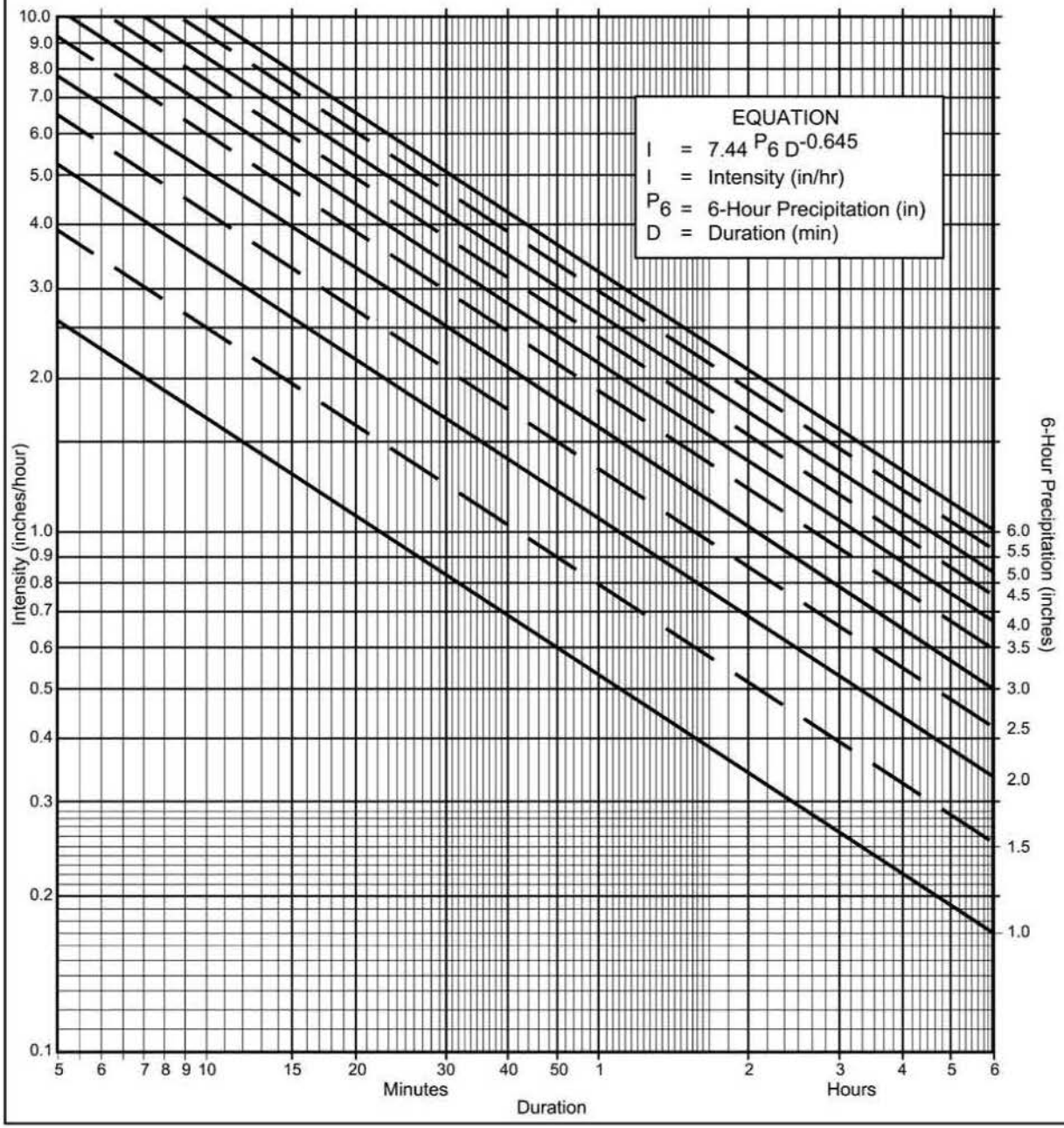
Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency _____ year

(b) P_6 = 2.70 in., P_{24} = 4.50, $\frac{P_6}{P_{24}} = \frac{2.70}{4.50}$ %(2) 60%

(c) Adjusted P_6(2) = 2.70 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 10/23/2023
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 9 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 3.69 ACRES
RUNOFF COEFFICIENT 0.5383
PEAK DISCHARGE 7.09 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 9	DISCHARGE (CFS) = 0.1
TIME (MIN) = 18	DISCHARGE (CFS) = 0.3
TIME (MIN) = 27	DISCHARGE (CFS) = 0.3
TIME (MIN) = 36	DISCHARGE (CFS) = 0.3
TIME (MIN) = 45	DISCHARGE (CFS) = 0.3
TIME (MIN) = 54	DISCHARGE (CFS) = 0.4
TIME (MIN) = 63	DISCHARGE (CFS) = 0.4
TIME (MIN) = 72	DISCHARGE (CFS) = 0.4
TIME (MIN) = 81	DISCHARGE (CFS) = 0.4
TIME (MIN) = 90	DISCHARGE (CFS) = 0.4
TIME (MIN) = 99	DISCHARGE (CFS) = 0.4
TIME (MIN) = 108	DISCHARGE (CFS) = 0.4
TIME (MIN) = 117	DISCHARGE (CFS) = 0.5
TIME (MIN) = 126	DISCHARGE (CFS) = 0.5
TIME (MIN) = 135	DISCHARGE (CFS) = 0.5
TIME (MIN) = 144	DISCHARGE (CFS) = 0.5
TIME (MIN) = 153	DISCHARGE (CFS) = 0.6
TIME (MIN) = 162	DISCHARGE (CFS) = 0.6
TIME (MIN) = 171	DISCHARGE (CFS) = 0.6
TIME (MIN) = 180	DISCHARGE (CFS) = 0.7
TIME (MIN) = 189	DISCHARGE (CFS) = 0.8
TIME (MIN) = 198	DISCHARGE (CFS) = 0.9
TIME (MIN) = 207	DISCHARGE (CFS) = 0.9
TIME (MIN) = 216	DISCHARGE (CFS) = 1.1
TIME (MIN) = 225	DISCHARGE (CFS) = 1.3
TIME (MIN) = 234	DISCHARGE (CFS) = 1.9
TIME (MIN) = 243	DISCHARGE (CFS) = 5.3
TIME (MIN) = 252	DISCHARGE (CFS) = 7.09
TIME (MIN) = 261	DISCHARGE (CFS) = 1.5
TIME (MIN) = 270	DISCHARGE (CFS) = 1
TIME (MIN) = 279	DISCHARGE (CFS) = 0.8
TIME (MIN) = 288	DISCHARGE (CFS) = 0.7
TIME (MIN) = 297	DISCHARGE (CFS) = 0.6
TIME (MIN) = 306	DISCHARGE (CFS) = 0.5
TIME (MIN) = 315	DISCHARGE (CFS) = 0.5
TIME (MIN) = 324	DISCHARGE (CFS) = 0.4
TIME (MIN) = 333	DISCHARGE (CFS) = 0.4
TIME (MIN) = 342	DISCHARGE (CFS) = 0.4
TIME (MIN) = 351	DISCHARGE (CFS) = 0.4
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3
TIME (MIN) = 369	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 10/23/2023
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 12 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 11.32 ACRES
RUNOFF COEFFICIENT 0.5409
PEAK DISCHARGE 20.32 CFS

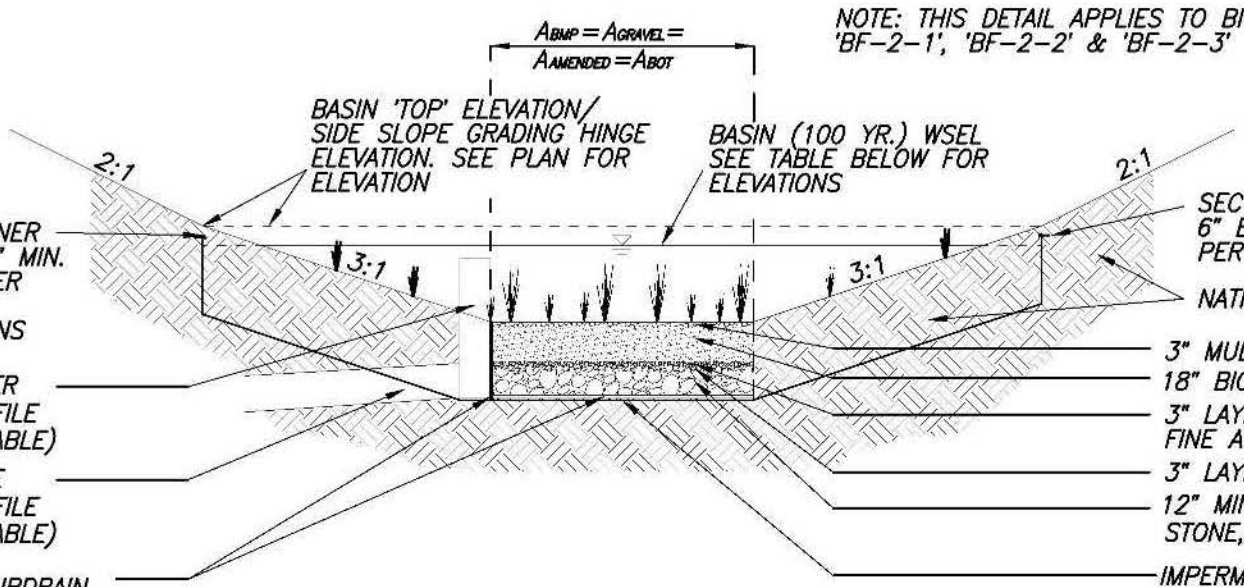
TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 12	DISCHARGE (CFS) = 1
TIME (MIN) = 24	DISCHARGE (CFS) = 1
TIME (MIN) = 36	DISCHARGE (CFS) = 1.1
TIME (MIN) = 48	DISCHARGE (CFS) = 1.1
TIME (MIN) = 60	DISCHARGE (CFS) = 1.1
TIME (MIN) = 72	DISCHARGE (CFS) = 1.2
TIME (MIN) = 84	DISCHARGE (CFS) = 1.3
TIME (MIN) = 96	DISCHARGE (CFS) = 1.3
TIME (MIN) = 108	DISCHARGE (CFS) = 1.4
TIME (MIN) = 120	DISCHARGE (CFS) = 1.4
TIME (MIN) = 132	DISCHARGE (CFS) = 1.6
TIME (MIN) = 144	DISCHARGE (CFS) = 1.6
TIME (MIN) = 156	DISCHARGE (CFS) = 1.8
TIME (MIN) = 168	DISCHARGE (CFS) = 1.9
TIME (MIN) = 180	DISCHARGE (CFS) = 2.2
TIME (MIN) = 192	DISCHARGE (CFS) = 2.4
TIME (MIN) = 204	DISCHARGE (CFS) = 2.9
TIME (MIN) = 216	DISCHARGE (CFS) = 3.3
TIME (MIN) = 228	DISCHARGE (CFS) = 4.9
TIME (MIN) = 240	DISCHARGE (CFS) = 11.4
TIME (MIN) = 252	DISCHARGE (CFS) = 20.32
TIME (MIN) = 264	DISCHARGE (CFS) = 3.9
TIME (MIN) = 276	DISCHARGE (CFS) = 2.6
TIME (MIN) = 288	DISCHARGE (CFS) = 2.1
TIME (MIN) = 300	DISCHARGE (CFS) = 1.7
TIME (MIN) = 312	DISCHARGE (CFS) = 1.5
TIME (MIN) = 324	DISCHARGE (CFS) = 1.3
TIME (MIN) = 336	DISCHARGE (CFS) = 1.2
TIME (MIN) = 348	DISCHARGE (CFS) = 1.1
TIME (MIN) = 360	DISCHARGE (CFS) = 1
TIME (MIN) = 372	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 10/23/2023
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 13 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 9.53 ACRES
RUNOFF COEFFICIENT 0.5437
PEAK DISCHARGE 16.41 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 13	DISCHARGE (CFS) = 0
TIME (MIN) = 26	DISCHARGE (CFS) = 0.9
TIME (MIN) = 39	DISCHARGE (CFS) = 0.9
TIME (MIN) = 52	DISCHARGE (CFS) = 0.9
TIME (MIN) = 65	DISCHARGE (CFS) = 0.9
TIME (MIN) = 78	DISCHARGE (CFS) = 1
TIME (MIN) = 91	DISCHARGE (CFS) = 1
TIME (MIN) = 104	DISCHARGE (CFS) = 1.1
TIME (MIN) = 117	DISCHARGE (CFS) = 1.2
TIME (MIN) = 130	DISCHARGE (CFS) = 1.3
TIME (MIN) = 143	DISCHARGE (CFS) = 1.3
TIME (MIN) = 156	DISCHARGE (CFS) = 1.5
TIME (MIN) = 169	DISCHARGE (CFS) = 1.6
TIME (MIN) = 182	DISCHARGE (CFS) = 1.8
TIME (MIN) = 195	DISCHARGE (CFS) = 1.9
TIME (MIN) = 208	DISCHARGE (CFS) = 2.4
TIME (MIN) = 221	DISCHARGE (CFS) = 2.7
TIME (MIN) = 234	DISCHARGE (CFS) = 3.9
TIME (MIN) = 247	DISCHARGE (CFS) = 9
TIME (MIN) = 260	DISCHARGE (CFS) = 16.41
TIME (MIN) = 273	DISCHARGE (CFS) = 3.2
TIME (MIN) = 286	DISCHARGE (CFS) = 2.1
TIME (MIN) = 299	DISCHARGE (CFS) = 1.7
TIME (MIN) = 312	DISCHARGE (CFS) = 1.4
TIME (MIN) = 325	DISCHARGE (CFS) = 1.2
TIME (MIN) = 338	DISCHARGE (CFS) = 1.1
TIME (MIN) = 351	DISCHARGE (CFS) = 1
TIME (MIN) = 364	DISCHARGE (CFS) = 0.9
TIME (MIN) = 377	DISCHARGE (CFS) = 0

NOTE: THIS DETAIL APPLIES TO BIOFILTRATION BASINS 'BF-2-1', 'BF-2-2' & 'BF-2-3'



<u>BIORETENTION SOIL MEDIA (BSM):</u>

- 18" MINIMUM THICKNESS.
- 70% TO 85% BY VOLUME WASHED SAND AND 15% TO 30% BY VOLUME COMPOST OR ALTERNATIVE ORGANIC AMENDMENT.
- BSM: THE C:N RATIO OF BSM SHALL BE BETWEEN 15 AND 40 TO REDUCE THE POTENTIAL FOR NITRATE LEACHING.
- MUST MAINTAIN A MINIMUM PERCOLATION RATE OF 5 INCHES PER HOUR THROUGHOUT THE LIFE OF THE FACILITY, AND IT MUST BE SUITABLE FOR MAINTAINING PLANT LIFE.
- FOR ADDITIONAL INFORMATION REFER TO APPENDIX F.3 OF THE CITY OF SAN DIEGO STORM WATER STANDARDS MANUAL.

<u>BIOFILTRATION PLANTING NOTE:</u>

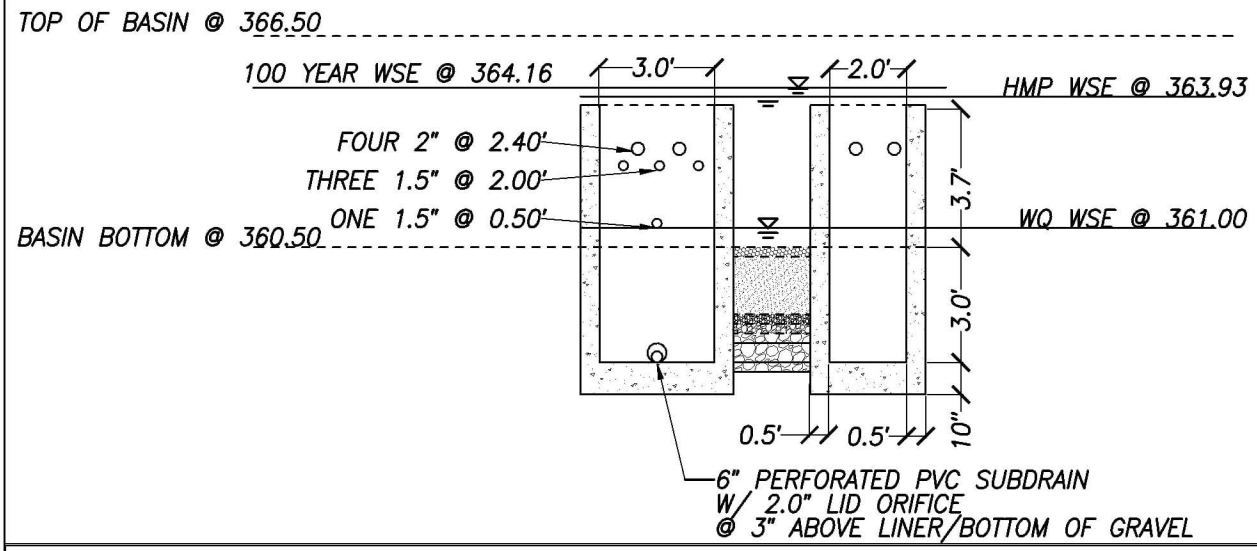
- ALL PLANTING IN 'BIOFILTRATION' AREAS SHALL CONFORM TO APPENDIX 'E' OF THE CITY OF SAN DIEGO LOW IMPACT DESIGN MANUAL.

	BOTTOM ELEVATION	WQ WSE	HMP WSE	100 YR-WSE	BASIN TOP ELEV.	BASIN BOTTOM AREA
BF-2-1	360.50	361.00	363.93	364.16	366.50	3,000 SFT
BF-2-2	318.00	318.50	322.00	322.07	324.00	8,500 SFT
BF-2-3	338.00	338.50	341.72	342.17	344.00	7,000 SFT

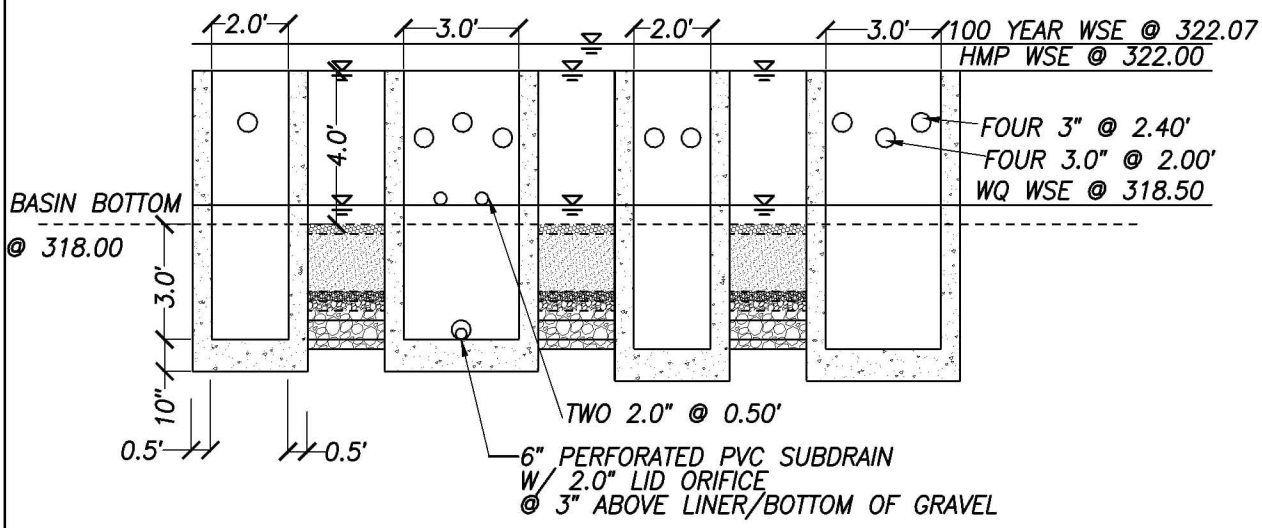
SOIL SECTION FOR WATER QUALITY/HYDROMODIFICATION BIOFILTRATION BASIN

NOT TO SCALE

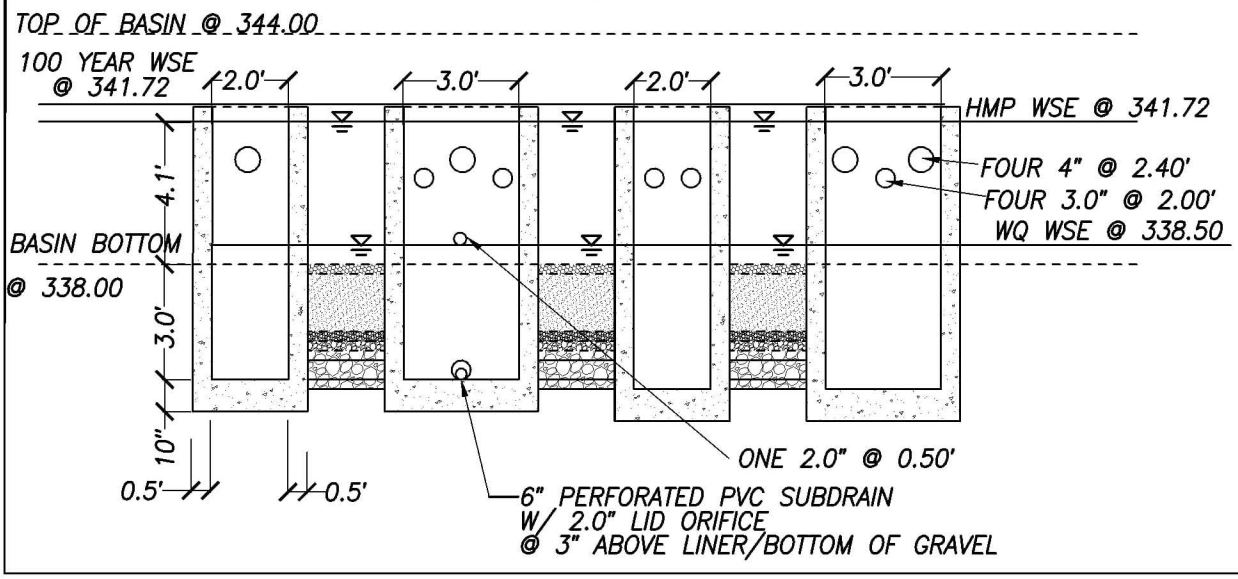
PRIVATE BIOFILTRATION BASIN BF-2-1



PRIVATE BIOFILTRATION BASIN BF-2-2



PRIVATE BIOFILTRATION BASIN BF-2-3



Emerald Hills BF 2-1

Discharge vs Elevation Table

Bottom orifice diameter:	1.5 "	Top orifice diameter:	2 "
Number:	1	Number:	4
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	2.40 ft
Middle orifice diameter:	1.5 "	Emergency weir:	
number of orif:	3	Invert:	3.70 ft
Cg-middle:	0.61	Weir Length (ft)	10.00 ft
invert elev:	2.00 ft	Riser Box LxW	2x3

