DRAINAGE STUDY
for
PACIFICA ELEMENTARY SCHOOL

City of Oceanside, California

Prepared for:

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1. Introduction

1.1. Scope of Work

The purpose of this study is to provide hydrology calculations in support of a proposed residential townhome development in the City of Oceanside, California. This report will quantify runoff for the 100-year frequency storm event and recommend storm drain infrastructure needed to convey stormwater through the site safely. Treatment of stormwater runoff from the site has been addressed in a separate report entitled "Stormwater Quality Management Plan for Pacifica Elementary School" prepared by Hunsaker & Associates, San Diego.

1.2. Existing Condition

The Pacifica Elementary School property is a 14.55-acre site located in the City of Oceanside, CA, west of Roja Drive and Macario Drive intersection. The site is an old school development with no buildings, and it is partially occupied with a parking lot, driveways, and large concrete pad while the western portion consists of vacant land. Refer to the project vicinity map located in appendix 1.

The property is accessible from Macario Drive by an existing paved driveway and from Roja Drive by Malaga drive, an existing paved road within the adjacent property southeast of the project. Residential developments bound the property to the north, south, west and east. An existing drainage channel that runs in a north-south direction borders the western portion of the site.

The studied drainage area is approximately 17.9 ac with 28% total imperviousness, including 3.35-ac offsite area. 0.65 acres of the offsite area is located southeast of the property, and drains through the project, to commingle with the onsite flows. The comingled runoff surface flows westerly towards the existing natural channel, where it combines with the runoff from the western offsite area. Then, the total flow drains southerly in the channel to the analyzed discharge point (at Node 108).

Onsite runoff from the northeastern portion of the site drains in a southwest direction to be captured via existing grate inlets and routed to the existing 24" stormdrain (at Node 104). The existing 24" stormdrain runs across the site southwesterly carrying the flow from node 104 with the bypassed offsite flows (coming from Macario Drive) to discharge into the existing channel (at Node 106). Runoff from the rest of the site is conveyed via surface flow in a southwest direction to discharge into the said channel and reach the analyzed discharge point (Node 108).

See **Appendix 4** for calculations of existing peak runoff from the site.

According to the FEMA Flood Insurance Rate Map (FIRM) for this site, the project is located in an unshaded Zone X, which is defined as "Areas determined to be outside the 500-year floodplain". Refer to the FIRMette Map in **Appendix 1**.

Per NRCS Soil report, the site consists of 33% Hydrologic Soil Group “B” and 67% of Hydrologic Soil Group “D”. Refer to **Appendix 2** for NRCS soils information.

The runoff coefficient for each subarea was calculated based on soil type and impervious percentage using the formula from San Diego County Hydrology Manual Section 3.1.2

C= 0.90 x (% Impervious) + Cp x (1 - % Impervious)

Cp = Pervious Coefficient Runoff value for the soil type (per San Diego County Hydrology Manual Table 3.1)
Cp Soil B = 0.25, Cp Soil D= 0.35
Cp-Subarea = (Soil type B% * 0.25) + (Soil Type D%* 0.35)

Please refer to existing conditions AES Input Data spreadsheet in appendix 4 for each subarea runoff factor.

Table 1 below summarizes the 100-year existing condition peak flow at the downstream project boundary.

TABLE 1 - Summary of Existing Flows

Exhibit	Node Number on Exhibit	Discharge Location	Drainage Area (ac)	C Area-Average Runoff Coefficient	Tc (min)	Q100-Year Peak Flow (cfs)
1	108	Southwest of the site	17.92	0.479	29.95	19.57

1.3. Proposed Condition

The proposed project is a 164-unit townhome development consisting of multi-family structures, driveways, access roads, sidewalks, landscaped areas, and an open space dedicated for biofiltration/detention basin facility (BF-1-1). The infrastructure will consist of streets and associated utilities including dual storm drain system (pipes, inlets, catch basins, brow ditches and cleanouts). One of the dual systems is necessary to collect and convey the onsite 100-year runoff through the project area to the proposed biofiltration basin. The second system (bypass storm drain system) is to replace the existing 24” storm drain that runs through the site and conveys the offsite flows and part of the onsite flows to the existing western channel. The existing 24” storm drain will be removed.

Onsite runoff will be conveyed via street curb and gutter system, to be captured by proposed inlets and routed via proposed storm drain system to the previously mentioned biofiltration basin BF-1-1 (Node 1). The biofiltration basin will treat onsite and

commingled offsite runoff, attenuate peak flows and aid in addressing flow control hydromodification requirements.

Runoff from 0.80 ac of Pvt Drive “A”, Building 1, half of Building 2, and half of Building 3 will drain towards Macario Drive, where it will be captured by the proposed inlet west of the intersection of Pvt Drive “A” and Macario Drive. The captured flow will be routed southwesterly via 24” proposed bypass storm drain system to ultimately discharge into the existing channel west of the site, similarly to existing conditions. A proprietary biofiltration BMP (Filterra unit or equivalent) is proposed to address the water quality requirements for the said area. For additional discussion on the proposed water quality features of the site, refer to the Stormwater Quality Management Plan for Pacifica Site (March 2023) prepared by Hunsaker & Associates San Diego, Inc.

Runoff from the northern and most of the southern undisturbed slopes will be routed via proposed brow ditches to enter proposed bypassed storm drain system via catch basins. The proposed bypass storm drain system will convey the said flows with the offsite flows (coming from Macario Drive) to the respected discharge point southwest of the site, where it comingles with the onsite treated flows (at Node 2) and continues southerly to the analyzed discharge point (at Node 3). See **Appendix 4** for calculations of proposed condition run-off.

The total studied drainage area is 17.92 ac with 40% imperviousness. The runoff coefficient for each subarea was calculated based on soil type and impervious percentage using the formula from San Diego County Hydrology Manual Section 3.1.2

C= 0.90 x (% Impervious) + Cp x (1 - % Impervious)

Cp = Pervious Coefficient Runoff value for the soil type (per San Diego County Hydrology Manual Table 3.1)
Cp Soil B = 0.25, Cp Soil D= 0.35
Cp-Subarea = (Soil type B% * 0.25) + (Soil Type D%* 0.35)

Please refer to proposed conditions AES Input Data spreadsheet in appendix 4 for each subarea runoff factor.

Table 2 below summarizes the unmitigated 100-year proposed condition peak flow at the downstream project boundary.