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.55	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.003
0.60	0.80	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.010
0.65	1.20	0.00	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.018
0.70	1.60	0.00	0.00	0.00	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.022
0.75	2.00	0.00	0.00	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.026
0.80	2.40	0.00	0.00	0.00	0.03	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.029
0.85	2.80	0.00	0.00	0.00	0.03	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.032
0.90	3.20	0.00	0.00	0.00	0.03	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.035
0.95	3.60	0.00	0.00	0.00	0.04	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.037
1.00	4.00	0.00	0.00	0.00	0.04	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.040
1.05	4.40	0.00	0.00	0.00	0.04	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.042
1.10	4.80	0.00	0.00	0.00	0.04	0.20	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.044
1.15	5.20	0.00	0.00	0.00	0.05	0.35	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.046
1.20	5.60	0.00	0.00	0.00	0.05	0.59	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.048
1.25	6.00	0.00	0.00	0.00	0.05	0.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.050
1.30	6.40	0.00	0.00	0.00	0.05	1.47	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.052
1.35	6.80	0.00	0.00	0.00	0.05	2.19	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.053
1.40	7.20	0.00	0.00	0.00	0.05	3.18	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.055
1.45	7.60	0.00	0.00	0.00	0.06	4.49	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.057
1.50	8.00	0.00	0.00	0.00	0.06	6.18	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.058
1.55	8.40	0.00	0.00	0.00	0.06	8.34	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.060
1.60	8.80	0.00	0.00	0.00	0.06	11.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.061
1.65	9.20	0.00	0.00	0.00	0.06	14.44	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.063
1.70	9.60	0.00	0.00	0.00	0.06	18.58	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.064
1.75	10.00	0.00	0.00	0.00	0.07	23.61	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.065
1.80	10.40	0.00	0.00	0.00	0.07	29.65	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.067
1.85	10.80	0.00	0.00	0.00	0.07	36.86	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.068
1.90	11.20	0.00	0.00	0.00	0.07	45.39	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.069
1.95	11.60	0.00	0.00	0.00	0.07	55.41	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.071
2.00	12.00	0.00	0.00	0.00	0.07	67.11	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.072
2.05	12.40	0.40	0.00	0.00	0.07	80.69	0.07	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.082
2.10	12.80	0.80	0.00	0.00	0.07	96.36	0.07	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.104
2.15	13.20	1.20	0.00	0.00	0.08	114.36	0.08	0.05	0.06	0.05	0.00	0.00	0.00	0.00	0.129
2.20	13.60	1.60	0.00	0.00	0.08	134.92	0.08	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.144
2.25	14.00	2.00	0.00	0.00	0.08	158.32	0.08	0.08	0.10	0.08	0.00	0.00	0.00	0.00	0.156
2.30	14.40	2.40	0.00	0.00	0.08	184.84	0.08	0.09	0.11	0.09	0.00	0.00	0.00	0.00	0.167
2.35	14.80	2.80	0.00	0.00	0.08	214.77	0.08	0.10	0.12	0.10	0.00	0.00	0.00	0.00	0.177
2.40	15.20	3.20	0.00	0.00	0.08	248.43	0.08	0.10	0.12	0.10	0.00	0.00	0.00	0.00	0.186
2.45	15.60	3.60	0.30	0.00	0.08	286.15	0.08	0.11	0.14	0.11	0.00	0.01	0.01	0.00	0.208
2.50	16.00	4.00	0.60	0.00	0.08	328.30	0.08	0.12	0.20	0.12	0.06	0.05	0.05	0.00	0.251
2.55	16.40	4.40	0.90	0.00	0.08	375.25	0.08	0.13	0.33	0.13	0.11	0.10	0.10	0.00	0.310
2.60	16.80	4.80	1.20	0.00	0.09	427.39	0.09	0.13	0.59	0.13	0.15	0.16	0.15	0.00	0.364
2.65	17.20	5.20	1.50	0.00	0.09	485.14	0.09	0.14	1.04	0.14	0.17	0.21	0.17	0.00	0.399
2.70	17.60	5.60	1.80	0.00	0.09	548.94	0.09	0.14	1.76	0.14	0.20	0.26	0.20	0.00	0.431
2.75	18.00	6.00	2.10	0.00	0.09	619.25	0.09	0.15	2.84	0.15	0.22	0.29	0.22	0.00	0.459
2.80	18.40	6.40	2.40	0.00	0.09	696.55	0.09	0.15	4.40	0.15	0.24	0.31	0.24	0.00	0.485
2.85	18.80	6.80	2.70	0.00	0.09	781.35	0.09	0.16	6.58	0.16	0.26	0.32	0.26	0.00	0.509
2.90	19.20	7.20	3.00	0.00	0.09	874.19	0.09	0.16	9.54	0.16	0.28	0.32	0.28	0.00	0.533
2.95	19.60	7.60	3.30	0.00	0.09	975.61	0.09	0.17	13.46	0.17	0.29	0.33	0.29	0.00	0.554
3.00	20.00	8.00	3.60	0.00	0.09	1086.19	0.09	0.17	18.54	0.17	0.31	0.37	0.31	0.00	0.575
3.05	20.40	8.40	3.90	0.00	0.09	1206.55	0.09	0.18	25.03	0.18	0.32	0.48	0.32	0.00	0.595
3.10	20.80	8.80	4.20	0.00	0.10	1337.31	0.10	0.18	33.19	0.18	0.34	0.69	0.34	0.00	0.615
3.15	21.20	9.20	4.50	0.00	0.10	1479.13	0.10	0.19	43.32	0.19	0.35	1.05	0.35	0.00	0.633
3.20	21.60	9.60	4.80	0.00	0.10	1632.69	0.10	0.19	55.74	0.19	0.36	1.62	0.36	0.00	0.651
3.25	22.00	10.00	5.10	0.00	0.10	1798.71	0.10	0.20	70.82	0.20	0.37	2.48	0.37	0.00	0.669
3.30	22.40	10.40	5.40	0.00	0.10	1977.93	0.10	0.20	88.96	0.20	0.39	3.73	0.39	0.00	0.686
3.35	22.80	10.80	5.70	0.00	0.10	2171.11	0.10	0.20	110.59	0.20	0.40	5.45	0.40	0.00	0.702
3.40	23.20	11.20	6.00	0.00	0.10	2379.06	0.10	0.21	136.18	0.21	0.41	7.78	0.41	0.00	0.719
3.45	23.60	11.60	6.30	0.00	0.10	2602.61	0.10	0.21	166.24	0.21	0.42	10.84	0.42	0.00	0.734
3.50	24.00	12.00	6.60	0.00	0.10	2842.60	0.10	0.22	201.34	0.22	0.43	14.80	0.43	0.00	0.750
3.55	24.40	12.40	6.90	0.00	0.10	3099.94	0.10	0.22	242.08	0.22	0.44	19.83	0.44	0.00	0.765
3.60	24.80	12.80	7.20	0.00	0.10	3375.54	0.10	0.22	289.09	0.22	0.45	26.11	0.45	0.00	0.780
3.65	25.20	13.20	7.50	0.00	0.11	3670.36	0.11	0.23	343.08	0.23	0.46	33.88	0.46	0.00	0.794
3.70	25.60	13.60	7.80	0.00	0.11	3985.37	0.11	0.23	404.77	0.23	0.47	43.35	0.47	0.00	0.808
3.75	26.00	14.00	8.10	0.06	0.11	4321.61	0.11	0.23	474.97	0.23	0.48	54.80	0.48	0.37	1.194
3.80	26.40	14.40	8.40	0.12	0.11	4680.11	0.11	0.24	554.52	0.24	0.49	68.51	0.49	1.05	1.889
3.85	26.80	14.80	8.70	0.18	0.11	5061.97	0.11	0.24	644.30	0.24	0.50	84.80	0.50	1.93	2.784
3.90	27.20	15.20	9.00	0.24	0.11	5468.31	0.11	0.24	745.28	0.24	0.51	103.99	0.51	2.98	3.841
3.95	27.60	15.60	9.30	0.30	0.11	5900.28	0.11	0.25	858.46	0.25	0.52	126.45	0.52	4.16	5.038
4.00	28.00	16.00	9.60	0.36	0.11	6359.08	0.11	0.25	984.90	0.25	0.53	152.58	0.53	5.47	6.360
4.05	28.40	16.40	9.90	0.42	0.11	6845.93	0.11	0.25	1125.74	0.25	0.53	182.79	0.53	6.90	7.796
4.10	28.80	16.80	10.20	0.48	0.11	7362.10	0.11	0.26	1282.16	0.26	0.54	217.55	0.54	8.42	9.338
4.15	29.20	17.20	10.50	0.54	0.11	7908.88	0.11	0.26	1455.41	0.26	0.55	257.34	0.55	10.05	10.978
4.20	29.60	17.60	10.80	0.60	0.11	8487.63	0.11	0.26	1646.81	0.26	0.56	302.68	0.56	11.77	12.711

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
4.25	30.00	18.00	11.10	0.66	0.12	9099.71	0.12	0.27	1857.74	0.27	0.57	354.12	0.57	13.58	14.532
4.30	30.40	18.40	11.40	0.72	0.12	9746.55	0.12	0.27	2089.64	0.27	0.58	412.25	0.58	15.48	16.438
4.35	30.80	18.80	11.70	0.78	0.12	10429.61	0.12	0.27	2344.05	0.27	0.58	477.68	0.58	17.45	18.424
4.40	31.20	19.20	12.00	0.84	0.12	11150.37	0.12	0.28	2622.56	0.28	0.59	551.09	0.59	19.50	20.487
4.45	31.60	19.60	12.30	0.90	0.12	11910.39	0.12	0.28	2926.82	0.28	0.60	633.17	0.60	21.63	22.625
4.50	32.00	20.00	12.60	0.96	0.12	12711.23	0.12	0.28	3258.57	0.28	0.61	724.66	0.61	23.83	24.835
4.55	32.40	20.40	12.90	1.02	0.12	13554.52	0.12	0.28	3619.65	0.28	0.61	826.34	0.61	26.10	27.114
4.60	32.80	20.80	13.20	1.08	0.12	14441.92	0.12	0.29	4011.92	0.29	0.62	939.03	0.62	28.43	29.461
4.65	33.20	21.20	13.50	1.14	0.12	15375.13	0.12	0.29	4437.38	0.29	0.63	1063.58	0.63	30.83	31.874
4.70	33.60	21.60	13.80	1.20	0.12	16355.92	0.12	0.29	4898.07	0.29	0.64	1200.92	0.64	33.30	34.351
4.75	34.00	22.00	14.10	1.26	0.12	17386.06	0.12	0.30	5396.13	0.30	0.64	1351.97	0.64	35.83	36.890
4.80	34.40	22.40	14.40	1.32	0.12	18467.40	0.12	0.30	5933.79	0.30	0.65	1517.75	0.65	38.42	39.490
4.85	34.80	22.80	14.70	1.38	0.12	19601.82	0.12	0.30	6513.34	0.30	0.66	1699.30	0.66	41.07	42.149
4.90	35.20	23.20	15.00	1.44	0.13	20791.25	0.13	0.30	7137.19	0.30	0.66	1897.70	0.66	43.77	44.867
4.95	35.60	23.60	15.30	1.50	0.13	22037.66	0.13	0.31	7807.83	0.31	0.67	2114.09	0.67	46.54	47.641
5.00	36.00	24.00	15.60	1.56	0.13	23343.08	0.13	0.31	8527.81	0.31	0.68	2349.66	0.68	49.36	50.471
5.05	36.40	24.40	15.90	1.62	0.13	24709.57	0.13	0.31	9299.83	0.31	0.68	2605.66	0.68	52.23	53.356
5.10	36.80	24.80	16.20	1.68	0.13	26139.24	0.13	0.31	10126.63	0.31	0.69	2883.37	0.69	55.16	56.295
5.15	37.20	25.20	16.50	1.74	0.13	27634.27	0.13	0.32	11011.07	0.32	0.70	3184.13	0.70	58.14	59.286
5.20	37.60	25.60	16.80	1.80	0.13	29196.86	0.13	0.32	11956.12	0.32	0.70	3509.36	0.70	61.18	62.329
5.25	38.00	26.00	17.10	1.86	0.13	30829.27	0.13	0.32	12964.82	0.32	0.71	3860.49	0.71	64.26	65.423
5.30	38.40	26.40	17.40	1.92	0.13	32533.83	0.13	0.32	14040.33	0.32	0.72	4239.05	0.72	67.39	68.566
5.35	38.80	26.80	17.70	1.98	0.13	34312.88	0.13	0.33	15185.92	0.33	0.72	4646.59	0.72	70.58	71.760
5.40	39.20	27.20	18.00	2.04	0.13	36168.85	0.13	0.33	16404.93	0.33	0.73	5084.75	0.73	73.81	75.001
5.45	39.60	27.60	18.30	2.10	0.13	38104.20	0.13	0.33	17700.85	0.33	0.74	5555.20	0.74	77.09	78.291
5.50	40.00	28.00	18.60	2.16	0.13	40121.45	0.13	0.33	19077.24	0.33	0.74	6059.70	0.74	80.42	81.628
5.55	40.40	28.40	18.90	2.22	0.13	42223.16	0.13	0.34	20537.79	0.34	0.75	6600.05	0.75	83.79	85.011
5.60	40.80	28.80	19.20	2.28	0.13	44411.96	0.13	0.34	22086.29	0.34	0.75	7178.12	0.75	87.21	88.440
5.65	41.20	29.20	19.50	2.34	0.14	46690.52	0.14	0.34	23726.65	0.34	0.76	7795.84	0.76	90.68	91.914
5.70	41.60	29.60	19.80	2.40	0.14	49061.58	0.14	0.34	25462.89	0.34	0.77	8455.21	0.77	94.19	95.433
5.75	42.00	30.00	20.10	2.46	0.14	51527.93	0.14	0.35	27299.14	0.35	0.77	9158.29	0.77	97.74	98.996
5.80	42.40	30.40	20.40	2.52	0.14	54092.39	0.14	0.35	29239.66	0.35	0.78	9907.22	0.78	101.34	102.602
5.85	42.80	30.80	20.70	2.58	0.14	56757.87	0.14	0.35	31288.83	0.35	0.78	10704.18	0.78	104.98	106.252
5.90	43.20	31.20	21.00	2.64	0.14	59527.33	0.14	0.35	33451.12	0.35	0.79	11551.46	0.79	108.66	109.944
5.95	43.60	31.60	21.30	2.70	0.14	62403.77	0.14	0.36	35731.16	0.36	0.80	12451.38	0.80	112.39	113.678
6.00	44.00	32.00	21.60	2.76	0.14	65390.26	0.14	0.36	38133.68	0.36	0.80	13406.35	0.80	116.15	117.453

Emerald Hills Stage Storage					
BF-2-1					
depth	area	area (ac)	elevation	volume (cf)	volume (acft)
0.00	3000	0.069	360.5	0	0
0.05	3035	0.070	360.55	150.9	0.003463
0.10	3069	0.070	360.6	303.5	0.006966
0.15	3104	0.071	360.65	457.8	0.010509
0.20	3138	0.072	360.7	613.8	0.014091
0.25	3173	0.073	360.75	771.6	0.017713
0.30	3207	0.074	360.8	931.1	0.021374
0.35	3242	0.074	360.85	1092.3	0.025075
0.40	3276	0.075	360.9	1255.2	0.028815
0.45	3311	0.076	360.95	1419.9	0.032596
0.50	3345	0.077	361	1586.3	0.036415
0.55	3380	0.078	361.05	1754.4	0.040275
0.60	3414	0.078	361.1	1924.2	0.044174
0.65	3449	0.079	361.15	2095.8	0.048112
0.70	3483	0.080	361.2	2269.1	0.05209
0.75	3518	0.081	361.25	2444.1	0.056108
0.80	3552	0.082	361.3	2620.8	0.060165
0.85	3587	0.082	361.35	2799.3	0.064262
0.90	3621	0.083	361.4	2979.5	0.068399
0.95	3656	0.084	361.45	3161.4	0.072575
1.00	3690	0.085	361.5	3345.0	0.076791
1.05	3727	0.086	361.55	3530.4	0.081048
1.10	3765	0.086	361.6	3717.7	0.085347
1.15	3802	0.087	361.65	3906.9	0.08969
1.20	3839	0.088	361.7	4097.9	0.094076
1.25	3877	0.089	361.75	4290.8	0.098504
1.30	3914	0.090	361.8	4485.6	0.102976
1.35	3951	0.091	361.85	4682.3	0.10749
1.40	3989	0.092	361.9	4880.8	0.112047
1.45	4026	0.092	361.95	5081.1	0.116647
1.50	4064	0.093	362	5283.4	0.12129
1.55	4101	0.094	362.05	5487.5	0.125975
1.60	4138	0.095	362.1	5693.5	0.130704
1.65	4176	0.096	362.15	5901.3	0.135475
1.70	4213	0.097	362.2	6111.0	0.14029
1.75	4250	0.098	362.25	6322.6	0.145147
1.80	4288	0.098	362.3	6536.0	0.150047
1.85	4325	0.099	362.35	6751.4	0.15499
1.90	4362	0.100	362.4	6968.5	0.159976
1.95	4400	0.101	362.45	7187.6	0.165004
2.00	4437	0.102	362.5	7408.5	0.170076
2.05	4477	0.103	362.55	7631.4	0.175192
2.10	4517	0.104	362.6	7856.2	0.180354
2.15	4558	0.105	362.65	8083.1	0.185562
2.20	4598	0.106	362.7	8312.0	0.190817
2.25	4638	0.106	362.75	8542.9	0.196117
2.30	4678	0.107	362.8	8775.8	0.201464
2.35	4718	0.108	362.85	9010.7	0.206857
2.40	4759	0.109	362.9	9247.6	0.212296
2.45	4799	0.110	362.95	9486.6	0.217781
2.50	4839	0.111	363	9727.5	0.223313
2.55	4879	0.112	363.05	9970.5	0.22889
2.60	4919	0.113	363.1	10215.4	0.234514
2.65	4960	0.114	363.15	10462.4	0.240184
2.70	5000	0.115	363.2	10711.4	0.245899
2.75	5040	0.116	363.25	10962.4	0.251662
2.80	5080	0.117	363.3	11215.4	0.25747
2.85	5120	0.118	363.35	11470.4	0.263324
2.90	5161	0.118	363.4	11727.4	0.269225
2.95	5201	0.119	363.45	11986.5	0.275171
3.00	5241	0.120	363.5	12247.5	0.281164
3.05	5284	0.121	363.55	12510.6	0.287204