TABLE 2 - Summary of Proposed Unmitigated Flows

Exhibit	Node Number on Exhibit	Discharge Location	Drainage Area (ac)	C Area-Average Runoff Coefficient	Tc (min)	Q100-Year Peak Flow (cfs)
2	3	Southwest of the site	17.92	0.5528	10.95	42.97

Due to the increased flow associated with the development of *Pacifica Site project*, peak flow attenuation will be achieved by the proposed biofiltration\detention basin BF-1-1. The riser within the basin has been sized and designed to include orifices along its height. Sizes and heights of orifices were determined to achieve outlet flow less than the pre-development flow shown on Table 1 above. Please refer to Chapter 2.2 for methodology and Appendix 5 for detention Analysis. The resultant discharge at Node 1 will continue westerly to comingle with the bypassed flow at Node 2 and flow southerly within the channel to Node 3, and ultimately discharges into San Luis Rey Rive San Luis Rey River, Lower (west of Interstate 15).

Since this project is subject to comply with hydromodification requirements, the design of the basin has been coordinated with those calculations, which are part of the *SWQMP for Pacifica Site.*

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Table-3 below summarizes the Q100 Mitigated flow at Node 1.

TABLE 3 - Summary of Mitigated Developed Flows

Exhibit	Node Number on Exhibit	Discharge Location	Drainage Area (ac)	C Area-Average Runoff Coefficient	Tc (min)	Q100-Year Peak Flow (cfs)
2	3	Southwest of the site	17.92	0.5528	10.87	18.92

2. Methodology

2.1 Hydrology

2-1 Modified Rational Method Hydrologic Analysis

Computer Software Package – AES-2015

Design Storm - 100- year return interval

Land Use – Medium-High Density Residential

Soil Type – Per the NRCS Web Soil Survey, the site soil consists of Hydrologic soil group B and D.

Runoff Coefficient - In accordance with the County of San Diego standards, runoff coefficient for each subarea was calculated based on soil type and impervious percentage using the formula from San Diego County Hydrology Manual Section 3.1.2
C= 0.90 x (% Impervious) + Cp x (1 - % Impervious)

Cp = Pervious Coefficient Runoff value for the soil type (per San Diego County Hydrology Manual Table 3.1)
Cp Soil B = 0.25, Cp Soil D= 0.35
Cp-Subarea = (Soil type B% * 0.25) + (Soil Type D%* 0.35)

Rainfall Intensity- The rainfall intensity is determined per the San Diego County Hydrology Manual based on 6-hour precipitation amounts and calculated time of concentrations. Six-hour precipitations are taken from the San Diego County Hydrology Manual isopluvials. P6=2.73 inch

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 miles, the Rational Method relates storm rainfall intensity, a runoff coefficient, and drainage area to peak runoff rate. This relationship is expressed by the equation:

Q = CIA, where:

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

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

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

A = The drainage basin area in acres.

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

The procedure for the subarea summation model is as follows:

(1) Subdivide the watershed into subareas with the initial subarea being less than 10 acres in size (generally one lot will do), and subsequent subareas gradually increasing in size. Assign upstream and downstream nodal numbers to each subarea to correlate calculations to the watershed map.

(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 = CIA.

(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-2003 computer subarea menu is as follows:

SUBAREA HYDROLOGIC PROCESS

1. Confluence analysis at node.
2. Initial subarea analysis (including time of concentration calculation).
3. Pipe flow travel time (computer estimated).
4. Pipe flow 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.

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

Underground storm drains are analyzed in a similar way. Flow data obtained from the surface model for inlets and collection points are input into the nodes representing those structures. Design grades and lengths are used to compute the capacity of the storm drains and to model the downstream travel times.

2-2 Detention Analysis

In order to provide adequate flood control, increases in peak flow rates at the outfall location for this site were mitigated using the proposed biofiltration basin.

The hydrology calculations discussed above provide peak flowrates for the vaults' inflow, which are entered into a separate program called RickRatHydro. The RickratHydro was used to produce an inflow hydrograph for the project drainage area to the biofiltration basin, based on the area, time of concentration, P6 value, runoff coefficient, and peak flow rate.

Mitigation within the biofiltration basin was modeled using SWMM 5.1. The Hydrograph that was generated from RickRatHydro was used as an input data for the inflows to the storage unit in the SWMM model. The riser was modeled using stage discharge table (Rating Curve in SWMM), and the volume was modeled using the storage stage table (Storage Curve), which represents the storage provided within the biofiltration basin depth above excluding the water quality ponding depth.

The results from the SWMM model were used as input data (code 7) in the AES proposed condition model at the discharge location from the proposed biofiltration basin (Node 1), to generate the AES model for proposed mitigated flows.

3. Results

Conveyance of Q100 runoff flows through the proposed site required dual storm drain system. One of the dual systems is 18" storm drain system proposed to route flows (onsite and comingled offsite) to the biofiltration basin to address water quality, hydromodification and peak flow attenuation; while the second system is 24" bypassed storm drain to replace the existing 24" storm drain that runs through the site and conveys the offsite flows and part of the onsite flows to the existing western channel.

Storm drain system and hydraulic calculations will be conducted as part of the final engineering drainage study.

One biofiltration/ detention basin was included in the design of the site to address hydromodification, peak flow attenuation, and water quality requirements. A proprietary biofiltration BMP is proposed at Macario Drive to address water quality requirements for the small northern portion of Pvt Drive "A" that drains away from the biofiltration basin. Per the hydrologic and detention analysis conducted as part of this study, the detention analysis for the basin is included in Appendix 5 of this report. The table below summarizes the flow reductions at the discharge location.

The flow from the site is attenuated to make sure that the post-developed flows will not exceed the capacity of the existing downstream drainage facilities (post development flows compared to the pre-development flows at the point of compliance southwest corner of the project (POC-1/ Node 3). See table 4 below

TABLE 4 – Pre-development Condition vs. Post-development Condition

Dis. Location	Pre-Area (ac)	Post-Area (ac)	Pre-: 100-Year Peak Flow (cfs)	Post-: 100-Year Unmit. Peak Flow (cfs)	Post-: 100-Year Mit. Peak Flow (cfs)	TC Pre (min)	TC Post Unmit (min)	TC Post Mit (min)	Vel. Pre (ft/s)	Vel. Post Unmit (ft/s)	Vel. Post Mit. (ft/s)	Q100 Flow Difference (cfs)
southwest corner	17.92	17.92	19.57	42.97	18.92	29.95	10.95	10.87	1.31	2.60	1.99	-0.65

-Dis. Location: Discharge Location
-Vel. (ft/s): Velocity (feet/second)
-Pre : Pre Developed Conditions
-Post. Unmit.: Post Developed Unmitigated Conditions
-Post. Mit.: Post Developed Mitigated Conditions

4. Conclusions

The proposed development of Pacifica Site can be roughly graded and improved with storm drain to accommodate the ultimate expected flows from development. In addition, with the proposed drainage facilities such as curb inlets, storm drain, water quality, flow control and detention basin, runoff can be mitigated to accepted San Diego County and City of Oceanside standards.

The proposed project will not substantially alter the existing drainage pattern of the site. There will be a decrease in the peak discharge from the site. Therefore, the proposed project will not impact downstream properties, drainage facilities or Libby Lake, the nearest receiving water.

References

San Diego County Hydrology Manual, County of San Diego Department of Public Works Flood Control Division, June 2003.

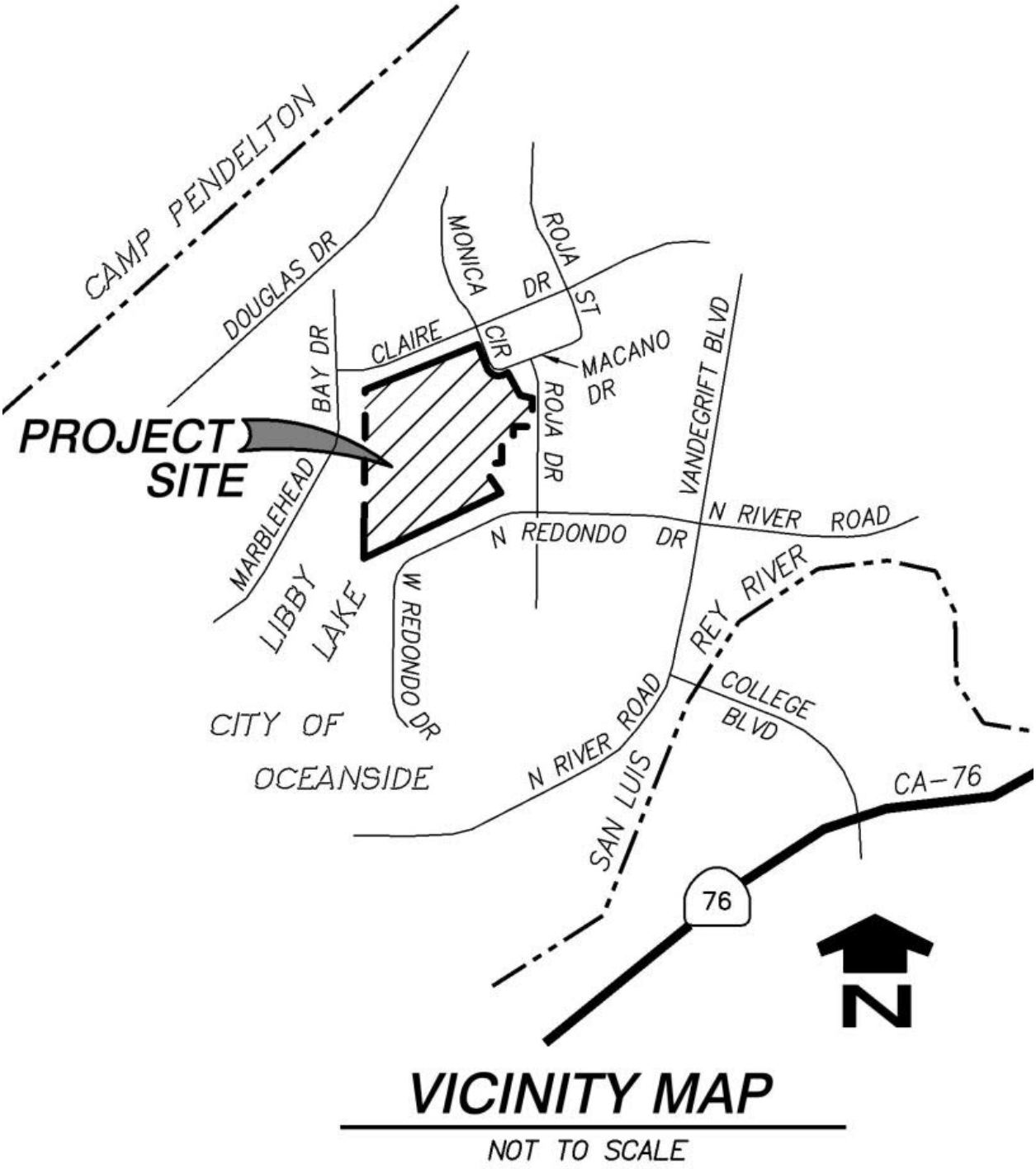
San Diego County Hydraulic Design Manual, County of San Diego Department of Public Works Flood Control Division, September 2014

San Diego County Drainage Design Manual, County of San Diego Department of Public Works Flood Control Division, July 2005

Stormwater Quality Management Plan for Pacifica Site, Hunsaker & Associates San Diego, Inc., March 2023.

Appendix 1 – Vicinity Map and FIRM Map

Vicinity Map



National Flood Hazard Layer FIRMette

FEMA

117°18'28"W 33°15'41"N

117°17'51"W 33°15'11"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

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 / 17.5 Cross Sections with 1% Annual Chance 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 6/12/2022 at 4:59 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.

Appendix 2 - Soils Information

Map Scale: 1:2,140 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

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 16, Sep 13, 2021

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

Date(s) aerial images were photographed: Jan 24, 2020—Feb 12, 2020

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
GoA	Grangeville fine sandy loam, 0 to 2 percent slopes	B	4.5	30.1%
LeC	Las Flores loamy fine sand, 2 to 9 percent slopes	D	0.7	5.0%
LeC2	Las Flores loamy fine sand, 5 to 9 percent slopes, eroded	D	0.9	5.8%
LeE2	Las Flores loamy fine sand, 15 to 30 percent slopes, eroded	D	8.9	59.2%
Totals for Area of Interest			**15.1**	**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 3 – Runoff Coefficient Determination

- The storm frequency of peak discharges is the same as that of I for the given T_c.