depth	area	area (ac)	elevation	volume (cf)	volume (acft)
3.10	5327	0.122	363.6	12775.9	0.293294
3.15	5370	0.123	363.65	13043.3	0.299434
3.20	5413	0.124	363.7	13312.9	0.305622
3.25	5456	0.125	363.75	13584.6	0.31186
3.30	5499	0.126	363.8	13858.5	0.318147
3.35	5542	0.127	363.85	14134.5	0.324484
3.40	5585	0.128	363.9	14412.7	0.33087
3.45	5628	0.129	363.95	14693.0	0.337305
3.50	5671	0.130	364	14975.5	0.34379
3.55	5714	0.131	364.05	15260.1	0.350324
3.60	5757	0.132	364.1	15546.9	0.356908
3.65	5800	0.133	364.15	15835.8	0.363541
3.70	5843	0.134	364.2	16126.9	0.370223
3.75	5886	0.135	364.25	16420.1	0.376954
3.80	5929	0.136	364.3	16715.5	0.383735
3.85	5972	0.137	364.35	17013.0	0.390565
3.90	6015	0.138	364.4	17312.7	0.397445
3.95	6058	0.139	364.45	17614.5	0.404374
4.00	6101	0.140	364.5	17918.5	0.411352
4.05	6147	0.141	364.55	18224.7	0.418381
4.10	6193	0.142	364.6	18533.2	0.425463
4.15	6238	0.143	364.65	18844.0	0.432598
4.20	6284	0.144	364.7	19157.0	0.439785
4.25	6330	0.145	364.75	19472.4	0.447024
4.30	6376	0.146	364.8	19790.0	0.454316
4.35	6422	0.147	364.85	20110.0	0.461661
4.40	6467	0.148	364.9	20432.2	0.469058
4.45	6513	0.150	364.95	20756.7	0.476508
4.50	6559	0.151	365	21083.5	0.484011
4.55	6605	0.152	365.05	21412.6	0.491566
4.60	6651	0.153	365.1	21744.0	0.499173
4.65	6696	0.154	365.15	22077.7	0.506833
4.70	6742	0.155	365.2	22413.6	0.514546
4.75	6788	0.156	365.25	22751.9	0.522311
4.80	6834	0.157	365.3	23092.4	0.530129
4.85	6880	0.158	365.35	23435.3	0.537999
4.90	6925	0.159	365.4	23780.4	0.545922
4.95	6971	0.160	365.45	24127.8	0.553898
5.00	7017	0.161	365.5	24477.5	0.561926
5.05	7066	0.162	365.55	24829.6	0.570008
5.10	7114	0.163	365.6	25184.1	0.578147
5.15	7163	0.164	365.65	25541.0	0.586341
5.20	7212	0.166	365.7	25900.4	0.594591
5.25	7260	0.167	365.75	26262.2	0.602897
5.30	7309	0.168	365.8	26626.4	0.611259
5.35	7358	0.169	365.85	26993.1	0.619676
5.40	7407	0.170	365.9	27362.2	0.62815
5.45	7455	0.171	365.95	27733.8	0.63668
5.50	7504	0.172	366	28108	1
5.55	7553	0.173	366.05	28484.2	0.653907
5.60	7601	0.175	366.1	28863.0	0.662604
5.65	7650	0.176	366.15	29244.3	0.671357
5.70	7699	0.177	366.2	29628.0	0.680166
5.75	7747	0.178	366.25	30014.2	0.689031
5.80	7796	0.179	366.3	30402.8	0.697952
5.85	7845	0.180	366.35	30793.8	0.706929
5.90	7894	0.181	366.4	31187.3	0.715961
5.95	7942	0.182	366.45	31583.2	0.72505
6.00	7991	0.183	366.5	31981	1

Emerald Hills BF 2-2

Discharge vs Elevation Table

Bottom orifice diameter:	2 "	Top orifice diameter:	3 "
Number:	2	Number:	4
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	2.40 ft
Middle orifice diameter:	3 "	Emergency weir:	
number of orif:	4	Invert:	4.00 ft
Cg-middle:	0.61	Weir Length (ft)	10.00 ft
invert elev:	2.00 ft	Riser Box LxW	2x3

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.55	0.30	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.007
0.60	0.60	0.00	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.024
0.65	0.90	0.00	0.00	0.00	0.06	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.050
0.70	1.20	0.00	0.00	0.00	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.073
0.75	1.50	0.00	0.00	0.00	0.09	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.087
0.80	1.80	0.00	0.00	0.00	0.10	0.13	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.099
0.85	2.10	0.00	0.00	0.00	0.11	0.15	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.110
0.90	2.40	0.00	0.00	0.00	0.12	0.16	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.120
0.95	2.70	0.00	0.00	0.00	0.13	0.16	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.129
1.00	3.00	0.00	0.00	0.00	0.14	0.16	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.138
1.05	3.30	0.00	0.00	0.00	0.15	0.17	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.146
1.10	3.60	0.00	0.00	0.00	0.15	0.19	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.154
1.15	3.90	0.00	0.00	0.00	0.16	0.24	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.161
1.20	4.20	0.00	0.00	0.00	0.17	0.34	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.168
1.25	4.50	0.00	0.00	0.00	0.17	0.52	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.174
1.30	4.80	0.00	0.00	0.00	0.18	0.81	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.181
1.35	5.10	0.00	0.00	0.00	0.19	1.24	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.187
1.40	5.40	0.00	0.00	0.00	0.19	1.86	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.193
1.45	5.70	0.00	0.00	0.00	0.20	2.73	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.199
1.50	6.00	0.00	0.00	0.00	0.20	3.89	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.205
1.55	6.30	0.00	0.00	0.00	0.21	5.42	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.210
1.60	6.60	0.00	0.00	0.00	0.22	7.40	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.215
1.65	6.90	0.00	0.00	0.00	0.22	9.91	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.221
1.70	7.20	0.00	0.00	0.00	0.23	13.06	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.226
1.75	7.50	0.00	0.00	0.00	0.23	16.94	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.231
1.80	7.80	0.00	0.00	0.00	0.24	21.68	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.236
1.85	8.10	0.00	0.00	0.00	0.24	27.40	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.240
1.90	8.40	0.00	0.00	0.00	0.25	34.26	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.245
1.95	8.70	0.00	0.00	0.00	0.25	42.40	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.250
2.00	9.00	0.00	0.00	0.00	0.25	51.99	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.254
2.05	9.30	0.20	0.00	0.00	0.26	63.22	0.26	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.275
2.10	9.60	0.40	0.00	0.00	0.26	76.29	0.26	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.326
2.15	9.90	0.60	0.00	0.00	0.27	91.40	0.27	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.401
2.20	10.20	0.80	0.00	0.00	0.27	108.78	0.27	0.26	0.22	0.22	0.00	0.00	0.00	0.00	0.495
2.25	10.50	1.00	0.00	0.00	0.28	128.67	0.28	0.34	0.32	0.32	0.00	0.00	0.00	0.00	0.600
2.30	10.80	1.20	0.00	0.00	0.28	151.34	0.28	0.40	0.43	0.40	0.00	0.00	0.00	0.00	0.682
2.35	11.10	1.40	0.00	0.00	0.28	177.06	0.28	0.46	0.53	0.46	0.00	0.00	0.00	0.00	0.740
2.40	11.40	1.60	0.00	0.00	0.29	206.12	0.29	0.50	0.63	0.50	0.00	0.00	0.00	0.00	0.792
2.45	11.70	1.80	0.20	0.00	0.29	238.84	0.29	0.55	0.71	0.55	0.00	0.02	0.02	0.00	0.856
2.50	12.00	2.00	0.40	0.00	0.30	275.55	0.30	0.59	0.78	0.59	0.00	0.06	0.06	0.00	0.947
2.55	12.30	2.20	0.60	0.00	0.30	316.59	0.30	0.63	0.83	0.63	0.15	0.13	0.13	0.00	1.060
2.60	12.60	2.40	0.80	0.00	0.30	362.33	0.30	0.66	0.86	0.66	0.26	0.22	0.22	0.00	1.189
2.65	12.90	2.60	1.00	0.00	0.31	413.17	0.31	0.70	0.87	0.70	0.34	0.32	0.32	0.00	1.328
2.70	13.20	2.80	1.20	0.00	0.31	469.51	0.31	0.73	0.88	0.73	0.40	0.43	0.40	0.00	1.442
2.75	13.50	3.00	1.40	0.00	0.31	531.79	0.31	0.76	0.88	0.76	0.46	0.53	0.46	0.00	1.530
2.80	13.80	3.20	1.60	0.00	0.32	600.46	0.32	0.79	0.90	0.79	0.50	0.63	0.50	0.00	1.612
2.85	14.10	3.40	1.80	0.00	0.32	675.99	0.32	0.82	0.94	0.82	0.55	0.71	0.55	0.00	1.688
2.90	14.40	3.60	2.00	0.00	0.33	758.88	0.33	0.85	1.03	0.85	0.59	0.78	0.59	0.00	1.760
2.95	14.70	3.80	2.20	0.00	0.33	849.65	0.33	0.87	1.20	0.87	0.63	0.83	0.63	0.00	1.828
3.00	15.00	4.00	2.40	0.00	0.33	948.85	0.33	0.90	1.48	0.90	0.66	0.86	0.66	0.00	1.894
3.05	15.30	4.20	2.60	0.00	0.34	1057.04	0.34	0.92	1.89	0.92	0.70	0.87	0.70	0.00	1.956
3.10	15.60	4.40	2.80	0.00	0.34	1174.83	0.34	0.95	2.50	0.95	0.73	0.88	0.73	0.00	2.017
3.15	15.90	4.60	3.00	0.00	0.34	1302.83	0.34	0.97	3.34	0.97	0.76	0.88	0.76	0.00	2.075
3.20	16.20	4.80	3.20	0.00	0.35	1441.68	0.35	1.00	4.47	1.00	0.79	0.90	0.79	0.00	2.132
3.25	16.50	5.00	3.40	0.00	0.35	1592.07	0.35	1.02	5.95	1.02	0.82	0.94	0.82	0.00	2.187
3.30	16.80	5.20	3.60	0.00	0.35	1754.68	0.35	1.04	7.86	1.04	0.85	1.03	0.85	0.00	2.240
3.35	17.10	5.40	3.80	0.00	0.36	1930.25	0.36	1.06	10.27	1.06	0.87	1.20	0.87	0.00	2.292
3.40	17.40	5.60	4.00	0.00	0.36	2119.52	0.36	1.09	13.27	1.09	0.90	1.48	0.90	0.00	2.343
3.45	17.70	5.80	4.20	0.00	0.36	2323.30	0.36	1.11	16.96	1.11	0.92	1.89	0.92	0.00	2.392
3.50	18.00	6.00	4.40	0.00	0.36	2542.37	0.36	1.13	21.43	1.13	0.95	2.50	0.95	0.00	2.441
3.55	18.30	6.20	4.60	0.00	0.37	2777.60	0.37	1.15	26.81	1.15	0.97	3.34	0.97	0.00	2.488
3.60	18.60	6.40	4.80	0.00	0.37	3029.85	0.37	1.17	33.22	1.17	1.00	4.47	1.00	0.00	2.535
3.65	18.90	6.60	5.00	0.00	0.37	3300.02	0.37	1.19	40.79	1.19	1.02	5.95	1.02	0.00	2.580
3.70	19.20	6.80	5.20	0.00	0.38	3589.06	0.38	1.21	49.66	1.21	1.04	7.86	1.04	0.00	2.625
3.75	19.50	7.00	5.40	0.00	0.38	3897.92	0.38	1.23	60.00	1.23	1.06	10.27	1.06	0.00	2.669
3.80	19.80	7.20	5.60	0.00	0.38	4227.60	0.38	1.24	71.96	1.24	1.09	13.27	1.09	0.00	2.712
3.85	20.10	7.40	5.80	0.00	0.39	4579.14	0.39	1.26	85.73	1.26	1.11	16.96	1.11	0.00	2.755
3.90	20.40	7.60	6.00	0.00	0.39	4953.61	0.39	1.28	101.50	1.28	1.13	21.43	1.13	0.00	2.797
3.95	20.70	7.80	6.20	0.00	0.39	5352.09	0.39	1.30	119.47	1.30	1.15	26.81	1.15	0.00	2.838
4.00	21.00	8.00	6.40	0.00	0.39	5775.73	0.39	1.32	139.85	1.32	1.17	33.22	1.17	0.00	2.878
4.05	21.30	8.20	6.60	0.06	0.40	6225.69	0.40	1.33	162.88	1.33	1.19	40.79	1.19	0.37	3.291
4.10	21.60	8.40	6.80	0.12	0.40	6703.18	0.40	1.35	188.80	1.35	1.21	49.66	1.21	1.05	4.011
4.15	21.90	8.60	7.00	0.18	0.40	7209.43	0.40	1.37	217.87	1.37	1.23	60.00	1.23	1.93	4.931
4.20	22.20	8.80	7.20	0.24	0.41	7745.72	0.41	1.38	250.36	1.38	1.24	71.96	1.24	2.98	6.013

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
4.25	22.50	9.00	7.40	0.30	0.41	8313.37	0.41	1.40	286.55	1.40	1.26	85.73	1.26	4.16	7.235
4.30	22.80	9.20	7.60	0.36	0.41	8913.73	0.41	1.42	326.75	1.42	1.28	101.50	1.28	5.47	8.582
4.35	23.10	9.40	7.80	0.42	0.41	9548.18	0.41	1.43	371.27	1.43	1.30	119.47	1.30	6.90	10.042
4.40	23.40	9.60	8.00	0.48	0.42	10218.16	0.42	1.45	420.45	1.45	1.32	139.85	1.32	8.42	11.607
4.45	23.70	9.80	8.20	0.54	0.42	10925.13	0.42	1.47	474.63	1.47	1.33	162.88	1.33	10.05	13.271
4.50	24.00	10.00	8.40	0.60	0.42	11670.60	0.42	1.48	534.19	1.48	1.35	188.80	1.35	11.77	15.028
4.55	24.30	10.20	8.60	0.66	0.43	12456.12	0.43	1.50	599.51	1.50	1.37	217.87	1.37	13.58	16.873
4.60	24.60	10.40	8.80	0.72	0.43	13283.27	0.43	1.51	670.98	1.51	1.38	250.36	1.38	15.48	18.801
4.65	24.90	10.60	9.00	0.78	0.43	14153.68	0.43	1.53	749.03	1.53	1.40	286.55	1.40	17.45	20.810
4.70	25.20	10.80	9.20	0.84	0.43	15069.03	0.43	1.54	834.09	1.54	1.42	326.75	1.42	19.50	22.896
4.75	25.50	11.00	9.40	0.90	0.44	16031.02	0.44	1.56	926.62	1.56	1.43	371.27	1.43	21.63	25.056
4.80	25.80	11.20	9.60	0.96	0.44	17041.42	0.44	1.57	1027.10	1.57	1.45	420.45	1.45	23.83	27.288
4.85	26.10	11.40	9.80	1.02	0.44	18102.02	0.44	1.59	1136.01	1.59	1.47	474.63	1.47	26.10	29.589
4.90	26.40	11.60	10.00	1.08	0.44	19214.67	0.44	1.60	1253.88	1.60	1.48	534.19	1.48	28.43	31.958
4.95	26.70	11.80	10.20	1.14	0.45	20381.26	0.45	1.62	1381.24	1.62	1.50	599.51	1.50	30.83	34.393
5.00	27.00	12.00	10.40	1.20	0.45	21603.72	0.45	1.63	1518.63	1.63	1.51	670.98	1.51	33.30	36.891
5.05	27.30	12.20	10.60	1.26	0.45	22884.03	0.45	1.64	1666.65	1.64	1.53	749.03	1.53	35.83	39.451
5.10	27.60	12.40	10.80	1.32	0.45	24224.21	0.45	1.66	1825.88	1.66	1.54	834.09	1.54	38.42	42.072
5.15	27.90	12.60	11.00	1.38	0.46	25626.34	0.46	1.67	1996.94	1.67	1.56	926.62	1.56	41.07	44.752
5.20	28.20	12.80	11.20	1.44	0.46	27092.54	0.46	1.69	2180.48	1.69	1.57	1027.10	1.57	43.77	47.490
5.25	28.50	13.00	11.40	1.50	0.46	28624.96	0.46	1.70	2377.16	1.70	1.59	1136.01	1.59	46.54	50.285
5.30	28.80	13.20	11.60	1.56	0.46	30225.83	0.46	1.71	2587.66	1.71	1.60	1253.88	1.60	49.36	53.136
5.35	29.10	13.40	11.80	1.62	0.47	31897.42	0.47	1.73	2812.70	1.73	1.62	1381.24	1.62	52.23	56.041
5.40	29.40	13.60	12.00	1.68	0.47	33642.02	0.47	1.74	3053.00	1.74	1.63	1518.63	1.63	55.16	58.999
5.45	29.70	13.80	12.20	1.74	0.47	35462.01	0.47	1.75	3309.34	1.75	1.64	1666.65	1.64	58.14	62.011
5.50	30.00	14.00	12.40	1.80	0.47	37359.80	0.47	1.77	3582.48	1.77	1.66	1825.88	1.66	61.18	65.073
5.55	30.30	14.20	12.60	1.86	0.48	39337.85	0.48	1.78	3873.23	1.78	1.67	1996.94	1.67	64.26	68.187
5.60	30.60	14.40	12.80	1.92	0.48	41398.68	0.48	1.79	4182.44	1.79	1.69	2180.48	1.69	67.39	71.350
5.65	30.90	14.60	13.00	1.98	0.48	43544.86	0.48	1.80	4510.95	1.80	1.70	2377.16	1.70	70.58	74.563
5.70	31.20	14.80	13.20	2.04	0.48	45778.99	0.48	1.82	4859.64	1.82	1.71	2587.66	1.71	73.81	77.824
5.75	31.50	15.00	13.40	2.10	0.49	48103.77	0.49	1.83	5229.44	1.83	1.73	2812.70	1.73	77.09	81.132
5.80	31.80	15.20	13.60	2.16	0.49	50521.91	0.49	1.84	5621.26	1.84	1.74	3053.00	1.74	80.42	84.488
5.85	32.10	15.40	13.80	2.22	0.49	53036.19	0.49	1.86	6036.09	1.86	1.75	3309.34	1.75	83.79	87.890
5.90	32.40	15.60	14.00	2.28	0.49	55649.44	0.49	1.87	6474.91	1.87	1.77	3582.48	1.77	87.21	91.337
5.95	32.70	15.80	14.20	2.34	0.49	58364.57	0.49	1.88	6938.73	1.88	1.78	3873.23	1.78	90.68	94.830
6.00	33.00	16.00	14.40	2.40	0.50	61184.51	0.50	1.89	7428.61	1.89	1.79	4182.44	1.79	94.19	98.368

Emerald Hills Stage Storage					
BF-2-2					
depth	area	area (ac)	elevation	volume (cf)	volume (acft)
0.00	8500	0.195	318	0	0
0.05	8570	0.197	318.05	426.7	0.009797
0.10	8639	0.198	318.1	857.0	0.019673
0.15	8709	0.200	318.15	1290.7	0.02963
0.20	8779	0.202	318.2	1727.9	0.039667
0.25	8849	0.203	318.25	2168.6	0.049783
0.30	8918	0.205	318.3	2612.7	0.05998
0.35	8988	0.206	318.35	3060.4	0.070257
0.40	9058	0.208	318.4	3511.5	0.080613
0.45	9127	0.210	318.45	3966.1	0.09105
0.50	9197	0.211	318.5	4424.3	0.101567
0.55	9267	0.213	318.55	4885.8	0.112164
0.60	9336	0.214	318.6	5350.9	0.12284
0.65	9406	0.216	318.65	5819.5	0.133597
0.70	9476	0.218	318.7	6291.5	0.144434
0.75	9546	0.219	318.75	6767.1	0.15535
0.80	9615	0.221	318.8	7246.1	0.166347
0.85	9685	0.222	318.85	7728.6	0.177424
0.90	9755	0.224	318.9	8214.6	0.188581
0.95	9824	0.226	318.95	8704.0	0.199817
1.00	9894	0.227	319	9197.0	0.211134
1.05	9967	0.229	319.05	9693.5	0.222532
1.10	10039	0.230	319.1	10193.7	0.234014
1.15	10112	0.232	319.15	10697.4	0.245579
1.20	10184	0.234	319.2	11204.8	0.257227
1.25	10257	0.235	319.25	11715.8	0.268959
1.30	10329	0.237	319.3	12230.5	0.280774
1.35	10402	0.239	319.35	12748.8	0.292672
1.40	10474	0.240	319.4	13270.7	0.304653
1.45	10547	0.242	319.45	13796.2	0.316717
1.50	10620	0.244	319.5	14325.4	0.328865
1.55	10692	0.245	319.55	14858.2	0.341097
1.60	10765	0.247	319.6	15394.6	0.353411
1.65	10837	0.249	319.65	15934.6	0.365809
1.70	10910	0.250	319.7	16478.3	0.37829
1.75	10982	0.252	319.75	17025.6	0.390854
1.80	11055	0.254	319.8	17576.5	0.403501
1.85	11127	0.255	319.85	18131.1	0.416232
1.90	11200	0.257	319.9	18689.3	0.429046
1.95	11272	0.259	319.95	19251.1	0.441944
2.00	11345	0.260	320	19816.5	0.454924
2.05	11420	0.262	320.05	20385.6	0.46799
2.10	11496	0.264	320.1	20958.5	0.481142
2.15	11571	0.266	320.15	21535.2	0.49438
2.20	11646	0.267	320.2	22115.6	0.507705
2.25	11722	0.269	320.25	22699.8	0.521117
2.30	11797	0.271	320.3	23287.8	0.534615
2.35	11872	0.273	320.35	23879.6	0.548199
2.40	11948	0.274	320.4	24475.1	0.56187
2.45	12023	0.276	320.45	25074.3	0.575627
2.50	12099	0.278	320.5	25677.4	0.589471
2.55	12174	0.279	320.55	26284.2	0.603402
2.60	12249	0.281	320.6	26894.8	0.617419
2.65	12325	0.283	320.65	27509.1	0.631522
2.70	12400	0.285	320.7	28127.2	0.645712
2.75	12475	0.286	320.75	28749.1	0.659988
2.80	12551	0.288	320.8	29374.7	0.674351
2.85	12626	0.290	320.85	30004.2	0.688801
2.90	12701	0.292	320.9	30637.3	0.703336
2.95	12777	0.293	320.95	31274.3	0.717959
3.00	12852	0.295	321	31915.0	0.732668
3.05	12930	0.297	321.05	32559.6	0.747465

depth	area	area (ac)	elevation	volume (cf)	volume (acft)
3.10	13008	0.299	321.1	33208.0	0.762351
3.15	13087	0.300	321.15	33860.4	0.777328
3.20	13165	0.302	321.2	34516.7	0.792394
3.25	13243	0.304	321.25	35176.9	0.80755
3.30	13321	0.306	321.3	35841.0	0.822796
3.35	13399	0.308	321.35	36509.0	0.838131
3.40	13478	0.309	321.4	37180.9	0.853556
3.45	13556	0.311	321.45	37856.8	0.869072
3.50	13634	0.313	321.5	38536.5	0.884676
3.55	13712	0.315	321.55	39220.2	0.900371
3.60	13790	0.317	321.6	39907.7	0.916155
3.65	13869	0.318	321.65	40599.2	0.932029
3.70	13947	0.320	321.7	41294.6	0.947993
3.75	14025	0.322	321.75	41993.9	0.964047
3.80	14103	0.324	321.8	42697.1	0.98019
3.85	14181	0.326	321.85	43404.2	0.996423
3.90	14260	0.327	321.9	44115.2	1.012746
3.95	14338	0.329	321.95	44830.2	1.029159
4.00	14416	0.331	322	45549.0	1.045661
4.05	14497	0.333	322.05	46271.8	1.062255
4.10	14578	0.335	322.1	46998.7	1.078942
4.15	14659	0.337	322.15	47729.6	1.095721
4.20	14740	0.338	322.2	48464.6	1.112594
4.25	14821	0.340	322.25	49203.6	1.12956
4.30	14902	0.342	322.3	49946.7	1.146618
4.35	14983	0.344	322.35	50693.8	1.16377
4.40	15064	0.346	322.4	51445.0	1.181015
4.45	15145	0.348	322.45	52200.2	1.198352
4.50	15226	0.350	322.5	52959.5	1.215783
4.55	15307	0.351	322.55	53722.8	1.233306
4.60	15388	0.353	322.6	54490.2	1.250923
4.65	15469	0.355	322.65	55261.6	1.268632
4.70	15550	0.357	322.7	56037.1	1.286435
4.75	15631	0.359	322.75	56816.6	1.30433
4.80	15712	0.361	322.8	57600.2	1.322319
4.85	15793	0.363	322.85	58387.8	1.3404
4.90	15874	0.364	322.9	59179.5	1.358574
4.95	15955	0.366	322.95	59975.2	1.376842
5.00	16036	0.368	323	60775.0	1.395202
5.05	16120	0.370	323.05	61578.9	1.413657
5.10	16204	0.372	323.1	62387.0	1.432208
5.15	16288	0.374	323.15	63199.3	1.450856
5.20	16371	0.376	323.2	64015.7	1.469599
5.25	16455	0.378	323.25	64836.4	1.488439
5.30	16539	0.380	323.3	65661.3	1.507375
5.35	16623	0.382	323.35	66490.3	1.526408
5.40	16707	0.384	323.4	67323.6	1.545536
5.45	16791	0.385	323.45	68161.0	1.564761
5.50	16874	0.387	323.5	69003	2
5.55	16958	0.389	323.55	69848.4	1.6035
5.60	17042	0.391	323.6	70698.5	1.623013
5.65	17126	0.393	323.65	71552.7	1.642623
5.70	17210	0.395	323.7	72411.1	1.662329
5.75	17294	0.397	323.75	73273.7	1.682132
5.80	17378	0.399	323.8	74140.4	1.70203
5.85	17461	0.401	323.85	75011.4	1.722025
5.90	17545	0.403	323.9	75886.6	1.742116
5.95	17629	0.405	323.95	76765.9	1.762304
6.00	17713	0.407	324	77649	2

Emerald Hills BF 2-3

Discharge vs Elevation Table

Bottom orifice diameter:	2 "	Top orifice diameter:	4 "
Number:	1	Number:	4
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	2.40 ft
Middle orifice diameter:	3 "	Emergency weir:	
number of orif:	4	Invert:	4.10 ft
Cg-middle:	0.61	Weir Length (ft)	10.00 ft
invert elev:	2.00 ft	Riser Box LxW	2x3

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.55	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.003
0.60	0.60	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.012
0.65	0.90	0.00	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.025
0.70	1.20	0.00	0.00	0.00	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.036
0.75	1.50	0.00	0.00	0.00	0.04	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.044
0.80	1.80	0.00	0.00	0.00	0.05	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.050
0.85	2.10	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.055
0.90	2.40	0.00	0.00	0.00	0.06	0.08	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.060
0.95	2.70	0.00	0.00	0.00	0.06	0.08	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.065
1.00	3.00	0.00	0.00	0.00	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.069
1.05	3.30	0.00	0.00	0.00	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.073
1.10	3.60	0.00	0.00	0.00	0.08	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.077
1.15	3.90	0.00	0.00	0.00	0.08	0.12	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.080
1.20	4.20	0.00	0.00	0.00	0.08	0.17	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.084
1.25	4.50	0.00	0.00	0.00	0.09	0.26	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.087
1.30	4.80	0.00	0.00	0.00	0.09	0.41	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.090
1.35	5.10	0.00	0.00	0.00	0.09	0.62	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.094
1.40	5.40	0.00	0.00	0.00	0.10	0.93	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.097
1.45	5.70	0.00	0.00	0.00	0.10	1.36	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.099
1.50	6.00	0.00	0.00	0.00	0.10	1.94	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.102
1.55	6.30	0.00	0.00	0.00	0.11	2.71	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.105
1.60	6.60	0.00	0.00	0.00	0.11	3.70	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.108
1.65	6.90	0.00	0.00	0.00	0.11	4.96	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.110
1.70	7.20	0.00	0.00	0.00	0.11	6.53	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.113
1.75	7.50	0.00	0.00	0.00	0.12	8.47	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.115
1.80	7.80	0.00	0.00	0.00	0.12	10.84	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.118
1.85	8.10	0.00	0.00	0.00	0.12	13.70	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.120
1.90	8.40	0.00	0.00	0.00	0.12	17.13	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.123
1.95	8.70	0.00	0.00	0.00	0.12	21.20	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.125
2.00	9.00	0.00	0.00	0.00	0.13	26.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.127
2.05	9.30	0.20	0.00	0.00	0.13	31.61	0.13	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.146
2.10	9.60	0.40	0.00	0.00	0.13	38.14	0.13	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.195
2.15	9.90	0.60	0.00	0.00	0.13	45.70	0.13	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.268
2.20	10.20	0.80	0.00	0.00	0.14	54.39	0.14	0.26	0.22	0.22	0.00	0.00	0.00	0.00	0.359
2.25	10.50	1.00	0.00	0.00	0.14	64.34	0.14	0.34	0.32	0.32	0.00	0.00	0.00	0.00	0.463
2.30	10.80	1.20	0.00	0.00	0.14	75.67	0.14	0.40	0.43	0.40	0.00	0.00	0.00	0.00	0.542
2.35	11.10	1.40	0.00	0.00	0.14	88.53	0.14	0.46	0.53	0.46	0.00	0.00	0.00	0.00	0.598
2.40	11.40	1.60	0.00	0.00	0.14	103.06	0.14	0.50	0.63	0.50	0.00	0.00	0.00	0.00	0.648
2.45	11.70	1.80	0.15	0.00	0.15	119.42	0.15	0.55	0.71	0.55	0.00	0.02	0.02	0.00	0.713
2.50	12.00	2.00	0.30	0.00	0.15	137.77	0.15	0.59	0.78	0.59	0.00	0.07	0.07	0.00	0.811
2.55	12.30	2.20	0.45	0.00	0.15	158.29	0.15	0.63	0.83	0.63	0.00	0.16	0.16	0.00	0.938
2.60	12.60	2.40	0.60	0.00	0.15	181.17	0.15	0.66	0.86	0.66	0.31	0.28	0.28	0.00	1.089
2.65	12.90	2.60	0.75	0.00	0.15	206.59	0.15	0.70	0.87	0.70	0.49	0.41	0.41	0.00	1.260
2.70	13.20	2.80	0.90	0.00	0.16	234.76	0.16	0.73	0.88	0.73	0.62	0.56	0.56	0.00	1.445
2.75	13.50	3.00	1.05	0.00	0.16	265.90	0.16	0.76	0.88	0.76	0.73	0.72	0.72	0.00	1.638
2.80	13.80	3.20	1.20	0.00	0.16	300.23	0.16	0.79	0.90	0.79	0.83	0.88	0.83	0.00	1.774
2.85	14.10	3.40	1.35	0.00	0.16	337.99	0.16	0.82	0.94	0.82	0.91	1.05	0.91	0.00	1.889
2.90	14.40	3.60	1.50	0.00	0.16	379.44	0.16	0.85	1.03	0.85	0.99	1.20	0.99	0.00	1.995
2.95	14.70	3.80	1.65	0.00	0.16	424.82	0.16	0.87	1.20	0.87	1.06	1.34	1.06	0.00	2.095
3.00	15.00	4.00	1.80	0.00	0.17	474.42	0.17	0.90	1.48	0.90	1.12	1.47	1.12	0.00	2.190
3.05	15.30	4.20	1.95	0.00	0.17	528.52	0.17	0.92	1.89	0.92	1.19	1.57	1.19	0.00	2.280
3.10	15.60	4.40	2.10	0.00	0.17	587.42	0.17	0.95	2.50	0.95	1.25	1.66	1.25	0.00	2.366
3.15	15.90	4.60	2.25	0.00	0.17	651.41	0.17	0.97	3.34	0.97	1.31	1.72	1.31	0.00	2.449
3.20	16.20	4.80	2.40	0.00	0.17	720.84	0.17	1.00	4.47	1.00	1.36	1.77	1.36	0.00	2.529
3.25	16.50	5.00	2.55	0.00	0.17	796.03	0.17	1.02	5.95	1.02	1.41	1.79	1.41	0.00	2.606
3.30	16.80	5.20	2.70	0.00	0.18	877.34	0.18	1.04	7.86	1.04	1.46	1.80	1.46	0.00	2.681
3.35	17.10	5.40	2.85	0.00	0.18	965.12	0.18	1.06	10.27	1.06	1.51	1.81	1.51	0.00	2.754
3.40	17.40	5.60	3.00	0.00	0.18	1059.76	0.18	1.09	13.27	1.09	1.56	1.81	1.56	0.00	2.824
3.45	17.70	5.80	3.15	0.00	0.18	1161.65	0.18	1.11	16.96	1.11	1.61	1.83	1.61	0.00	2.893
3.50	18.00	6.00	3.30	0.00	0.18	1271.19	0.18	1.13	21.43	1.13	1.65	1.88	1.65	0.00	2.960
3.55	18.30	6.20	3.45	0.00	0.18	1388.80	0.18	1.15	26.81	1.15	1.69	1.97	1.69	0.00	3.026
3.60	18.60	6.40	3.60	0.00	0.19	1514.93	0.19	1.17	33.22	1.17	1.74	2.12	1.74	0.00	3.090
3.65	18.90	6.60	3.75	0.00	0.19	1650.01	0.19	1.19	40.79	1.19	1.78	2.36	1.78	0.00	3.153
3.70	19.20	6.80	3.90	0.00	0.19	1794.53	0.19	1.21	49.66	1.21	1.82	2.72	1.82	0.00	3.214
3.75	19.50	7.00	4.05	0.00	0.19	1948.96	0.19	1.23	60.00	1.23	1.86	3.21	1.86	0.00	3.274
3.80	19.80	7.20	4.20	0.00	0.19	2113.80	0.19	1.24	71.96	1.24	1.90	3.89	1.90	0.00	3.333
3.85	20.10	7.40	4.35	0.00	0.19	2289.57	0.19	1.26	85.73	1.26	1.94	4.78	1.94	0.00	3.391
3.90	20.40	7.60	4.50	0.00	0.19	2476.80	0.19	1.28	101.50	1.28	1.97	5.92	1.97	0.00	3.448
3.95	20.70	7.80	4.65	0.00	0.20	2676.05	0.20	1.30	119.47	1.30	2.01	7.37	2.01	0.00	3.504
4.00	21.00	8.00	4.80	0.00	0.20	2887.86	0.20	1.32	139.85	1.32	2.05	9.17	2.05	0.00	3.559
4.05	21.30	8.20	4.95	0.00	0.20	3112.84	0.20	1.33	162.88	1.33	2.08	11.38	2.08	0.00	3.614
4.10	21.60	8.40	5.10	0.00	0.20	3351.59	0.20	1.35	188.80	1.35	2.12	14.06	2.12	0.00	3.667
4.15	21.90	8.60	5.25	0.06	0.20	3604.71	0.20	1.37	217.87	1.37	2.15	17.27	2.15	0.37	4.092
4.20	22.20	8.80	5.40	0.12	0.20	3872.86	0.20	1.38	250.36	1.38	2.18	21.08	2.18	1.05	4.825

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
4.25	22.50	9.00	5.55	0.18	0.20	4156.69	0.20	1.40	286.55	1.40	2.22	25.58	2.22	1.93	5.757
4.30	22.80	9.20	5.70	0.24	0.21	4456.87	0.21	1.42	326.75	1.42	2.25	30.84	2.25	2.98	6.852
4.35	23.10	9.40	5.85	0.30	0.21	4774.09	0.21	1.43	371.27	1.43	2.28	36.95	2.28	4.16	8.085
4.40	23.40	9.60	6.00	0.36	0.21	5109.08	0.21	1.45	420.45	1.45	2.31	44.00	2.31	5.47	9.444
4.45	23.70	9.80	6.15	0.42	0.21	5462.57	0.21	1.47	474.63	1.47	2.35	52.10	2.35	6.90	10.916
4.50	24.00	10.00	6.30	0.48	0.21	5835.30	0.21	1.48	534.19	1.48	2.38	61.34	2.38	8.42	12.493
4.55	24.30	10.20	6.45	0.54	0.21	6228.06	0.21	1.50	599.51	1.50	2.41	71.85	2.41	10.05	14.168
4.60	24.60	10.40	6.60	0.60	0.21	6641.63	0.21	1.51	670.98	1.51	2.44	83.73	2.44	11.77	15.936
4.65	24.90	10.60	6.75	0.66	0.22	7076.84	0.22	1.53	749.03	1.53	2.47	97.13	2.47	13.58	17.792
4.70	25.20	10.80	6.90	0.72	0.22	7534.51	0.22	1.54	834.09	1.54	2.50	112.16	2.50	15.48	19.731
4.75	25.50	11.00	7.05	0.78	0.22	8015.51	0.22	1.56	926.62	1.56	2.52	128.98	2.52	17.45	21.751
4.80	25.80	11.20	7.20	0.84	0.22	8520.71	0.22	1.57	1027.10	1.57	2.55	147.72	2.55	19.50	23.848
4.85	26.10	11.40	7.35	0.90	0.22	9051.01	0.22	1.59	1136.01	1.59	2.58	168.55	2.58	21.63	26.018
4.90	26.40	11.60	7.50	0.96	0.22	9607.34	0.22	1.60	1253.88	1.60	2.61	191.63	2.61	23.83	28.261
4.95	26.70	11.80	7.65	1.02	0.22	10190.63	0.22	1.62	1381.24	1.62	2.64	217.14	2.64	26.10	30.573
5.00	27.00	12.00	7.80	1.08	0.22	10801.86	0.22	1.63	1518.63	1.63	2.67	245.24	2.67	28.43	32.952
5.05	27.30	12.20	7.95	1.14	0.23	11442.02	0.23	1.64	1666.65	1.64	2.69	276.14	2.69	30.83	35.396
5.10	27.60	12.40	8.10	1.20	0.23	12112.11	0.23	1.66	1825.88	1.66	2.72	310.02	2.72	33.30	37.905
5.15	27.90	12.60	8.25	1.26	0.23	12813.17	0.23	1.67	1996.94	1.67	2.75	347.09	2.75	35.83	40.475
5.20	28.20	12.80	8.40	1.32	0.23	13546.27	0.23	1.69	2180.48	1.69	2.77	387.58	2.77	38.42	43.106
5.25	28.50	13.00	8.55	1.38	0.23	14312.48	0.23	1.70	2377.16	1.70	2.80	431.70	2.80	41.07	45.796
5.30	28.80	13.20	8.70	1.44	0.23	15112.92	0.23	1.71	2587.66	1.71	2.83	479.68	2.83	43.77	48.544
5.35	29.10	13.40	8.85	1.50	0.23	15948.71	0.23	1.73	2812.70	1.73	2.85	531.77	2.85	46.54	51.348
5.40	29.40	13.60	9.00	1.56	0.23	16821.01	0.23	1.74	3053.00	1.74	2.88	588.23	2.88	49.36	54.208
5.45	29.70	13.80	9.15	1.62	0.24	17731.01	0.24	1.75	3309.34	1.75	2.90	649.31	2.90	52.23	57.123
5.50	30.00	14.00	9.30	1.68	0.24	18679.90	0.24	1.77	3582.48	1.77	2.93	715.30	2.93	55.16	60.091
5.55	30.30	14.20	9.45	1.74	0.24	19668.93	0.24	1.78	3873.23	1.78	2.95	786.46	2.95	58.14	63.111
5.60	30.60	14.40	9.60	1.80	0.24	20699.34	0.24	1.79	4182.44	1.79	2.98	863.10	2.98	61.18	66.183
5.65	30.90	14.60	9.75	1.86	0.24	21772.43	0.24	1.80	4510.95	1.80	3.00	945.52	3.00	64.26	69.306
5.70	31.20	14.80	9.90	1.92	0.24	22889.50	0.24	1.82	4859.64	1.82	3.02	1034.03	3.02	67.39	72.478
5.75	31.50	15.00	10.05	1.98	0.24	24051.88	0.24	1.83	5229.44	1.83	3.05	1128.97	3.05	70.58	75.700
5.80	31.80	15.20	10.20	2.04	0.24	25260.95	0.24	1.84	5621.26	1.84	3.07	1230.67	3.07	73.81	78.970
5.85	32.10	15.40	10.35	2.10	0.25	26518.09	0.25	1.86	6036.09	1.86	3.10	1339.48	3.10	77.09	82.287
5.90	32.40	15.60	10.50	2.16	0.25	27824.72	0.25	1.87	6474.91	1.87	3.12	1455.76	3.12	80.42	85.651
5.95	32.70	15.80	10.65	2.22	0.25	29182.28	0.25	1.88	6938.73	1.88	3.14	1579.88	3.14	83.79	89.062
6.00	33.00	16.00	10.80	2.28	0.25	30592.25	0.25	1.89	7428.61	1.89	3.17	1712.23	3.17	87.21	92.519