- 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 Section 4.1.2.4).

- The peak rate of runoff is the only information produced by using the RM.

3.1.2 Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The concepts related to the runoff coefficient were evaluated in a report entitled *Evaluation, Rational Method "C" Values* (Hill, 2002) that was reviewed by the Hydrology Manual Committee. The Report is available at San Diego County Department of Public Works, Flood Control Section and on the San Diego County Department of Public Works web page.

The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map provided in Appendix A. 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 3-1, as adjustments to these values may be appropriate based on site-specific characteristics. In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$$

Where: C_p = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map provided in Appendix A.

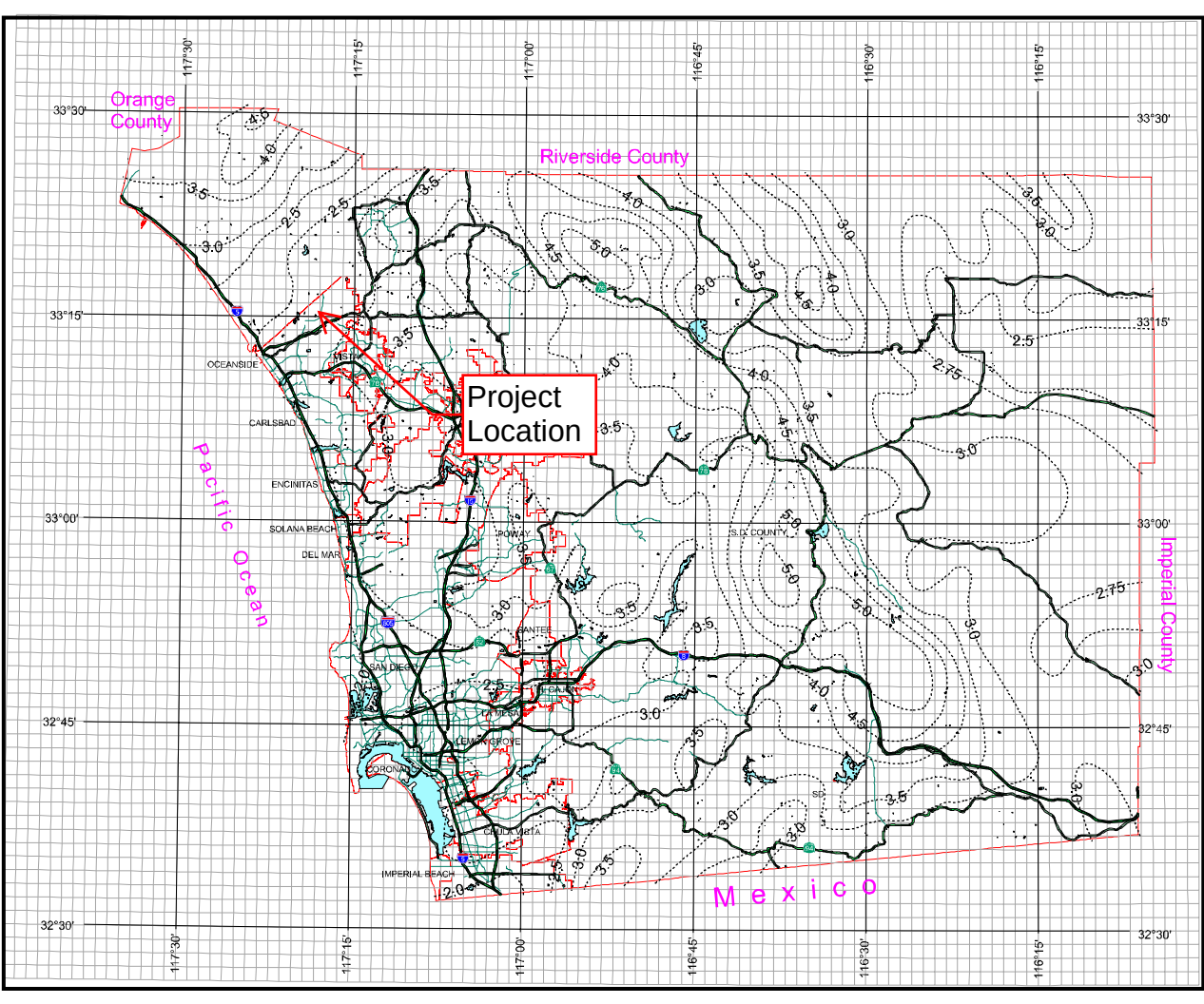
The values in Table 3-1 are typical for most urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the local agency.

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Appendix 4 –**Design Rainfall Determination**