Emerald Hills Stage Storage					
BF-2-3					
depth	area	area (ac)	elevation	volume (cf)	volume (acft)
0.00	7000	0.161	338	0	0
0.05	7062	0.162	338.05	351.6	0.008071
0.10	7124	0.164	338.1	706.2	0.016212
0.15	7186	0.165	338.15	1064.0	0.024425
0.20	7248	0.166	338.2	1424.8	0.03271
0.25	7311	0.168	338.25	1788.8	0.041065
0.30	7373	0.169	338.3	2155.9	0.049492
0.35	7435	0.171	338.35	2526.1	0.057991
0.40	7497	0.172	338.4	2899.4	0.06656
0.45	7559	0.174	338.45	3275.8	0.075201
0.50	7621	0.175	338.5	3655.3	0.083913
0.55	7683	0.176	338.55	4037.9	0.092696
0.60	7745	0.178	338.6	4423.6	0.101551
0.65	7807	0.179	338.65	4812.4	0.110477
0.70	7869	0.181	338.7	5204.3	0.119474
0.75	7932	0.182	338.75	5599.3	0.128543
0.80	7994	0.184	338.8	5997.4	0.137682
0.85	8056	0.185	338.85	6398.7	0.146893
0.90	8118	0.186	338.9	6803.0	0.156176
0.95	8180	0.188	338.95	7210.5	0.165529
1.00	8242	0.189	339	7621.0	0.174954
1.05	8302	0.191	339.05	8034.6	0.184449
1.10	8363	0.192	339.1	8451.2	0.194014
1.15	8423	0.193	339.15	8870.9	0.203648
1.20	8484	0.195	339.2	9293.6	0.213351
1.25	8544	0.196	339.25	9719.3	0.223124
1.30	8605	0.198	339.3	10148.0	0.232966
1.35	8665	0.199	339.35	10579.8	0.242878
1.40	8726	0.200	339.4	11014.5	0.252859
1.45	8786	0.202	339.45	11452.3	0.262909
1.50	8847	0.203	339.5	11893.1	0.273029
1.55	8907	0.204	339.55	12337.0	0.283218
1.60	8967	0.206	339.6	12783.8	0.293476
1.65	9028	0.207	339.65	13233.7	0.303804
1.70	9088	0.209	339.7	13686.6	0.314201
1.75	9149	0.210	339.75	14142.5	0.324668
1.80	9209	0.211	339.8	14601.5	0.335204
1.85	9270	0.213	339.85	15063.5	0.345809
1.90	9330	0.214	339.9	15528.4	0.356484
1.95	9391	0.216	339.95	15996.5	0.367228
2.00	9451	0.217	340	16467.5	0.378042
2.05	9453	0.217	340.05	16940.1	0.388891
2.10	9456	0.217	340.1	17412.8	0.399744
2.15	9458	0.217	340.15	17885.7	0.410599
2.20	9461	0.217	340.2	18358.7	0.421457
2.25	9463	0.217	340.25	18831.8	0.432318
2.30	9466	0.217	340.3	19305.0	0.443182
2.35	9468	0.217	340.35	19778.4	0.454048
2.40	9471	0.217	340.4	20251.8	0.464918
2.45	9473	0.217	340.45	20725.4	0.47579
2.50	9476	0.218	340.5	21199.1	0.486665
2.55	9478	0.218	340.55	21673.0	0.497543
2.60	9480	0.218	340.6	22146.9	0.508423
2.65	9483	0.218	340.65	22621.0	0.519307
2.70	9485	0.218	340.7	23095.2	0.530193
2.75	9488	0.218	340.75	23569.5	0.541082
2.80	9490	0.218	340.8	24044.0	0.551974
2.85	9493	0.218	340.85	24518.6	0.562868
2.90	9495	0.218	340.9	24993.2	0.573766
2.95	9498	0.218	340.95	25468.1	0.584666
3.00	9500	0.218	341	25943.0	0.595569
3.05	9540	0.219	341.05	26419.0	0.606497

depth	area	area (ac)	elevation	volume (cf)	volume (acft)
3.10	9580	0.220	341.1	26897.0	0.61747
3.15	9620	0.221	341.15	27377.0	0.628489
3.20	9660	0.222	341.2	27859.0	0.639555
3.25	9700	0.223	341.25	28343.0	0.650666
3.30	9740	0.224	341.3	28829.0	0.661823
3.35	9780	0.225	341.35	29317.0	0.673026
3.40	9820	0.225	341.4	29807.0	0.684275
3.45	9860	0.226	341.45	30299.0	0.695569
3.50	9900	0.227	341.5	30793.0	0.70691
3.55	9940	0.228	341.55	31289.0	0.718297
3.60	9980	0.229	341.6	31787.0	0.729729
3.65	10020	0.230	341.65	32287.0	0.741208
3.70	10060	0.231	341.7	32789.0	0.752732
3.75	10100	0.232	341.75	33293.0	0.764302
3.80	10140	0.233	341.8	33799.0	0.775918
3.85	10180	0.234	341.85	34307.0	0.78758
3.90	10220	0.235	341.9	34817.0	0.799288
3.95	10260	0.236	341.95	35329.0	0.811042
4.00	10300	0.236	342	35843.0	0.822842
4.05	10361	0.238	342.05	36359.5	0.8347
4.10	10422	0.239	342.1	36879.1	0.846628
4.15	10483	0.241	342.15	37401.7	0.858625
4.20	10544	0.242	342.2	37927.4	0.870693
4.25	10605	0.243	342.25	38456.1	0.882831
4.30	10666	0.245	342.3	38987.9	0.895039
4.35	10727	0.246	342.35	39522.7	0.907317
4.40	10788	0.248	342.4	40060.6	0.919665
4.45	10849	0.249	342.45	40601.5	0.932083
4.50	10910	0.250	342.5	41145.5	0.944571
4.55	10971	0.252	342.55	41692.5	0.957129
4.60	11032	0.253	342.6	42242.6	0.969757
4.65	11093	0.255	342.65	42795.7	0.982455
4.70	11154	0.256	342.7	43351.9	0.995223
4.75	11215	0.257	342.75	43911.1	1.008061
4.80	11276	0.259	342.8	44473.4	1.020969
4.85	11337	0.260	342.85	45038.7	1.033947
4.90	11398	0.262	342.9	45607.1	1.046995
4.95	11459	0.263	342.95	46178.5	1.060113
5.00	11520	0.264	343	46753.0	1.073301
5.05	11574	0.266	343.05	47330.3	1.086555
5.10	11628	0.267	343.1	47910.4	1.099871
5.15	11682	0.268	343.15	48493.1	1.11325
5.20	11736	0.269	343.2	49078.6	1.12669
5.25	11790	0.271	343.25	49666.7	1.140192
5.30	11844	0.272	343.3	50257.6	1.153756
5.35	11898	0.273	343.35	50851.1	1.167382
5.40	11952	0.274	343.4	51447.4	1.18107
5.45	12006	0.276	343.45	52046.3	1.19482
5.50	12060	0.277	343.5	52648	1
5.55	12114	0.278	343.55	53252.3	1.222506
5.60	12168	0.279	343.6	53859.4	1.236442
5.65	12222	0.281	343.65	54469.1	1.25044
5.70	12276	0.282	343.7	55081.6	1.2645
5.75	12330	0.283	343.75	55696.7	1.278621
5.80	12384	0.284	343.8	56314.6	1.292805
5.85	12438	0.286	343.85	56935.1	1.307051
5.90	12492	0.287	343.9	57558.4	1.321359
5.95	12546	0.288	343.95	58184.3	1.335729
6.00	12600	0.289	344	58813	1

BF-2-1		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	0.194	150.9	1.500	17.36
0.05	0.194	152.6	0.218	15.86
0.10	0.194	154.3	0.221	15.64
0.15	0.194	156.0	0.223	15.42
0.20	0.194	157.8	0.226	15.20
0.25	0.194	159.5	1.000	14.97
0.30	0.194	161.2	0.231	13.97
0.35	0.194	162.9	2.000	13.74
0.40	0.194	164.7	0.236	11.74
0.45	0.194	166.4	0.238	11.51
0.50	0.194	168.1	0.239	11.27
0.55	0.197	169.8	0.235	11.03
0.60	0.204	171.6	0.229	10.80
0.65	0.212	173.3	0.225	10.57
0.70	0.216	175.0	0.223	10.34
0.75	0.220	176.7	0.221	10.12
0.80	0.223	178.5	0.220	9.90
0.85	0.226	180.2	0.220	9.68
0.90	0.229	181.9	0.219	9.46
0.95	0.232	183.6	0.219	9.24
1.00	0.234	185.4	0.219	9.02
1.05	0.236	187.3	0.219	8.80
1.10	0.238	189.2	0.220	8.58
1.15	0.240	191.0	0.220	8.36
1.20	0.242	192.9	0.220	8.14
1.25	0.244	194.8	0.221	7.92
1.30	0.246	196.6	0.221	7.70
1.35	0.248	198.5	0.222	7.48
1.40	0.249	200.4	0.223	7.26
1.45	0.251	202.2	0.223	7.03
1.50	0.252	204.1	0.224	6.81
1.55	0.254	206.0	0.225	6.59
1.60	0.255	207.8	0.225	6.36
1.65	0.257	209.7	0.226	6.14
1.70	0.258	211.6	0.227	5.91
1.75	0.260	213.4	0.228	5.68
1.80	0.261	215.3	0.229	5.46
1.85	0.262	217.2	0.229	5.23
1.90	0.264	219.0	0.230	5.00
1.95	0.265	220.9	0.231	4.77
2.00	0.266	222.9	0.228	4.54
2.05	0.276	224.9	0.218	4.31
2.10	0.298	226.9	0.203	4.09
2.15	0.323	228.9	0.192	3.89
2.20	0.338	230.9	0.186	3.70
2.25	0.350	232.9	0.182	3.51
2.30	0.361	234.9	0.178	3.33
2.35	0.371	236.9	0.175	3.15
2.40	0.380	238.9	0.170	2.97
2.45	0.402	240.9	0.158	2.80
2.50	0.446	243.0	0.142	2.65

BF-2-1		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
2.55	0.504	245.0	0.128	2.50
2.60	0.558	247.0	0.119	2.38
2.65	0.594	249.0	0.114	2.26
2.70	0.625	251.0	0.109	2.14
2.75	0.653	253.0	0.106	2.03
2.80	0.679	255.0	0.102	1.93
2.85	0.704	257.0	0.100	1.83
2.90	0.727	259.0	0.098	1.73
2.95	0.749	261.0	0.096	1.63
3.00	0.770	263.1	0.094	1.53
3.05	0.790	265.3	0.092	1.44
3.10	0.809	267.4	0.091	1.35
3.15	0.828	269.6	0.090	1.26
3.20	0.846	271.7	0.088	1.17
3.25	0.863	273.9	0.087	1.08
3.30	0.880	276.0	0.086	0.99
3.35	0.897	278.2	0.085	0.91
3.40	0.913	280.3	0.085	0.82
3.45	0.929	282.5	0.084	0.74
3.50	0.944	284.6	0.083	0.65
3.55	0.959	286.8	0.082	0.57
3.60	0.974	288.9	0.082	0.49
3.65	0.988	291.1	0.081	0.40
3.70	1.002	293.2	0.068	0.32
3.75	1.389	295.4	0.047	0.26
3.80	2.083	297.5	0.033	0.21
3.85	2.978	299.7	0.024	0.18
3.90	4.035	301.8	0.018	0.15
3.95	5.232	304.0	0.014	0.13
4.00	6.554	306.2	0.012	0.12
4.05	7.990	308.5	0.010	0.11
4.10	9.532	310.8	0.008	0.10
4.15	11.172	313.1	0.007	0.09
4.20	12.905	315.4	0.006	0.08
4.25	14.727	317.6	0.006	0.08
4.30	16.632	319.9	0.005	0.07
4.35	18.618	322.2	0.005	0.07
4.40	20.681	324.5	0.004	0.06
4.45	22.819	326.8	0.004	0.06
4.50	25.029	329.1	0.003	0.05
4.55	27.308	331.4	0.003	0.05
4.60	29.656	333.7	0.003	0.05
4.65	32.068	336.0	0.003	0.04
4.70	34.545	338.3	0.003	0.04
4.75	37.084	340.5	0.002	0.04
4.80	39.684	342.8	0.002	0.04
4.85	42.343	345.1	0.002	0.03
4.90	45.061	347.4	0.002	0.03
4.95	47.835	349.7	0.002	0.03
5.00	50.666	352.1	0.002	0.03
5.05	53.550	354.5	0.002	0.02

BF-2-1		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
5.10	56.489	356.9	0.002	0.02
5.15	59.480	359.4	0.002	0.02
5.20	62.523	361.8	0.002	0.02
5.25	65.617	364.2	0.002	0.02
5.30	68.761	366.7	0.001	0.02
5.35	71.954	369.1	0.001	0.01
5.40	75.196	371.5	0.001	0.01
5.45	78.485	374.0	0.001	0.01
5.50	81.822	376.4	0.001	0.01
5.55	85.205	378.9	0.001	0.01
5.60	88.634	381.3	0.001	0.01
5.65	92.108	383.7	0.001	0.01
5.70	95.627	386.2	0.001	0.01
5.75	99.190	388.6	0.001	0.01
5.80	102.796	391.0	0.001	0.00
5.85	106.446	393.5	0.001	0.00
5.90	110.138	395.9	0.001	0.00
5.95	113.872	398.3	0.001	0.00
6.00	117.647			

BF-2-2		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	0.194	426.7	1.500	26.72
0.05	0.194	430.2	0.615	25.22
0.10	0.194	433.7	0.620	24.61
0.15	0.194	437.2	0.625	23.99
0.20	0.194	440.7	0.630	23.36
0.25	0.194	444.2	1.000	22.73
0.30	0.194	447.7	0.640	21.73
0.35	0.194	451.1	2.000	21.09
0.40	0.194	454.6	0.650	19.09
0.45	0.194	458.1	0.655	18.44
0.50	0.194	461.6	0.649	17.79
0.55	0.201	465.1	0.616	17.14
0.60	0.219	468.6	0.563	16.52
0.65	0.244	472.0	0.513	15.96
0.70	0.267	475.5	0.482	15.44
0.75	0.281	479.0	0.463	14.96
0.80	0.294	482.5	0.448	14.50
0.85	0.304	486.0	0.436	14.05
0.90	0.314	489.5	0.426	13.62
0.95	0.324	493.0	0.418	13.19
1.00	0.332	496.5	0.410	12.77
1.05	0.340	500.1	0.404	12.36
1.10	0.348	503.8	0.398	11.96
1.15	0.355	507.4	0.393	11.56
1.20	0.362	511.0	0.389	11.17
1.25	0.369	514.7	0.384	10.78
1.30	0.375	518.3	0.381	10.39
1.35	0.381	521.9	0.377	10.01
1.40	0.387	525.5	0.374	9.63
1.45	0.393	529.2	0.371	9.26
1.50	0.399	532.8	0.369	8.89
1.55	0.404	536.4	0.366	8.52
1.60	0.410	540.0	0.364	8.15
1.65	0.415	543.7	0.362	7.79
1.70	0.420	547.3	0.360	7.43
1.75	0.425	550.9	0.358	7.07
1.80	0.430	554.6	0.356	6.71
1.85	0.435	558.2	0.355	6.35
1.90	0.439	561.8	0.353	6.00
1.95	0.444	565.4	0.352	5.65
2.00	0.448	569.1	0.344	5.29
2.05	0.469	572.9	0.322	4.95
2.10	0.520	576.7	0.287	4.63
2.15	0.596	580.4	0.251	4.34
2.20	0.689	584.2	0.219	4.09
2.25	0.795	588.0	0.196	3.87
2.30	0.876	591.7	0.182	3.68
2.35	0.934	595.5	0.172	3.49
2.40	0.986	599.3	0.163	3.32
2.45	1.051	603.0	0.153	3.16
2.50	1.142	606.8	0.141	3.01

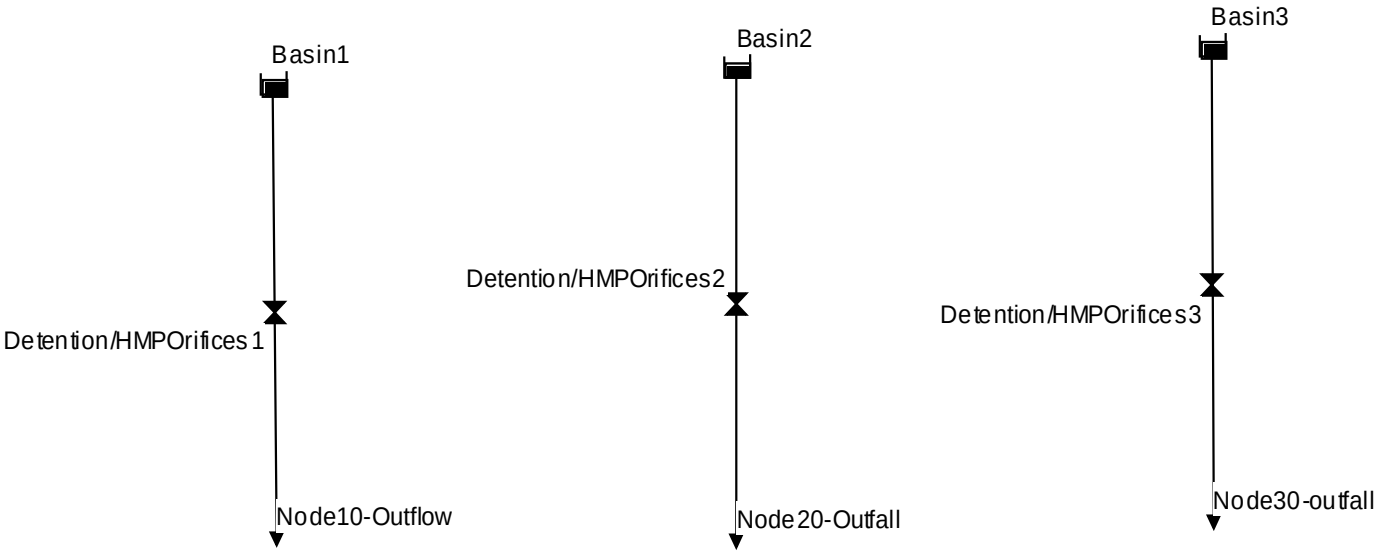
BF-2-2		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
2.55	1.254	610.6	0.129	2.86
2.60	1.383	614.3	0.117	2.74
2.65	1.522	618.1	0.109	2.62
2.70	1.636	621.9	0.103	2.51
2.75	1.724	625.6	0.098	2.41
2.80	1.806	629.4	0.095	2.31
2.85	1.882	633.2	0.092	2.21
2.90	1.954	636.9	0.089	2.12
2.95	2.022	640.7	0.087	2.03
3.00	2.088	644.6	0.084	1.95
3.05	2.151	648.5	0.083	1.86
3.10	2.211	652.4	0.081	1.78
3.15	2.269	656.3	0.079	1.70
3.20	2.326	660.2	0.078	1.62
3.25	2.381	664.1	0.077	1.54
3.30	2.434	668.0	0.075	1.46
3.35	2.486	671.9	0.074	1.39
3.40	2.537	675.8	0.073	1.31
3.45	2.587	679.7	0.072	1.24
3.50	2.635	683.7	0.071	1.17
3.55	2.683	687.6	0.071	1.10
3.60	2.729	691.5	0.070	1.03
3.65	2.775	695.4	0.069	0.96
3.70	2.819	699.3	0.068	0.89
3.75	2.863	703.2	0.068	0.82
3.80	2.907	707.1	0.067	0.75
3.85	2.949	711.0	0.067	0.69
3.90	2.991	714.9	0.066	0.62
3.95	3.032	718.8	0.065	0.55
4.00	3.073	722.8	0.061	0.49
4.05	3.485	726.9	0.053	0.43
4.10	4.205	730.9	0.044	0.37
4.15	5.125	735.0	0.036	0.33
4.20	6.207	739.0	0.030	0.29
4.25	7.429	743.1	0.025	0.26
4.30	8.776	747.1	0.022	0.24
4.35	10.236	751.2	0.019	0.22
4.40	11.802	755.2	0.017	0.20
4.45	13.466	759.3	0.015	0.18
4.50	15.222	763.3	0.013	0.17
4.55	17.067	767.4	0.012	0.15
4.60	18.995	771.4	0.011	0.14
4.65	21.004	775.5	0.010	0.13
4.70	23.090	779.5	0.009	0.12
4.75	25.250	783.6	0.008	0.11
4.80	27.482	787.6	0.008	0.10
4.85	29.784	791.7	0.007	0.10
4.90	32.152	795.7	0.007	0.09
4.95	34.587	799.8	0.006	0.08
5.00	37.085	803.9	0.006	0.08
5.05	39.645	808.1	0.005	0.07

BF-2-2		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
5.10	42.266	812.3	0.005	0.06
5.15	44.946	816.5	0.005	0.06
5.20	47.685	820.7	0.005	0.05
5.25	50.480	824.9	0.004	0.05
5.30	53.330	829.1	0.004	0.05
5.35	56.235	833.2	0.004	0.04
5.40	59.194	837.4	0.004	0.04
5.45	62.205	841.6	0.004	0.03
5.50	65.267	845.8	0.004	0.03
5.55	68.381	850.0	0.003	0.03
5.60	71.544	854.2	0.003	0.02
5.65	74.757	858.4	0.003	0.02
5.70	78.018	862.6	0.003	0.02
5.75	81.326	866.8	0.003	0.01
5.80	84.682	871.0	0.003	0.01
5.85	88.084	875.2	0.003	0.01
5.90	91.532	879.4	0.003	0.01
5.95	95.024	883.6	0.003	0.00
6.00	98.562			

BF-2-3		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	0.194	351.6	1.500	25.70
0.05	0.194	354.7	0.507	24.20
0.10	0.194	357.8	0.512	23.70
0.15	0.194	360.9	0.516	23.19
0.20	0.194	364.0	0.521	22.67
0.25	0.194	367.1	1.000	22.15
0.30	0.194	370.2	0.529	21.15
0.35	0.194	373.3	2.000	20.62
0.40	0.194	376.4	0.538	18.62
0.45	0.194	379.5	0.543	18.08
0.50	0.194	382.6	0.543	17.54
0.55	0.198	385.7	0.531	17.00
0.60	0.206	388.8	0.508	16.46
0.65	0.219	391.9	0.484	15.96
0.70	0.231	395.0	0.468	15.47
0.75	0.238	398.1	0.459	15.00
0.80	0.244	401.2	0.452	14.54
0.85	0.249	404.3	0.446	14.09
0.90	0.254	407.4	0.441	13.65
0.95	0.259	410.5	0.437	13.21
1.00	0.263	413.6	0.433	12.77
1.05	0.267	416.6	0.430	12.34
1.10	0.271	419.7	0.427	11.91
1.15	0.275	422.7	0.425	11.48
1.20	0.278	425.7	0.423	11.05
1.25	0.281	428.7	0.421	10.63
1.30	0.285	431.7	0.419	10.21
1.35	0.288	434.8	0.418	9.79
1.40	0.291	437.8	0.416	9.37
1.45	0.294	440.8	0.415	8.96
1.50	0.296	443.8	0.414	8.54
1.55	0.299	446.9	0.413	8.13
1.60	0.302	449.9	0.412	7.71
1.65	0.304	452.9	0.411	7.30
1.70	0.307	455.9	0.411	6.89
1.75	0.310	458.9	0.410	6.48
1.80	0.312	462.0	0.410	6.07
1.85	0.314	465.0	0.409	5.66
1.90	0.317	468.0	0.409	5.25
1.95	0.319	471.0	0.409	4.84
2.00	0.321	472.6	0.397	4.43
2.05	0.340	472.7	0.360	4.04
2.10	0.389	472.9	0.309	3.68
2.15	0.462	473.0	0.259	3.37
2.20	0.553	473.1	0.217	3.11
2.25	0.657	473.2	0.189	2.89
2.30	0.736	473.3	0.172	2.70
2.35	0.792	473.5	0.161	2.53
2.40	0.842	473.6	0.150	2.37
2.45	0.908	473.7	0.138	2.22
2.50	1.005	473.8	0.123	2.08

BF-2-3		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
2.55	1.132	474.0	0.109	1.96
2.60	1.283	474.1	0.096	1.85
2.65	1.454	474.2	0.085	1.75
2.70	1.639	474.3	0.076	1.67
2.75	1.832	474.4	0.069	1.59
2.80	1.968	474.6	0.065	1.52
2.85	2.083	474.7	0.062	1.46
2.90	2.189	474.8	0.059	1.40
2.95	2.289	474.9	0.056	1.34
3.00	2.384	476.0	0.054	1.28
3.05	2.474	478.0	0.053	1.23
3.10	2.561	480.0	0.051	1.17
3.15	2.643	482.0	0.050	1.12
3.20	2.723	484.0	0.049	1.07
3.25	2.801	486.0	0.048	1.02
3.30	2.875	488.0	0.047	0.98
3.35	2.948	490.0	0.046	0.93
3.40	3.019	492.0	0.045	0.88
3.45	3.087	494.0	0.044	0.84
3.50	3.154	496.0	0.043	0.80
3.55	3.220	498.0	0.043	0.75
3.60	3.284	500.0	0.042	0.71
3.65	3.347	502.0	0.041	0.67
3.70	3.408	504.0	0.041	0.63
3.75	3.468	506.0	0.040	0.59
3.80	3.527	508.0	0.040	0.55
3.85	3.585	510.0	0.039	0.51
3.90	3.642	512.0	0.039	0.47
3.95	3.698	514.0	0.038	0.43
4.00	3.754	516.5	0.038	0.39
4.05	3.808	519.6	0.038	0.35
4.10	3.861	522.6	0.036	0.31
4.15	4.286	525.7	0.031	0.28
4.20	5.019	528.7	0.027	0.25
4.25	5.951	531.8	0.023	0.22
4.30	7.046	534.8	0.019	0.20
4.35	8.280	537.9	0.017	0.18
4.40	9.638	540.9	0.014	0.16
4.45	11.110	544.0	0.013	0.15
4.50	12.687	547.0	0.011	0.13
4.55	14.362	550.1	0.010	0.12
4.60	16.130	553.1	0.009	0.11
4.65	17.986	556.2	0.008	0.10
4.70	19.926	559.2	0.007	0.10
4.75	21.945	562.3	0.007	0.09
4.80	24.042	565.3	0.006	0.08
4.85	26.213	568.4	0.006	0.08
4.90	28.455	571.4	0.005	0.07
4.95	30.767	574.5	0.005	0.06
5.00	33.146	577.3	0.005	0.06
5.05	35.591	580.0	0.004	0.05

BF-2-3		$Q_{Sub\ Drain}$=	0.1942	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
5.10	38.099	582.7	0.004	0.05
5.15	40.669	585.4	0.004	0.05
5.20	43.300	588.1	0.004	0.04
5.25	45.990	590.8	0.003	0.04
5.30	48.738	593.5	0.003	0.04
5.35	51.542	596.2	0.003	0.03
5.40	54.402	598.9	0.003	0.03
5.45	57.317	601.6	0.003	0.03
5.50	60.285	604.3	0.003	0.02
5.55	63.305	607.0	0.003	0.02
5.60	66.377	609.7	0.002	0.02
5.65	69.500	612.4	0.002	0.02
5.70	72.672	615.1	0.002	0.01
5.75	75.894	617.8	0.002	0.01
5.80	79.164	620.5	0.002	0.01
5.85	82.481	623.3	0.002	0.01
5.90	85.846	625.9	0.002	0.00
5.95	89.256	628.6	0.002	0.00
6.00	92.713			


Basin1
Detention/HMPOrifices1
Node10-Outflow
Basin2
Detention/HMPOrifices2
Node20-Outfall
Basin3
Detention/HMPOrifices3
Node30-outfall

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           03/20/2021
START_TIME           00:00:00
REPORT_START_DATE    03/20/2021
REPORT_START_TIME    00:00:00
END_DATE             03/20/2021
END_TIME             10:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:15:00
WET_STEP             00:05:00
DRY_STEP             01:00:00
ROUTING_STEP         0:00:30
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
Node10-Outflow   0          FREE                        NO
Node20-Outfall   0          FREE                        NO
```

```
Node30-outfall   0          FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------          -------- --------
Basin1           0        5.5        0          TABULAR    Basin1Storage                0        0
Basin2           0        5.5        0          TABULAR    Basin2Storage                0        0
Basin3           0        5.5        0          TABULAR    Basin3Storage                0        0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
Detention/HMPOrifices1 Basin1           Node10-Outflow   0          TABULAR/DEPTH   Basin1Discharge             NO
Detention/HMPOrifices2 Basin2           Node20-Outfall   0          TABULAR/HEAD    Basin2Discharge             NO
Detention/HMPOrifices3 Basin3           Node30-outfall   0          TABULAR/HEAD    Basin3Discharge             NO

[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
Basin1           FLOW             Basin1InflowHyd  FLOW     1.0      1.0
Basin2           FLOW             Basin2InflowHyd  FLOW     1.0      1.0
Basin3           FLOW             Basin3InflowHyd  FLOW     1.0      1.0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Basin1Discharge  Rating     0.00       0.000
Basin1Discharge             0.05       0.003
Basin1Discharge             0.10       0.010
Basin1Discharge             0.15       0.018
Basin1Discharge             0.20       0.022
Basin1Discharge             0.25       0.026
Basin1Discharge             0.30       0.029
Basin1Discharge             0.35       0.032
Basin1Discharge             0.40       0.035
Basin1Discharge             0.45       0.037
Basin1Discharge             0.50       0.040
Basin1Discharge             0.55       0.042
Basin1Discharge             0.60       0.044
Basin1Discharge             0.65       0.046
Basin1Discharge             0.70       0.048
Basin1Discharge             0.75       0.050
Basin1Discharge             0.80       0.052
Basin1Discharge             0.85       0.053
Basin1Discharge             0.90       0.055
Basin1Discharge             0.95       0.057
Basin1Discharge             1.00       0.058
Basin1Discharge             1.05       0.060
Basin1Discharge             1.10       0.061
Basin1Discharge             1.15       0.063
Basin1Discharge             1.20       0.064
Basin1Discharge             1.25       0.065
```

Basin1Discharge	1.30	0.067
Basin1Discharge	1.35	0.068
Basin1Discharge	1.40	0.069
Basin1Discharge	1.45	0.071
Basin1Discharge	1.50	0.072
Basin1Discharge	1.55	0.082
Basin1Discharge	1.60	0.104
Basin1Discharge	1.65	0.129
Basin1Discharge	1.70	0.144
Basin1Discharge	1.75	0.156
Basin1Discharge	1.80	0.167
Basin1Discharge	1.85	0.177
Basin1Discharge	1.90	0.186
Basin1Discharge	1.95	0.208
Basin1Discharge	2.00	0.251
Basin1Discharge	2.05	0.310
Basin1Discharge	2.10	0.364
Basin1Discharge	2.15	0.399
Basin1Discharge	2.20	0.431
Basin1Discharge	2.25	0.459
Basin1Discharge	2.30	0.485
Basin1Discharge	2.35	0.509
Basin1Discharge	2.40	0.533
Basin1Discharge	2.45	0.554
Basin1Discharge	2.50	0.575
Basin1Discharge	2.55	0.595
Basin1Discharge	2.60	0.615
Basin1Discharge	2.65	0.633
Basin1Discharge	2.70	0.651
Basin1Discharge	2.75	0.669
Basin1Discharge	2.80	0.686
Basin1Discharge	2.85	0.702
Basin1Discharge	2.90	0.719
Basin1Discharge	2.95	0.734
Basin1Discharge	3.00	0.750
Basin1Discharge	3.05	0.765
Basin1Discharge	3.10	0.780
Basin1Discharge	3.15	0.794
Basin1Discharge	3.20	0.808
Basin1Discharge	3.25	1.194
Basin1Discharge	3.30	1.889
Basin1Discharge	3.35	2.784
Basin1Discharge	3.40	3.841
Basin1Discharge	3.45	5.038
Basin1Discharge	3.50	6.360
Basin1Discharge	3.55	7.796
Basin1Discharge	3.60	9.338
Basin1Discharge	3.65	10.978
Basin1Discharge	3.70	12.711
Basin1Discharge	3.75	14.532
Basin1Discharge	3.80	16.438
Basin1Discharge	3.85	18.424

```
Basin1Discharge             3.90       20.487
Basin1Discharge             3.95       22.625
Basin1Discharge             4.00       24.835
Basin1Discharge             4.05       27.114
Basin1Discharge             4.10       29.461
Basin1Discharge             4.15       31.874
Basin1Discharge             4.20       34.351
Basin1Discharge             4.25       36.890
Basin1Discharge             4.30       39.490
Basin1Discharge             4.35       42.149
Basin1Discharge             4.40       44.867
Basin1Discharge             4.45       47.641
Basin1Discharge             4.50       50.471
Basin1Discharge             4.55       53.356
Basin1Discharge             4.60       56.295
Basin1Discharge             4.65       59.286
Basin1Discharge             4.70       62.329
Basin1Discharge             4.75       65.423
Basin1Discharge             4.80       68.566
Basin1Discharge             4.85       71.760
Basin1Discharge             4.90       75.001
Basin1Discharge             4.95       78.291
Basin1Discharge             5.00       81.628
Basin1Discharge             5.05       85.011
Basin1Discharge             5.10       88.440
Basin1Discharge             5.15       91.914
Basin1Discharge             5.20       95.433
Basin1Discharge             5.25       98.996
Basin1Discharge             5.30       102.602
Basin1Discharge             5.35       106.252
Basin1Discharge             5.40       109.944
Basin1Discharge             5.45       113.678
Basin1Discharge             5.50       117.453
;
Basin2Discharge  Rating     0.00       0.000
Basin2Discharge             0.05       0.007
Basin2Discharge             0.10       0.024
Basin2Discharge             0.15       0.050
Basin2Discharge             0.20       0.073
Basin2Discharge             0.25       0.087
Basin2Discharge             0.30       0.099
Basin2Discharge             0.35       0.110
Basin2Discharge             0.40       0.120
Basin2Discharge             0.45       0.129
Basin2Discharge             0.50       0.138
Basin2Discharge             0.55       0.146
Basin2Discharge             0.60       0.154
Basin2Discharge             0.65       0.161
Basin2Discharge             0.70       0.168
Basin2Discharge             0.75       0.174
Basin2Discharge             0.80       0.181
Basin2Discharge             0.85       0.187
```

Basin2Discharge	0.90	0.193
Basin2Discharge	0.95	0.199
Basin2Discharge	1.00	0.205
Basin2Discharge	1.05	0.210
Basin2Discharge	1.10	0.215
Basin2Discharge	1.15	0.221
Basin2Discharge	1.20	0.226
Basin2Discharge	1.25	0.231
Basin2Discharge	1.30	0.236
Basin2Discharge	1.35	0.240
Basin2Discharge	1.40	0.245
Basin2Discharge	1.45	0.250
Basin2Discharge	1.50	0.254
Basin2Discharge	1.55	0.275
Basin2Discharge	1.60	0.326
Basin2Discharge	1.65	0.401
Basin2Discharge	1.70	0.495
Basin2Discharge	1.75	0.600
Basin2Discharge	1.80	0.682
Basin2Discharge	1.85	0.740
Basin2Discharge	1.90	0.792
Basin2Discharge	1.95	0.856
Basin2Discharge	2.00	0.947
Basin2Discharge	2.05	1.060
Basin2Discharge	2.10	1.189
Basin2Discharge	2.15	1.328
Basin2Discharge	2.20	1.442
Basin2Discharge	2.25	1.530
Basin2Discharge	2.30	1.612
Basin2Discharge	2.35	1.688
Basin2Discharge	2.40	1.760
Basin2Discharge	2.45	1.828
Basin2Discharge	2.50	1.894
Basin2Discharge	2.55	1.956
Basin2Discharge	2.60	2.017
Basin2Discharge	2.65	2.075
Basin2Discharge	2.70	2.132
Basin2Discharge	2.75	2.187
Basin2Discharge	2.80	2.240
Basin2Discharge	2.85	2.292
Basin2Discharge	2.90	2.343
Basin2Discharge	2.95	2.392
Basin2Discharge	3.00	2.441
Basin2Discharge	3.05	2.488
Basin2Discharge	3.10	2.535
Basin2Discharge	3.15	2.580
Basin2Discharge	3.20	2.625
Basin2Discharge	3.25	2.669
Basin2Discharge	3.30	2.712
Basin2Discharge	3.35	2.755
Basin2Discharge	3.40	2.797
Basin2Discharge	3.45	2.838

```
Basin2Discharge             3.50       2.878
Basin2Discharge             3.55       3.291
Basin2Discharge             3.60       4.011
Basin2Discharge             3.65       4.931
Basin2Discharge             3.70       6.013
Basin2Discharge             3.75       7.235
Basin2Discharge             3.80       8.582
Basin2Discharge             3.85       10.042
Basin2Discharge             3.90       11.607
Basin2Discharge             3.95       13.271
Basin2Discharge             4.00       15.028
Basin2Discharge             4.05       16.873
Basin2Discharge             4.10       18.801
Basin2Discharge             4.15       20.810
Basin2Discharge             4.20       22.896
Basin2Discharge             4.25       25.056
Basin2Discharge             4.30       27.288
Basin2Discharge             4.35       29.589
Basin2Discharge             4.40       31.958
Basin2Discharge             4.45       34.393
Basin2Discharge             4.50       36.891
Basin2Discharge             4.55       39.451
Basin2Discharge             4.60       42.072
Basin2Discharge             4.65       44.752
Basin2Discharge             4.70       47.490
Basin2Discharge             4.75       50.285
Basin2Discharge             4.80       53.136
Basin2Discharge             4.85       56.041
Basin2Discharge             4.90       58.999
Basin2Discharge             4.95       62.011
Basin2Discharge             5.00       65.073
Basin2Discharge             5.05       68.187
Basin2Discharge             5.10       71.350
Basin2Discharge             5.15       74.563
Basin2Discharge             5.20       77.824
Basin2Discharge             5.25       81.132
Basin2Discharge             5.30       84.488
Basin2Discharge             5.35       87.890
Basin2Discharge             5.40       91.337
Basin2Discharge             5.45       94.830
Basin2Discharge             5.50       98.368
;
Basin3Discharge  Rating     0.00       0.000
Basin3Discharge             0.05       0.003
Basin3Discharge             0.10       0.012
Basin3Discharge             0.15       0.025
Basin3Discharge             0.20       0.036
Basin3Discharge             0.25       0.044
Basin3Discharge             0.30       0.050
Basin3Discharge             0.35       0.055
Basin3Discharge             0.40       0.060
Basin3Discharge             0.45       0.065
```

Basin3Discharge	0.50	0.069
Basin3Discharge	0.55	0.073
Basin3Discharge	0.60	0.077
Basin3Discharge	0.65	0.080
Basin3Discharge	0.70	0.084
Basin3Discharge	0.75	0.087
Basin3Discharge	0.80	0.090
Basin3Discharge	0.85	0.094
Basin3Discharge	0.90	0.097
Basin3Discharge	0.95	0.099
Basin3Discharge	1.00	0.102
Basin3Discharge	1.05	0.105
Basin3Discharge	1.10	0.108
Basin3Discharge	1.15	0.110
Basin3Discharge	1.20	0.113
Basin3Discharge	1.25	0.115
Basin3Discharge	1.30	0.118
Basin3Discharge	1.35	0.120
Basin3Discharge	1.40	0.123
Basin3Discharge	1.45	0.125
Basin3Discharge	1.50	0.127
Basin3Discharge	1.55	0.146
Basin3Discharge	1.60	0.195
Basin3Discharge	1.65	0.268
Basin3Discharge	1.70	0.359
Basin3Discharge	1.75	0.463
Basin3Discharge	1.80	0.542
Basin3Discharge	1.85	0.598
Basin3Discharge	1.90	0.648
Basin3Discharge	1.95	0.713
Basin3Discharge	2.00	0.811
Basin3Discharge	2.05	0.938
Basin3Discharge	2.10	1.089
Basin3Discharge	2.15	1.260
Basin3Discharge	2.20	1.445
Basin3Discharge	2.25	1.638
Basin3Discharge	2.30	1.774
Basin3Discharge	2.35	1.889
Basin3Discharge	2.40	1.995
Basin3Discharge	2.45	2.095
Basin3Discharge	2.50	2.190
Basin3Discharge	2.55	2.280
Basin3Discharge	2.60	2.366
Basin3Discharge	2.65	2.449
Basin3Discharge	2.70	2.529
Basin3Discharge	2.75	2.606
Basin3Discharge	2.80	2.681
Basin3Discharge	2.85	2.754
Basin3Discharge	2.90	2.824
Basin3Discharge	2.95	2.893
Basin3Discharge	3.00	2.960
Basin3Discharge	3.05	3.026