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

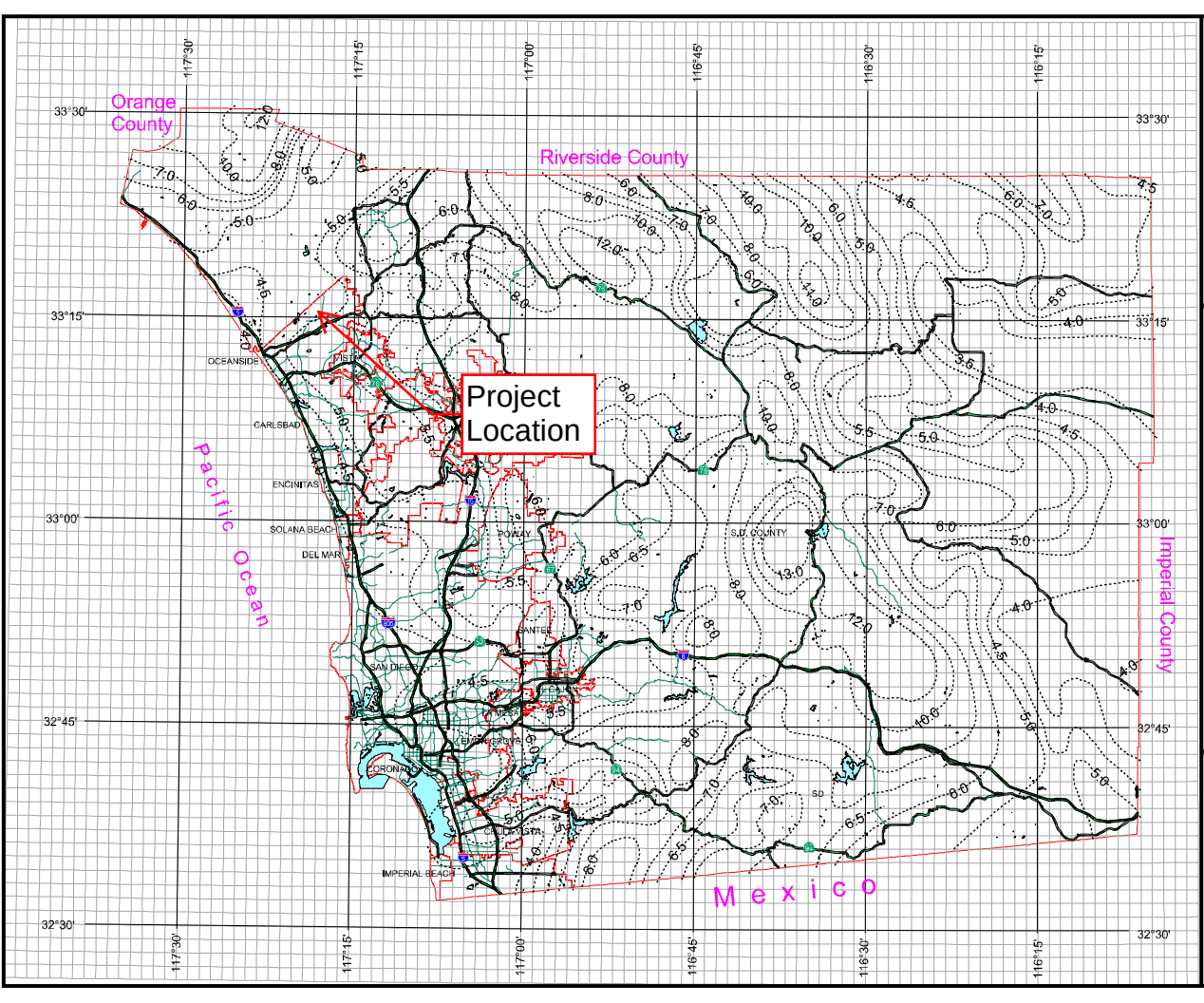
P-6 = 2.73 in.

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)

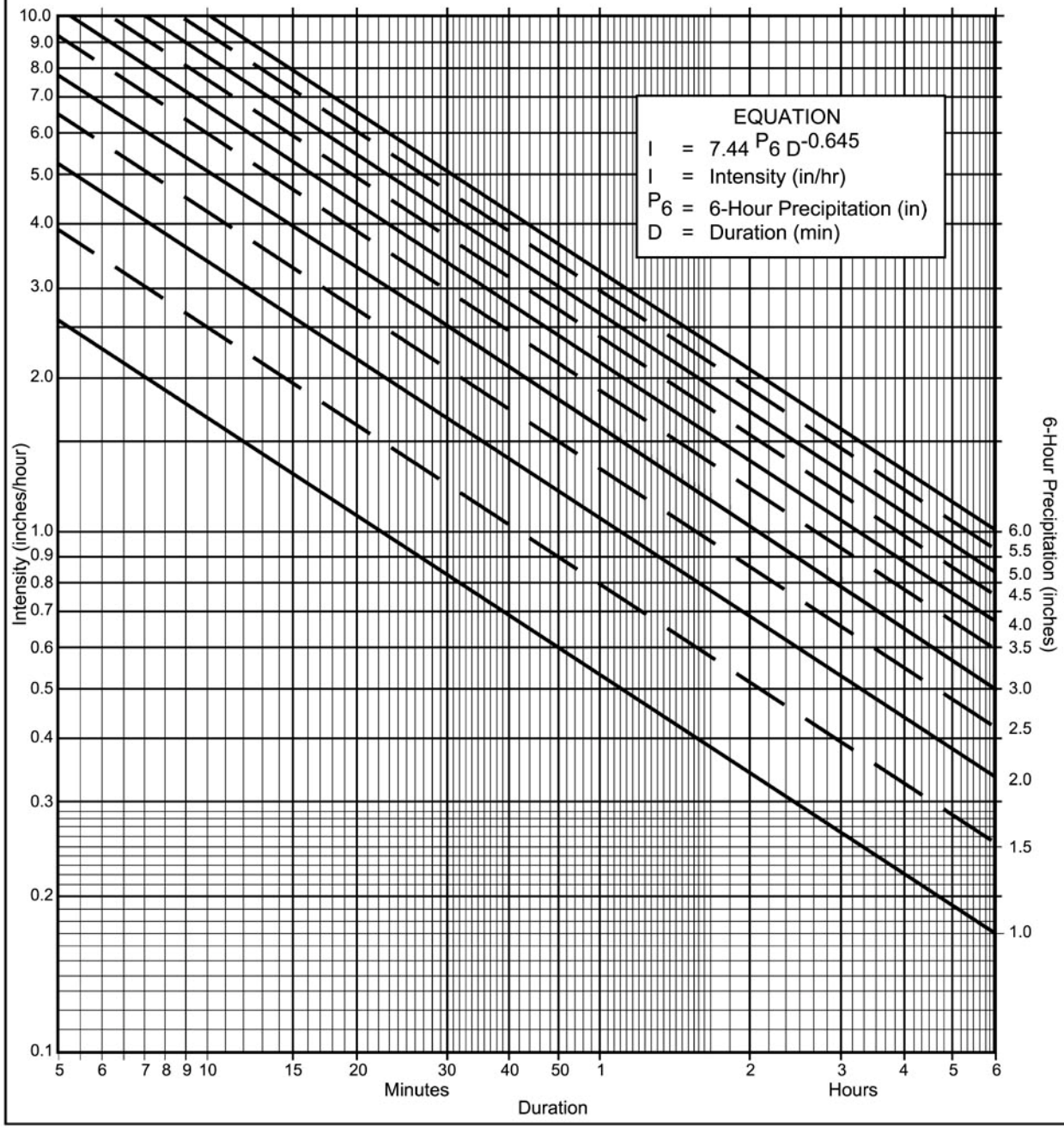
P-6 = 4.92 in.