```
Basin3Discharge             3.10       3.090
Basin3Discharge             3.15       3.153
Basin3Discharge             3.20       3.214
Basin3Discharge             3.25       3.274
Basin3Discharge             3.30       3.333
Basin3Discharge             3.35       3.391
Basin3Discharge             3.40       3.448
Basin3Discharge             3.45       3.504
Basin3Discharge             3.50       3.559
Basin3Discharge             3.55       3.614
Basin3Discharge             3.60       3.667
Basin3Discharge             3.65       4.092
Basin3Discharge             3.70       4.825
Basin3Discharge             3.75       5.757
Basin3Discharge             3.80       6.852
Basin3Discharge             3.85       8.085
Basin3Discharge             3.90       9.444
Basin3Discharge             3.95       10.916
Basin3Discharge             4.00       12.493
Basin3Discharge             4.05       14.168
Basin3Discharge             4.10       15.936
Basin3Discharge             4.15       17.792
Basin3Discharge             4.20       19.731
Basin3Discharge             4.25       21.751
Basin3Discharge             4.30       23.848
Basin3Discharge             4.35       26.018
Basin3Discharge             4.40       28.261
Basin3Discharge             4.45       30.573
Basin3Discharge             4.50       32.952
Basin3Discharge             4.55       35.396
Basin3Discharge             4.60       37.905
Basin3Discharge             4.65       40.475
Basin3Discharge             4.70       43.106
Basin3Discharge             4.75       45.796
Basin3Discharge             4.80       48.544
Basin3Discharge             4.85       51.348
Basin3Discharge             4.90       54.208
Basin3Discharge             4.95       57.123
Basin3Discharge             5.00       60.091
Basin3Discharge             5.05       63.111
Basin3Discharge             5.10       66.183
Basin3Discharge             5.15       69.306
Basin3Discharge             5.20       72.478
Basin3Discharge             5.25       75.700
Basin3Discharge             5.30       78.970
Basin3Discharge             5.35       82.287
Basin3Discharge             5.40       85.651
Basin3Discharge             5.45       89.062
Basin3Discharge             5.50       92.519
;
Basin1Storage    Storage    0.00       3345
Basin1Storage               0.05       3380
```

Basin1Storage	0.10	3414
Basin1Storage	0.15	3449
Basin1Storage	0.20	3483
Basin1Storage	0.25	3518
Basin1Storage	0.30	3552
Basin1Storage	0.35	3587
Basin1Storage	0.40	3621
Basin1Storage	0.45	3656
Basin1Storage	0.50	3690
Basin1Storage	0.55	3727
Basin1Storage	0.60	3765
Basin1Storage	0.65	3802
Basin1Storage	0.70	3839
Basin1Storage	0.75	3877
Basin1Storage	0.80	3914
Basin1Storage	0.85	3951
Basin1Storage	0.90	3989
Basin1Storage	0.95	4026
Basin1Storage	1.00	4064
Basin1Storage	1.05	4101
Basin1Storage	1.10	4138
Basin1Storage	1.15	4176
Basin1Storage	1.20	4213
Basin1Storage	1.25	4250
Basin1Storage	1.30	4288
Basin1Storage	1.35	4325
Basin1Storage	1.40	4362
Basin1Storage	1.45	4400
Basin1Storage	1.50	4437
Basin1Storage	1.55	4477
Basin1Storage	1.60	4517
Basin1Storage	1.65	4558
Basin1Storage	1.70	4598
Basin1Storage	1.75	4638
Basin1Storage	1.80	4678
Basin1Storage	1.85	4718
Basin1Storage	1.90	4759
Basin1Storage	1.95	4799
Basin1Storage	2.00	4839
Basin1Storage	2.05	4879
Basin1Storage	2.10	4919
Basin1Storage	2.15	4960
Basin1Storage	2.20	5000
Basin1Storage	2.25	5040
Basin1Storage	2.30	5080
Basin1Storage	2.35	5120
Basin1Storage	2.40	5161
Basin1Storage	2.45	5201
Basin1Storage	2.50	5241
Basin1Storage	2.55	5284
Basin1Storage	2.60	5327
Basin1Storage	2.65	5370

Basin1Storage	2.70	5413
Basin1Storage	2.75	5456
Basin1Storage	2.80	5499
Basin1Storage	2.85	5542
Basin1Storage	2.90	5585
Basin1Storage	2.95	5628
Basin1Storage	3.00	5671
Basin1Storage	3.05	5714
Basin1Storage	3.10	5757
Basin1Storage	3.15	5800
Basin1Storage	3.20	5843
Basin1Storage	3.25	5886
Basin1Storage	3.30	5929
Basin1Storage	3.35	5972
Basin1Storage	3.40	6015
Basin1Storage	3.45	6058
Basin1Storage	3.50	6101
Basin1Storage	3.55	6147
Basin1Storage	3.60	6193
Basin1Storage	3.65	6238
Basin1Storage	3.70	6284
Basin1Storage	3.75	6330
Basin1Storage	3.80	6376
Basin1Storage	3.85	6422
Basin1Storage	3.90	6467
Basin1Storage	3.95	6513
Basin1Storage	4.00	6559
Basin1Storage	4.05	6605
Basin1Storage	4.10	6651
Basin1Storage	4.15	6696
Basin1Storage	4.20	6742
Basin1Storage	4.25	6788
Basin1Storage	4.30	6834
Basin1Storage	4.35	6880
Basin1Storage	4.40	6925
Basin1Storage	4.45	6971
Basin1Storage	4.50	7017
Basin1Storage	4.55	7066
Basin1Storage	4.60	7114
Basin1Storage	4.65	7163
Basin1Storage	4.70	7212
Basin1Storage	4.75	7260
Basin1Storage	4.80	7309
Basin1Storage	4.85	7358
Basin1Storage	4.90	7407
Basin1Storage	4.95	7455
Basin1Storage	5.00	7504
Basin1Storage	5.05	7553
Basin1Storage	5.10	7601
Basin1Storage	5.15	7650
Basin1Storage	5.20	7699
Basin1Storage	5.25	7747

```
Basin1Storage               5.30       7796
Basin1Storage               5.35       7845
Basin1Storage               5.40       7894
Basin1Storage               5.45       7942
Basin1Storage               5.50       7991
;
Basin2Storage    Storage    0.00       9197
Basin2Storage               0.05       9267
Basin2Storage               0.10       9336
Basin2Storage               0.15       9406
Basin2Storage               0.20       9476
Basin2Storage               0.25       9546
Basin2Storage               0.30       9615
Basin2Storage               0.35       9685
Basin2Storage               0.40       9755
Basin2Storage               0.45       9824
Basin2Storage               0.50       9894
Basin2Storage               0.55       9967
Basin2Storage               0.60       10039
Basin2Storage               0.65       10112
Basin2Storage               0.70       10184
Basin2Storage               0.75       10257
Basin2Storage               0.80       10329
Basin2Storage               0.85       10402
Basin2Storage               0.90       10474
Basin2Storage               0.95       10547
Basin2Storage               1.00       10620
Basin2Storage               1.05       10692
Basin2Storage               1.10       10765
Basin2Storage               1.15       10837
Basin2Storage               1.20       10910
Basin2Storage               1.25       10982
Basin2Storage               1.30       11055
Basin2Storage               1.35       11127
Basin2Storage               1.40       11200
Basin2Storage               1.45       11272
Basin2Storage               1.50       11345
Basin2Storage               1.55       11420
Basin2Storage               1.60       11496
Basin2Storage               1.65       11571
Basin2Storage               1.70       11646
Basin2Storage               1.75       11722
Basin2Storage               1.80       11797
Basin2Storage               1.85       11872
Basin2Storage               1.90       11948
Basin2Storage               1.95       12023
Basin2Storage               2.00       12099
Basin2Storage               2.05       12174
Basin2Storage               2.10       12249
Basin2Storage               2.15       12325
Basin2Storage               2.20       12400
Basin2Storage               2.25       12475
```

Basin2Storage	2.30	12551
Basin2Storage	2.35	12626
Basin2Storage	2.40	12701
Basin2Storage	2.45	12777
Basin2Storage	2.50	12852
Basin2Storage	2.55	12930
Basin2Storage	2.60	13008
Basin2Storage	2.65	13087
Basin2Storage	2.70	13165
Basin2Storage	2.75	13243
Basin2Storage	2.80	13321
Basin2Storage	2.85	13399
Basin2Storage	2.90	13478
Basin2Storage	2.95	13556
Basin2Storage	3.00	13634
Basin2Storage	3.05	13712
Basin2Storage	3.10	13790
Basin2Storage	3.15	13869
Basin2Storage	3.20	13947
Basin2Storage	3.25	14025
Basin2Storage	3.30	14103
Basin2Storage	3.35	14181
Basin2Storage	3.40	14260
Basin2Storage	3.45	14338
Basin2Storage	3.50	14416
Basin2Storage	3.55	14497
Basin2Storage	3.60	14578
Basin2Storage	3.65	14659
Basin2Storage	3.70	14740
Basin2Storage	3.75	14821
Basin2Storage	3.80	14902
Basin2Storage	3.85	14983
Basin2Storage	3.90	15064
Basin2Storage	3.95	15145
Basin2Storage	4.00	15226
Basin2Storage	4.05	15307
Basin2Storage	4.10	15388
Basin2Storage	4.15	15469
Basin2Storage	4.20	15550
Basin2Storage	4.25	15631
Basin2Storage	4.30	15712
Basin2Storage	4.35	15793
Basin2Storage	4.40	15874
Basin2Storage	4.45	15955
Basin2Storage	4.50	16036
Basin2Storage	4.55	16120
Basin2Storage	4.60	16204
Basin2Storage	4.65	16288
Basin2Storage	4.70	16371
Basin2Storage	4.75	16455
Basin2Storage	4.80	16539
Basin2Storage	4.85	16623

```
Basin2Storage               4.90       16707
Basin2Storage               4.95       16791
Basin2Storage               5.00       16874
Basin2Storage               5.05       16958
Basin2Storage               5.10       17042
Basin2Storage               5.15       17126
Basin2Storage               5.20       17210
Basin2Storage               5.25       17294
Basin2Storage               5.30       17378
Basin2Storage               5.35       17461
Basin2Storage               5.40       17545
Basin2Storage               5.45       17629
Basin2Storage               5.50       17713
;
Basin3Storage    Storage    0.00       7621
Basin3Storage               0.05       7683
Basin3Storage               0.10       7745
Basin3Storage               0.15       7807
Basin3Storage               0.20       7869
Basin3Storage               0.25       7932
Basin3Storage               0.30       7994
Basin3Storage               0.35       8056
Basin3Storage               0.40       8118
Basin3Storage               0.45       8180
Basin3Storage               0.50       8242
Basin3Storage               0.55       8302
Basin3Storage               0.60       8363
Basin3Storage               0.65       8423
Basin3Storage               0.70       8484
Basin3Storage               0.75       8544
Basin3Storage               0.80       8605
Basin3Storage               0.85       8665
Basin3Storage               0.90       8726
Basin3Storage               0.95       8786
Basin3Storage               1.00       8847
Basin3Storage               1.05       8907
Basin3Storage               1.10       8967
Basin3Storage               1.15       9028
Basin3Storage               1.20       9088
Basin3Storage               1.25       9149
Basin3Storage               1.30       9209
Basin3Storage               1.35       9270
Basin3Storage               1.40       9330
Basin3Storage               1.45       9391
Basin3Storage               1.50       9451
Basin3Storage               1.55       9453
Basin3Storage               1.60       9456
Basin3Storage               1.65       9458
Basin3Storage               1.70       9461
Basin3Storage               1.75       9463
Basin3Storage               1.80       9466
Basin3Storage               1.85       9468
```

Basin3Storage	1.90	9471
Basin3Storage	1.95	9473
Basin3Storage	2.00	9476
Basin3Storage	2.05	9478
Basin3Storage	2.10	9480
Basin3Storage	2.15	9483
Basin3Storage	2.20	9485
Basin3Storage	2.25	9488
Basin3Storage	2.30	9490
Basin3Storage	2.35	9493
Basin3Storage	2.40	9495
Basin3Storage	2.45	9498
Basin3Storage	2.50	9500
Basin3Storage	2.55	9540
Basin3Storage	2.60	9580
Basin3Storage	2.65	9620
Basin3Storage	2.70	9660
Basin3Storage	2.75	9700
Basin3Storage	2.80	9740
Basin3Storage	2.85	9780
Basin3Storage	2.90	9820
Basin3Storage	2.95	9860
Basin3Storage	3.00	9900
Basin3Storage	3.05	9940
Basin3Storage	3.10	9980
Basin3Storage	3.15	10020
Basin3Storage	3.20	10060
Basin3Storage	3.25	10100
Basin3Storage	3.30	10140
Basin3Storage	3.35	10180
Basin3Storage	3.40	10220
Basin3Storage	3.45	10260
Basin3Storage	3.50	10300
Basin3Storage	3.55	10361
Basin3Storage	3.60	10422
Basin3Storage	3.65	10483
Basin3Storage	3.70	10544
Basin3Storage	3.75	10605
Basin3Storage	3.80	10666
Basin3Storage	3.85	10727
Basin3Storage	3.90	10788
Basin3Storage	3.95	10849
Basin3Storage	4.00	10910
Basin3Storage	4.05	10971
Basin3Storage	4.10	11032
Basin3Storage	4.15	11093
Basin3Storage	4.20	11154
Basin3Storage	4.25	11215
Basin3Storage	4.30	11276
Basin3Storage	4.35	11337
Basin3Storage	4.40	11398
Basin3Storage	4.45	11459

```
Basin3Storage               4.50       11520
Basin3Storage               4.55       11574
Basin3Storage               4.60       11628
Basin3Storage               4.65       11682
Basin3Storage               4.70       11736
Basin3Storage               4.75       11790
Basin3Storage               4.80       11844
Basin3Storage               4.85       11898
Basin3Storage               4.90       11952
Basin3Storage               4.95       12006
Basin3Storage               5.00       12060
Basin3Storage               5.05       12114
Basin3Storage               5.10       12168
Basin3Storage               5.15       12222
Basin3Storage               5.20       12276
Basin3Storage               5.25       12330
Basin3Storage               5.30       12384
Basin3Storage               5.35       12438
Basin3Storage               5.40       12492
Basin3Storage               5.45       12546
Basin3Storage               5.50       12600

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Basin1InflowHyd  3/20/2021  0:00       0
Basin1InflowHyd  3/20/2021  0:09       0.1
Basin1InflowHyd  3/20/2021  0:18       0.3
Basin1InflowHyd  3/20/2021  0:27       0.3
Basin1InflowHyd  3/20/2021  0:36       0.3
Basin1InflowHyd  3/20/2021  0:45       0.3
Basin1InflowHyd  3/20/2021  0:54       0.4
Basin1InflowHyd  3/20/2021  1:03       0.4
Basin1InflowHyd  3/20/2021  1:12       0.4
Basin1InflowHyd  3/20/2021  1:21       0.4
Basin1InflowHyd  3/20/2021  1:30       0.4
Basin1InflowHyd  3/20/2021  1:39       0.4
Basin1InflowHyd  3/20/2021  1:48       0.4
Basin1InflowHyd  3/20/2021  1:57       0.5
Basin1InflowHyd  3/20/2021  2:06       0.5
Basin1InflowHyd  3/20/2021  2:15       0.5
Basin1InflowHyd  3/20/2021  2:24       0.5
Basin1InflowHyd  3/20/2021  2:33       0.6
Basin1InflowHyd  3/20/2021  2:42       0.6
Basin1InflowHyd  3/20/2021  2:51       0.6
Basin1InflowHyd  3/20/2021  3:00       0.7
Basin1InflowHyd  3/20/2021  3:09       0.8
Basin1InflowHyd  3/20/2021  3:18       0.9
Basin1InflowHyd  3/20/2021  3:27       0.9
Basin1InflowHyd  3/20/2021  3:36       1.1
Basin1InflowHyd  3/20/2021  3:45       1.3
Basin1InflowHyd  3/20/2021  3:54       1.9
```

```
Basin1InflowHyd  3/20/2021  4:03       5.3
Basin1InflowHyd  3/20/2021  4:12       7.09
Basin1InflowHyd  3/20/2021  4:21       1.5
Basin1InflowHyd  3/20/2021  4:30       1
Basin1InflowHyd  3/20/2021  4:39       0.8
Basin1InflowHyd  3/20/2021  4:48       0.7
Basin1InflowHyd  3/20/2021  4:57       0.6
Basin1InflowHyd  3/20/2021  5:06       0.5
Basin1InflowHyd  3/20/2021  5:15       0.5
Basin1InflowHyd  3/20/2021  5:24       0.4
Basin1InflowHyd  3/20/2021  5:33       0.4
Basin1InflowHyd  3/20/2021  5:42       0.4
Basin1InflowHyd  3/20/2021  5:51       0.4
Basin1InflowHyd  3/20/2021  6:00       0.3
Basin1InflowHyd  3/20/2021  6:09       0
;
Basin2InflowHyd  3/20/2021  0:00       0
Basin2InflowHyd  3/20/2021  0:12       1
Basin2InflowHyd  3/20/2021  0:24       1
Basin2InflowHyd  3/20/2021  0:36       1.1
Basin2InflowHyd  3/20/2021  0:48       1.1
Basin2InflowHyd  3/20/2021  1:00       1.1
Basin2InflowHyd  3/20/2021  1:12       1.2
Basin2InflowHyd  3/20/2021  1:24       1.3
Basin2InflowHyd  3/20/2021  1:36       1.3
Basin2InflowHyd  3/20/2021  1:48       1.4
Basin2InflowHyd  3/20/2021  2:00       1.4
Basin2InflowHyd  3/20/2021  2:12       1.6
Basin2InflowHyd  3/20/2021  2:24       1.6
Basin2InflowHyd  3/20/2021  2:36       1.8
Basin2InflowHyd  3/20/2021  2:48       1.9
Basin2InflowHyd  3/20/2021  3:00       2.2
Basin2InflowHyd  3/20/2021  3:12       2.4
Basin2InflowHyd  3/20/2021  3:24       2.9
Basin2InflowHyd  3/20/2021  3:36       3.3
Basin2InflowHyd  3/20/2021  3:48       4.9
Basin2InflowHyd  3/20/2021  4:00       11.4
Basin2InflowHyd  3/20/2021  4:12       20.32
Basin2InflowHyd  3/20/2021  4:24       3.9
Basin2InflowHyd  3/20/2021  4:36       2.6
Basin2InflowHyd  3/20/2021  4:48       2.1
Basin2InflowHyd  3/20/2021  5:00       1.7
Basin2InflowHyd  3/20/2021  5:12       1.5
Basin2InflowHyd  3/20/2021  5:24       1.3
Basin2InflowHyd  3/20/2021  5:36       1.2
Basin2InflowHyd  3/20/2021  5:48       1.1
Basin2InflowHyd  3/20/2021  6:00       1
Basin2InflowHyd  3/20/2021  6:12       0
;
Basin3InflowHyd  3/20/2021  0:00       0
Basin3InflowHyd  3/20/2021  0:13       0
Basin3InflowHyd  3/20/2021  0:26       0.9
```

```
Basin3InflowHyd  3/20/2021  0:39       0.9
Basin3InflowHyd  3/20/2021  0:52       0.9
Basin3InflowHyd  3/20/2021  1:05       0.9
Basin3InflowHyd  3/20/2021  1:18       1
Basin3InflowHyd  3/20/2021  1:31       1
Basin3InflowHyd  3/20/2021  1:44       1.1
Basin3InflowHyd  3/20/2021  1:57       1.2
Basin3InflowHyd  3/20/2021  2:10       1.3
Basin3InflowHyd  3/20/2021  2:23       1.3
Basin3InflowHyd  3/20/2021  2:36       1.5
Basin3InflowHyd  3/20/2021  2:49       1.6
Basin3InflowHyd  3/20/2021  3:02       1.8
Basin3InflowHyd  3/20/2021  3:15       1.9
Basin3InflowHyd  3/20/2021  3:28       2.4
Basin3InflowHyd  3/20/2021  3:41       2.7
Basin3InflowHyd  3/20/2021  3:54       3.9
Basin3InflowHyd  3/20/2021  4:07       9
Basin3InflowHyd  3/20/2021  4:20       16.41
Basin3InflowHyd  3/20/2021  4:33       3.2
Basin3InflowHyd  3/20/2021  4:46       2.1
Basin3InflowHyd  3/20/2021  4:59       1.7
Basin3InflowHyd  3/20/2021  5:12       1.4
Basin3InflowHyd  3/20/2021  5:25       1.2
Basin3InflowHyd  3/20/2021  5:38       1.1
Basin3InflowHyd  3/20/2021  5:51       1
Basin3InflowHyd  3/20/2021  6:04       0.9
Basin3InflowHyd  3/20/2021  6:17       0
;
Basin4InflowHyd  3/20/2021  0:00       0
Basin4InflowHyd  3/20/2021  0:10       0.6
Basin4InflowHyd  3/20/2021  0:20       0.6
Basin4InflowHyd  3/20/2021  0:30       0.7
Basin4InflowHyd  3/20/2021  0:40       0.7
Basin4InflowHyd  3/20/2021  0:50       0.7
Basin4InflowHyd  3/20/2021  1:00       0.7
Basin4InflowHyd  3/20/2021  1:10       0.8
Basin4InflowHyd  3/20/2021  1:20       0.8
Basin4InflowHyd  3/20/2021  1:30       0.8
Basin4InflowHyd  3/20/2021  1:40       0.8
Basin4InflowHyd  3/20/2021  1:50       0.9
Basin4InflowHyd  3/20/2021  2:00       0.9
Basin4InflowHyd  3/20/2021  2:10       1
Basin4InflowHyd  3/20/2021  2:20       1
Basin4InflowHyd  3/20/2021  2:30       1.1
Basin4InflowHyd  3/20/2021  2:40       1.2
Basin4InflowHyd  3/20/2021  2:50       1.3
Basin4InflowHyd  3/20/2021  3:00       1.4
Basin4InflowHyd  3/20/2021  3:10       1.6
Basin4InflowHyd  3/20/2021  3:20       1.7
Basin4InflowHyd  3/20/2021  3:30       2.1
Basin4InflowHyd  3/20/2021  3:40       2.4
Basin4InflowHyd  3/20/2021  3:50       3.5
```