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 = 2.73 in., P_{24} = 4.92, $\frac{P_6}{P_{24}} = \frac{2.73}{4.92}$ = %(2) 55%

(c) Adjusted P_6(2) = 2.73 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

Appendix 5 –Hydrology Calculations and Exhibits

EXISTING CONDITION

Existing Condition																		
AES INPUT DATA																		
Node #			Elevation		Length (ft)		Area (Ac)			imperviousness	Soil Type B Area (ac)	Soil Type D Area (ac)	C value	If Channel			If memory
From	To	code	Up	Down		slope	total	Pervious	impervious					Base (ft)	Z:1	maning	Bank #
100	102	2	115	103.5	100	11.50%	0.10	0.10	0.00	0.00%	0.00	0.10	0.35				
102	103	5	103.5	101	126.7	1.97%	0.51	0.17	0.34	66.78%	0.00	0.51	0.72	119	30:1	0.03	
103	104	3	90.80	88.48	387.3	0.60%											
105	104	8					1.60	0.49	1.11	69.33%	0.92	0.68	0.71				
104	106	3	88.39	72.63	542.84	2.90%											
106	108	5	72.6	67.9	377	1.25%	2.22	2.22	0	0.00%	1.43	0.79	0.29	25	29:1	0.03	
108	108	10															1
110	112	2	134	105	100	29.00%	0.18	0.18	0.00	0.00%	0.00	0.18	0.35				
112	108	5	105	67.9	1528.7	2.43%	13.31	9.76	3.55	26.69%	3.58	9.73	0.48	153	45:1	0.03	
112	108	11															1
108	108	12															1
Total							17.92	12.92	5.00	28%	5.93	11.99	0.479				

Example
0.9 X (3.55/13.31)+0.35 X (9.73/13.31)X (9.76/13.31)+0.25 X (3.58/13.31)X (9.76/13.31)= 0.48
(0.9X Imp%) +(0.35 X Soil D%X Per%)+ (0.25 X Soil B % X Per %)

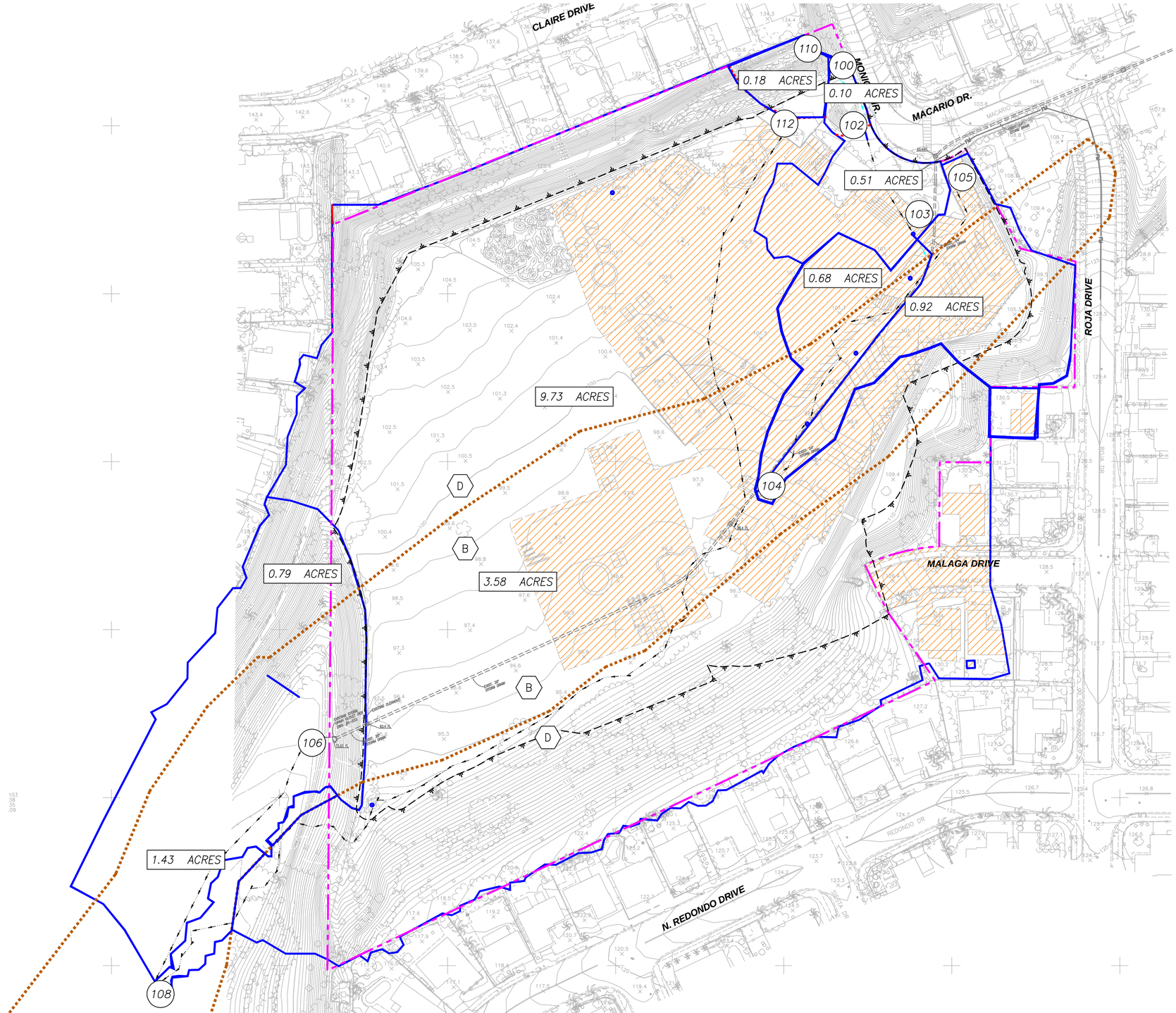
LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- XX.XX ACRES — AREA
- X — HYDROLOGIC SOIL TYPE
- XXX — NODE NUMBER
- SOIL BOUNDARY
- EXISTING IMPERVIOUS AREA
- LIMITS OF AREA TO BE DISTURBED

H&A

60 0 60 120 180

SCALE 1"= 60'



PREPARED BY:

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PLANNING 9707 Waples Street
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SURVEYING PH(858)558-4500 · FX(858)558-1414

EXISITNG HYDROLOGY PACIFIC SITE

CITY OF OCEANSIDE, CALIFORNIA

MAP 1 OF 1

W.O.# 3087-0010

R:\1714\Hyd\DR\CAD\1714$EX-TM-HYDROLOGY.dwg[]Jun-13-2022:10:56

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

            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:

                     Hunsaker & Associates San Diego, Inc.
                               9707 Waples Street
                              San Diego,  CA 92121


----------------------------------------------------------------------------
  FILE NAME: R:\1714\HYD\DR\CALCS\AES\EX\EX100.DAT
  TIME/DATE OF STUDY: 14:01 06/10/2022
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.730
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   14.0      9.0    0.020/0.018/0.020   0.33    2.00 0.0313 0.125 0.0160
  2   14.0      9.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  3   12.0      6.0    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 =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    115.00
  DOWNSTREAM ELEVATION(FEET) =    103.50
  ELEVATION DIFFERENCE(FEET) =     11.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    103.50  DOWNSTREAM(FEET) =    101.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0250
  CHANNEL BASE(FEET) =  119.00   "Z" FACTOR =  30.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.732
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.50
  AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   3.30
  Tc(MIN.) =    9.57
  SUBAREA AREA(ACRES) =     0.51       SUBAREA RUNOFF(CFS) =    1.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.659
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    90.80  DOWNSTREAM(FEET) =    88.48
  FLOW LENGTH(FEET) =   387.30   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.) =   3.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =   11.36
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     587.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.237
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6960
  SUBAREA AREA(ACRES) =    1.60   SUBAREA RUNOFF(CFS) =    4.81
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       6.52
  TC(MIN.) =   11.36

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    88.39  DOWNSTREAM(FEET) =    72.63
  FLOW LENGTH(FEET) =   542.84   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.) =   8.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.52
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   12.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1130.14 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     72.60  DOWNSTREAM(FEET) =     67.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   337.00   CHANNEL SLOPE =  0.0139
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =  29.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.406
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   3.57
  Tc(MIN.) =   15.94
  SUBAREA AREA(ACRES) =     2.22       SUBAREA RUNOFF(CFS) =    2.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.493
  TOTAL AREA(ACRES) =        4.4         PEAK FLOW RATE(CFS) =       7.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    1467.14 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    134.00
  DOWNSTREAM ELEVATION(FEET) =    105.00
  ELEVATION DIFFERENCE(FEET) =     29.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =     67.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1528.70   CHANNEL SLOPE =  0.0243
  CHANNEL BASE(FEET) =  153.00   "Z" FACTOR =  45.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.267
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.08
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =  23.68
  Tc(MIN.) =   29.95
  SUBAREA AREA(ACRES) =    13.31       SUBAREA RUNOFF(CFS) =   14.48
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.478
  TOTAL AREA(ACRES) =       13.5         PEAK FLOW RATE(CFS) =      14.63
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    1628.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 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       14.63    29.95       2.267       13.49
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    1628.70 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.43    15.94       3.406        4.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    1467.14 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      15.22      15.94        3.406
      2      19.57      29.95        2.267

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.57   Tc(MIN.) =   29.95
  TOTAL AREA(ACRES) =       17.9

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       17.9  TC(MIN.) =     29.95
  PEAK FLOW RATE(CFS)   =      19.57
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

PROPOSED CONDITION

Proposed Condition																	
AES INPUT DATA																	
Node #			Elevation				Area				Soil Type B Area	Soil Type		If Channel			If memory
From	To	code	Up	Down	Length	slope	total	pervious	impervious	imperviousness	(ac)	D Area	C value	Base (ft)	Z:1	maning	Bank #
400	402	2	134	105	165.0	17.58%	0.16	0.16	0.00	0.00%	0.000	0.16	0.35				
402	404	5	105	104	58.0	1.72%								2	2:01	0.015	
402	404	8					0.33	0.33	0.00	0.00%	0.000	0.33	0.35				
404	700	3	93.5	91.9	160.0	1.00%											
700	700	10															1
300	302	2	105.6	104.9	70.0	1.00%	0.10	0.00	0.10	100.00%	0.100	0.00	0.90				
302	304	6	104.9	102	220.3	1.32%	0.45	0.00	0.45	100.00%	0.150	0.30	0.90				
304	304	1															1 of 2
306	308	2	127	106	90.9	23.11%	0.10	0.10	0.00	0.00%	0.050	0.05	0.30				
308	310	5	106	104	156.7	1.28%								2	2:01	0.015	
308	310	8					0.27	0.2	0.07	25.93%	0.000	0.33	0.55				
310	304	3	93.4	93.1	27.5	1.09%											
304	304	1															2 of 2
304	700	3	93.1	91.9	212.98	0.56%											
700	700	10															1
700	700	11															1
700	700	12															1
700	701	3	91.9	87.2	497.6	0.94%											
701	701	10															1
406	408	2	140.5	114.5	100.0	26.00%	0.10	0.10	0.00	0.00%	0.000	0.10	0.35				
408	410	5	114.5	106	239.8	3.54%								2	2:01	0.015	
408	410	8					0.49	0.49	0.00	0.00%	0.000	0.49	0.35				
410	416	3	101	99.7	129.6	1.00%											
412	416	8					0.08	0.08	0.00	0.00%	0.000	0.08	0.35				
416	701	3	99.7	87.2	54.1	23.09%											
700	701	11															1
700	701	12															1
701	428	3	87.2	85.7	140.34	1.07%											
428	428	1															1 of 2
414	424	2	135	99.4	68.55	51.93%	0.10	0.10	0.00	0.00%	0.000	0.10	0.35				
424	428	5	99.4	96.7	177.06	1.52%								2	2:01	0.015	
424	428	8					0.29	0.29	0.00	0.00%	0.000	0.29	0.35				
428	428	1															2 of 2
428	2	3	85.5	83.3	226.5	0.97%											
2	2	10															1
430	432	2	130.5	121	100.0	9.50%	0.10	0.10	0.00	0.00%	0.000	0.10	0.35				
432	434	5	128.7	94	619.9	5.60%								2	2:01	0.015	
432	434	8					1.81	1.81	0.00	0.00%	0.000	1.81	0.35				
434	2	3	94	83.3	124.0	8.63%											
2	2	11															1
2	2	12															
2	2	10															1
Routed to Basin																	
130	132	2	128	105	84.2	27.32%	0.10	0.10	0.00	0.00%	0.000	0.10	0.35				
132	134	5	107	105	96.0	2.08%								2	2:01	0.015	
132	134	8					0.53	0.53	0.00	0.00%	0.250	0.28	0.30				

Proposed Condition																		
AES INPUT DATA																		
Node #			Elevation				Area				Soil Type B Area	Soil Type		If Channel			If memory
From	To	code	Up	Down	Length	slope	total	pervious	impervious	imperviousness	(ac)	D Area	C value	Base (ft)	Z:1	maning	Bank #
134	104	3	97.5	96.9	41.9	1.43%											
104	104	1															1 of 2
100	102	2	104.3	102.86	74.3	1.94%	0.10	0.00	0.10	100.00%	0.100	0.00	0.90				
102	104	6	102.86	100.99	95.4	1.96%	0.21	0.00	0.21	100.00%	0.210	0.00	0.90				
104	104	1															2 of 2
104	703	3	96.6	96.4	12.8	1.56%											
703	703	1															1 of 2
114	116	2	103.7	102.95	65.0	1.15%	0.10	0.02	0.08	78.00%	0.100	0.00	0.76				
116	118	6	102.95	101.17	95.4	1.87%	0.22	0.05	0.17	78.00%	0.220	0.00	0.76				
118	703	3	96.6	96.4	24.0	0.83%											
703	703	1															2 of 2
703	706	3	96.4	94.8	150.7	1.06%											
706	706	1															1:3'
138	140	2	130	109.5	100.0	20.50%	0.10	0.10	0.00	0.00%	0.000	0.10	0.35				
140	142	5	109.5	96	71.7	18.84%								2	2:01	0.015	
140	142	8					0.11	0.11	0.00	0.00%	0.000	0.11	0.35				
142	108	3	96	95	7.3	13.70%											
107	108	8					0.08	0.02	0.06	78.00%	0.060	0.02	0.77				
108	706	3	95	94.8	13.1	1.53%											
706	706	1															2:3'
200	202	2	105.65	104.8	65.0	1.31%	0.10	0.02	0.08	78.00%	0.000	0.10	0.78				
202	204	6	104.8	102.7	237.0	0.89%	0.49	0.11	0.38	78.00%	0.000	0.49	0.78				
204	706	3	97.1	94.8	308.5	0.75%											
706	706	1															3:3'
706	708	3	94.8	94.2	51.75	1.16%											
144	708	8					0.10	0.10	0.00	0.00%	0.000	0.10	0.35				
708	712	3	94.2	93.5	70.3	1.00%											
712	712	1															1:2
162	164	2	103.6	102.95	65.0	1.00%	0.10	0.02	0.08	78.00%	0.000	0.10	0.78				
164	166	6	102.95	98.6	435.0	1.00%	0.94	0.21	0.73	78.00%	0.700	0.23	0.76				
166	712	3	93.6	93.5	13.2	0.76%											
166	712	1															2:2
712	718	3	93.5	92.2	45.3	2.87%											
718	718	10															2
168	170	2	130.2	129	75.0	1.60%	0.10	0.04	0.06	59.00%	0.000	0.10	0.67				
170	174	6	129	98.8	405.7	7.44%	0.29	0.10	0.19	65.00%	0.000	0.29	0.71				
174	718	3	93.9	92.2	55.0	3.09%											
718	718	11															2
718	718	12															2
718	180	3	92.2	91.9	48.0	0.62%											
180	180	1															2:1
176	178	2	131.2	129	75.0	2.93%	0.10	0.04	0.06	59.00%	0.000	0.10	0.67				
178	180	6	129	97.5	452.0	6.97%	0.68	0.22	0.46	68.00%	0.240	0.44	0.71				
180	180	1															2:2
180	722	3	91.9	91	159.0	0.57%											
722	722	10															2

Proposed Condition																		
AES INPUT DATA																		
Node #			Elevation				Area				Soil Type B Area	Soil Type		If Channel			If memory
From	To	code	Up	Down	Length	slope	total	pervious	impervious	imperviousness	(ac)	D Area	C value	Base (ft)	Z:1	maning	Bank #
206	208	2	103.8	103.2	65.0	0.92%	0.10	0.02	0.08	78.00%	0.000	0.10	0.78				
208	210	6	103.2	97.8	566.5	0.95%	1.84	0.40	1.44	78.00%	0.010	1.83	0.78				
210	720	3	92.7	92.5	14.8	1.35%											
720	720	1															1:2
212	214	2	100.7	99.9	75.0	1.07%	0.10	0.02	0.08	78.00%	0.000	0.10	0.78				
214	216	6	99.9	97.8	186.9	1.12%	0.21	0.05	0.16	78.00%	0.070	0.14	0.77				
216	720	3	92.7	92.5	13.5	1.48%											
720	720	1															2:2
720	722	3	92.5	91	115.0	1.30%											
722	722	11															2
722	722	12															2
722	724	3	91	90.4	82.0	0.73%											
724	724	1															1:2
218	220	2	102.55	101.9	65.0	1.00%	0.10	0.02	0.08	78.00%	0.000	0.10	0.78				
220	724	6	101.9	95.4	650.0	1.00%	1.80	0.40	1.40	78.00%	1.322	0.48	0.76				
724	724	1															2:2
723	724	8					0.65	0.14	0.51	78.00%		0.65	0.78				
724	1	3	90.4	89	53.2	2.63%											
436	1	8					1.13	1.13	0.00	0.00%		1.13	0.35				
Discharge from Basin																	
1	2	3	83	82.3	35.4	1.98%											
2	2	11															1
2	2	12															1
2	3	5	72.6	67.9	377	1.25%	2.25	2.25	0	0.00%	1.43	0.79	0.28	25	2:01	0.035	
4	3	8					0.88	0.88	0	0.00%	0.17	0.71	0.33				
Total							17.9	10.86	7.03	39%			0.552				

Example
0.9 X (1.4/1.8)+0.35 X (0.48/1.8)X (0.4/1.80)+0.25 X (1.322/1.8)X (0.4/1.8)= 0.76
(0.9X Imp%) +(0.35 X Soil D%X Per%)+ (0.25 X Soil B % X Per %)

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- XX.XX ACRES — AREA
- X — HYDROLOGIC SOIL TYPE
- XXX — NODE NUMBER
- SOIL BOUNDARY
- LIMITS OF AREA TO BE DISTURBED

60 0 60 120 180
SCALE 1" = 60'

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

PROPOSED
HYDROLOGY MAP

PACIFICA SITE

CITY OF OCEANSIDE, CALIFORNIA

MAP 1 OF 1

W.O.# 5087-0010

R:\1714\Hyd\DR\CAD\1714