```
Basin4InflowHyd  3/20/2021  4:00       5.3
Basin4InflowHyd  3/20/2021  4:10       17.54
Basin4InflowHyd  3/20/2021  4:20       2.8
Basin4InflowHyd  3/20/2021  4:30       1.9
Basin4InflowHyd  3/20/2021  4:40       1.5
Basin4InflowHyd  3/20/2021  4:50       1.2
Basin4InflowHyd  3/20/2021  5:00       1.1
Basin4InflowHyd  3/20/2021  5:10       1
Basin4InflowHyd  3/20/2021  5:20       0.9
Basin4InflowHyd  3/20/2021  5:30       0.8
Basin4InflowHyd  3/20/2021  5:40       0.7
Basin4InflowHyd  3/20/2021  5:50       0.7
Basin4InflowHyd  3/20/2021  6:00       0.7
Basin4InflowHyd  3/20/2021  6:10       0
;
Basin5InflowHyd  3/20/2021  0:00       0
Basin5InflowHyd  3/20/2021  0:09       0
Basin5InflowHyd  3/20/2021  0:18       0.5
Basin5InflowHyd  3/20/2021  0:27       0.6
Basin5InflowHyd  3/20/2021  0:36       0.6
Basin5InflowHyd  3/20/2021  0:45       0.6
Basin5InflowHyd  3/20/2021  0:54       0.6
Basin5InflowHyd  3/20/2021  1:03       0.6
Basin5InflowHyd  3/20/2021  1:12       0.6
Basin5InflowHyd  3/20/2021  1:21       0.7
Basin5InflowHyd  3/20/2021  1:30       0.7
Basin5InflowHyd  3/20/2021  1:39       0.7
Basin5InflowHyd  3/20/2021  1:48       0.7
Basin5InflowHyd  3/20/2021  1:57       0.8
Basin5InflowHyd  3/20/2021  2:06       0.8
Basin5InflowHyd  3/20/2021  2:15       0.8
Basin5InflowHyd  3/20/2021  2:24       0.9
Basin5InflowHyd  3/20/2021  2:33       0.9
Basin5InflowHyd  3/20/2021  2:42       1
Basin5InflowHyd  3/20/2021  2:51       1.1
Basin5InflowHyd  3/20/2021  3:00       1.2
Basin5InflowHyd  3/20/2021  3:09       1.3
Basin5InflowHyd  3/20/2021  3:18       1.4
Basin5InflowHyd  3/20/2021  3:27       1.6
Basin5InflowHyd  3/20/2021  3:36       1.9
Basin5InflowHyd  3/20/2021  3:45       2.2
Basin5InflowHyd  3/20/2021  3:54       3.2
Basin5InflowHyd  3/20/2021  4:03       4.9
Basin5InflowHyd  3/20/2021  4:12       15.78
Basin5InflowHyd  3/20/2021  4:21       2.6
Basin5InflowHyd  3/20/2021  4:30       1.7
Basin5InflowHyd  3/20/2021  4:39       1.3
Basin5InflowHyd  3/20/2021  4:48       1.1
Basin5InflowHyd  3/20/2021  4:57       1
Basin5InflowHyd  3/20/2021  5:06       0.9
Basin5InflowHyd  3/20/2021  5:15       0.8
Basin5InflowHyd  3/20/2021  5:24       0.7
```

```
Basin5InflowHyd  3/20/2021  5:33       0.7
Basin5InflowHyd  3/20/2021  5:42       0.6
Basin5InflowHyd  3/20/2021  5:51       0.6
Basin5InflowHyd  3/20/2021  6:00       0.6
Basin5InflowHyd  3/20/2021  6:09       0
;
Basin6InflowHyd  3/20/2021  0:11       0
Basin6InflowHyd  3/20/2021  0:22       0.5
Basin6InflowHyd  3/20/2021  0:33       0.6
Basin6InflowHyd  3/20/2021  0:44       0.6
Basin6InflowHyd  3/20/2021  0:55       0.6
Basin6InflowHyd  3/20/2021  1:06       0.6
Basin6InflowHyd  3/20/2021  1:17       0.6
Basin6InflowHyd  3/20/2021  1:28       0.7
Basin6InflowHyd  3/20/2021  1:39       0.7
Basin6InflowHyd  3/20/2021  1:50       0.7
Basin6InflowHyd  3/20/2021  2:01       0.8
Basin6InflowHyd  3/20/2021  2:12       0.8
Basin6InflowHyd  3/20/2021  2:23       0.8
Basin6InflowHyd  3/20/2021  2:34       0.9
Basin6InflowHyd  3/20/2021  2:45       1
Basin6InflowHyd  3/20/2021  2:56       1.1
Basin6InflowHyd  3/20/2021  3:07       1.1
Basin6InflowHyd  3/20/2021  3:18       1.3
Basin6InflowHyd  3/20/2021  3:29       1.4
Basin6InflowHyd  3/20/2021  3:40       1.7
Basin6InflowHyd  3/20/2021  3:51       2
Basin6InflowHyd  3/20/2021  4:02       2.9
Basin6InflowHyd  3/20/2021  4:13       3.5
Basin6InflowHyd  3/20/2021  4:24       15
Basin6InflowHyd  3/20/2021  4:35       2.3
Basin6InflowHyd  3/20/2021  4:46       1.5
Basin6InflowHyd  3/20/2021  4:57       1.2
Basin6InflowHyd  3/20/2021  5:08       1
Basin6InflowHyd  3/20/2021  5:19       0.9
Basin6InflowHyd  3/20/2021  5:30       0.8
Basin6InflowHyd  3/20/2021  5:41       0.7
Basin6InflowHyd  3/20/2021  5:52       0.7
Basin6InflowHyd  3/20/2021  6:03       0.6
Basin6InflowHyd  3/20/2021  6:14       0.6
Basin6InflowHyd  3/20/2021  6:25       0

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
```

```
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Node10-Outflow   -702.726           5698.467
Node20-Outfall   1337.308           5689.949
Node30-outfall   3449.744           5766.610
Basin1           -719.761           7580.920
Basin2           1337.308           7649.063
Basin3           3441.227           7734.242

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.014)

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 03/20/2021 00:00:00
Ending Date 03/20/2021 10:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 30.00 sec

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	2.956	0.963
External Outflow	2.086	0.680
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.868	0.283
Continuity Error (%)	0.053	

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	29.00 sec
Average Time Step	:	30.00 sec
Maximum Time Step	:	30.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	1.00
Percent Not Converging	:	0.00

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days	hr:min	Reported Max Depth Feet
Node10-Outflow	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
Node20-Outfall	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
Node30-outfall	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
Basin1	STORAGE	1.78	3.16	3.16	0	04:40	3.16
Basin2	STORAGE	1.88	3.57	3.57	0	04:28	3.57
Basin3	STORAGE	1.72	3.67	3.67	0	04:32	3.66

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Node10-Outflow	OUTFALL	0.00	0.80	0	04:40	0	0.0891	0.000
Node20-Outfall	OUTFALL	0.00	3.53	0	04:28	0	0.317	0.000
Node30-outfall	OUTFALL	0.00	4.45	0	04:32	0	0.274	0.000
Basin1	STORAGE	7.09	7.09	0	04:12	0.143	0.143	0.034
Basin2	STORAGE	20.32	20.32	0	04:12	0.445	0.445	0.047
Basin3	STORAGE	16.41	16.41	0	04:20	0.375	0.375	0.066

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Basin1	7.492	25	0	0	14.304	47	0 04:40	0.80
Basin2	20.586	28	0	0	42.089	57	0 04:28	3.53
Basin3	15.126	27	0	0	34.015	62	0 04:32	4.45

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
Node10-Outflow	97.83	0.34	0.80	0.089
Node20-Outfall	99.00	1.19	3.53	0.317
Node30-outfall	96.42	1.05	4.45	0.274
System	97.75	2.58	4.45	0.680

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
Detention/HMPOrifices1	DUMMY	0.80	0 04:40			
Detention/HMPOrifices2	DUMMY	3.53	0 04:28			
Detention/HMPOrifices3	DUMMY	4.45	0 04:32			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Oct 23 13:44:40 2023
Analysis ended on: Mon Oct 23 13:44:40 2023
Total elapsed time: < 1 sec

EMERGENCY SPILLWAY CALCULATION

PROJECT NAME	Emerald Hills
WORK ORDER	1375-0238

BF-2-1 Node 10

100-YEAR PEAK FLOW TO BASIN	---------->	***7.09***	**cfs**
BOTTOM OF BASIN ELEVATION	---------->	**360.5**	**feet**
TOP OF BASIN ELEVATION	---------->	***366.5***	**feet**

.

FOR BROAD-CRESTED EMERGENCY SPILLWAY WEIRS:

If the SPILLWAY OPENING =	---------->	***10***	**feet**
Then the Crest Elevation Must Be =		***366.08***	**feet**
If the CREST ELEVATION =	---------->	***364.20***	**feet**
Then the Spillway Opening Must Be =		***0.77***	**feet**

USE 10' wide spillway (Type G Catch Basin) set at elevation 364.2'.

EMERGENCY SPILLWAY CALCULATION

PROJECT NAME	Emerald Hills
WORK ORDER	1375-0238

BF-2-2 Node 20

100-YEAR PEAK FLOW TO BASIN	---------->	***20.32***	**cfs**
BOTTOM OF BASIN ELEVATION	---------->	**318**	**feet**
TOP OF BASIN ELEVATION	---------->	***324.0***	**feet**

FOR BROAD-CRESTED EMERGENCY SPILLWAY WEIRS:

If the SPILLWAY OPENING =	---------->	***10***	**feet**
Then the Crest Elevation Must Be =		***323.16***	**feet**
If the CREST ELEVATION =	---------->	***322.50***	**feet**
Then the Spillway Opening Must Be =		***4.17***	**feet**

USE 10' wide spillway set at elevation 322.5'.

EMERGENCY SPILLWAY CALCULATION

PROJECT NAME	Emerald Hills
WORK ORDER	1375-0238

BF-2-3 Node 30

100-YEAR PEAK FLOW TO BASIN	---------->	***16.41***	**cfs**
BOTTOM OF BASIN ELEVATION	---------->	***338***	**feet**
TOP OF BASIN ELEVATION	---------->	***344.0***	**feet**

.

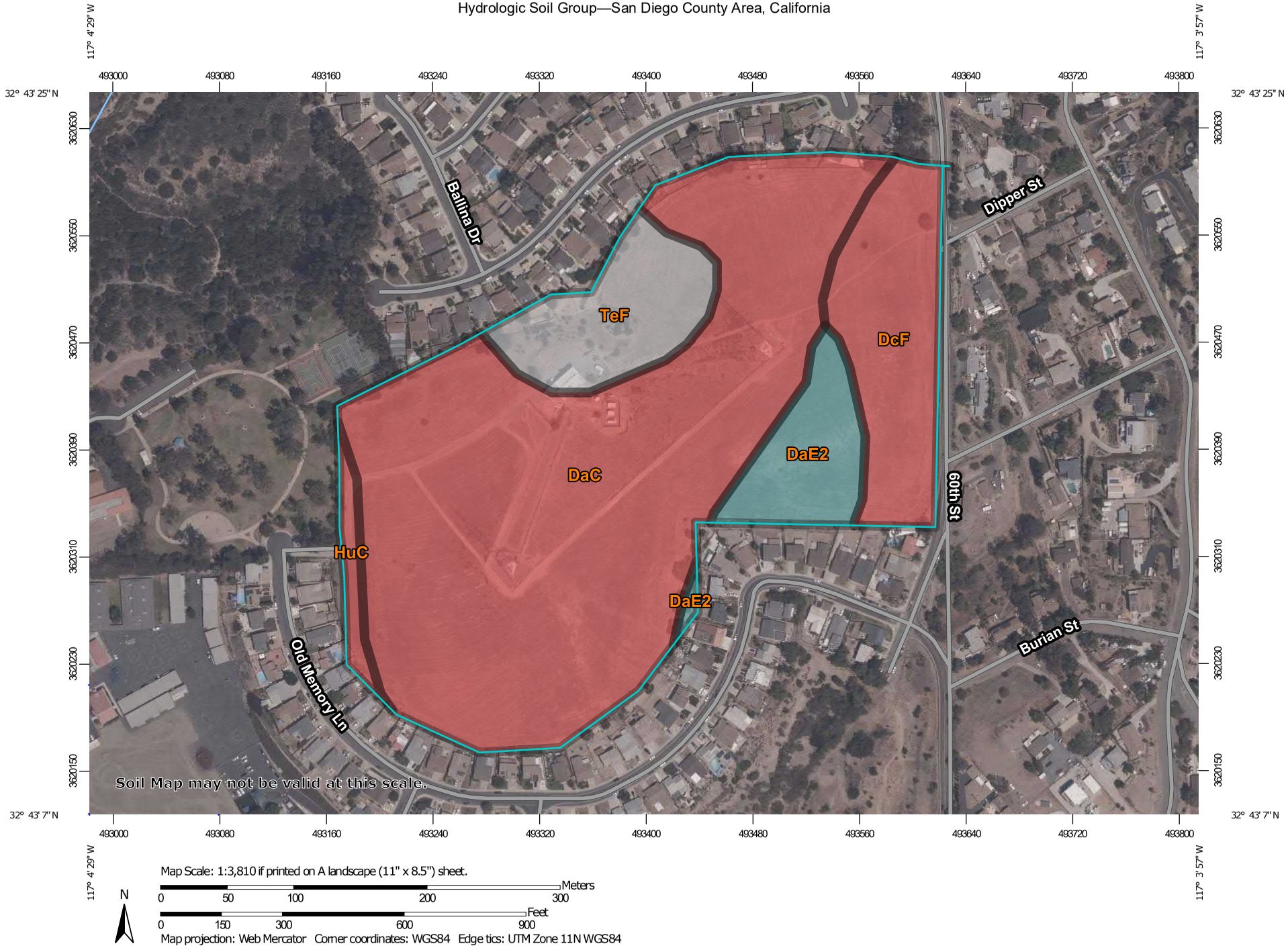
FOR BROAD-CRESTED EMERGENCY SPILLWAY WEIRS:

If the SPILLWAY OPENING =	---------->	***10***	**feet**
Then the Crest Elevation Must Be =		***343.27***	**feet**
If the CREST ELEVATION =	---------->	***342.20***	**feet**
Then the Spillway Opening Must Be =		***2.56***	**feet**

USE 10' wide spillway (Type G Catch Basin) set at elevation 342.2'.

Appendix 3 - Soils Information

Hydrologic Soil Group—San Diego County Area, California



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

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

Date(s) aerial images were photographed: Aug 22, 2018—Aug 31, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaC	Diablo clay, 2 to 9 percent slopes	D	22.1	67.5%
DaE2	Diablo clay, 15 to 30 percent slopes, eroded, warm MAAT	C	2.4	7.4%
DcF	Diablo-Urban land complex, 15 to 50 percent slopes	D	4.4	13.5%
HuC	Huerhuero-Urban land complex, 2 to 9 percent slopes	D	0.6	1.9%
TeF	Terrace escarpments		3.2	9.7%
Totals for Area of Interest			**32.7**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix 4 - FEMA FIRemtte and FIRM Panel

National Flood Hazard Layer FIRMette

FEMA

117°4'35"W 32°43'31"N

117°3'57"W 32°43'1"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/24/2023 at 3:07 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). This information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2009.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the *Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

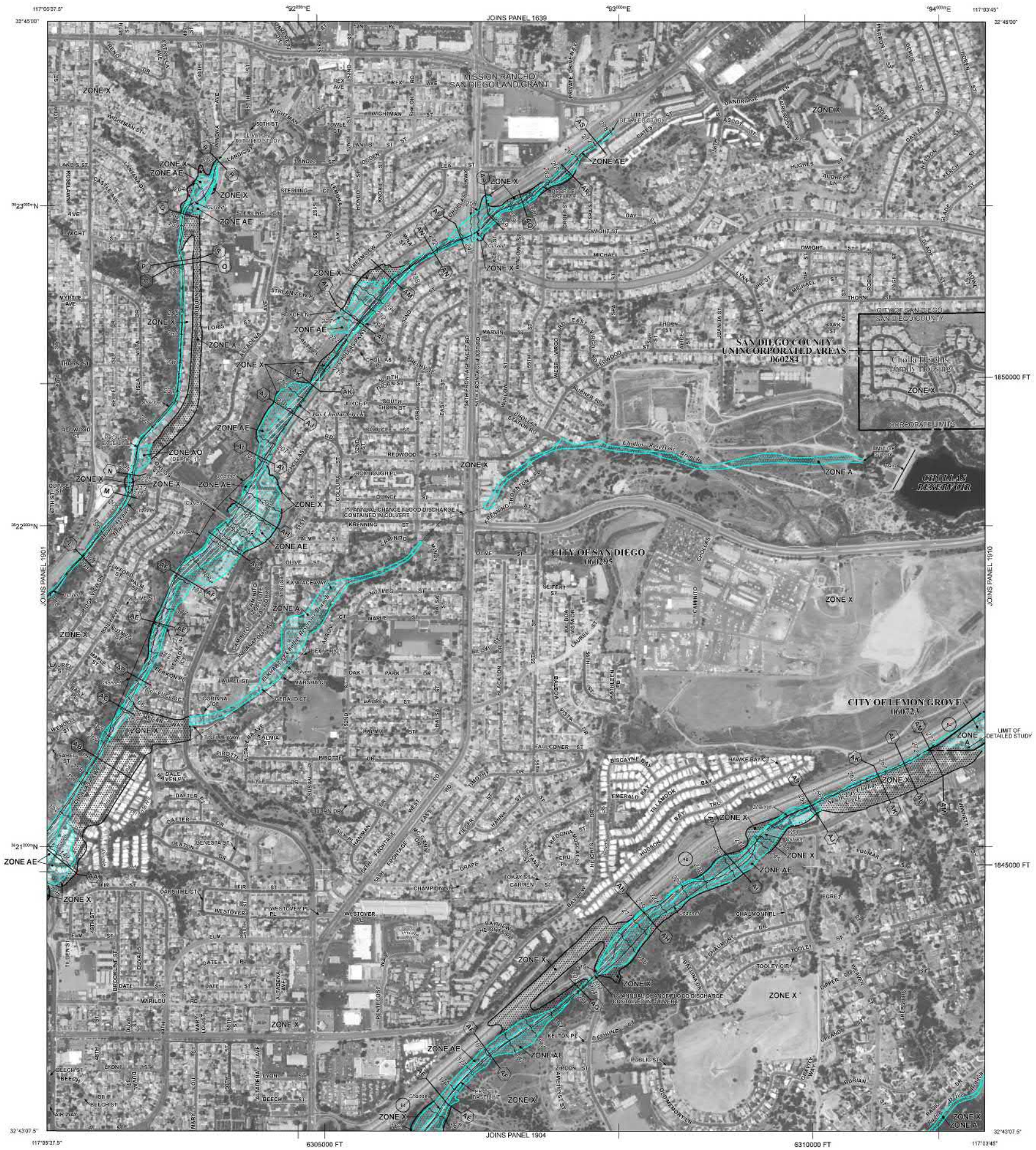
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-877-FEMA MAP (1-877-336-2627) for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **"profile base lines"** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 (EL 987) — Base Flood Elevation line and value; elevation in feet* / Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988
- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 FT — 5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 16, 2012 – to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to update map elevations to North American Vertical Datum of 1988.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 100 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1902G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1902 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEMON GROVE, CITY OF	060723	1902	G
SAN DIEGO COUNTY	060284	1902	G
SAN DIEGO, CITY OF	060295	1902	G

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

MAP NUMBER
06073C1902G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency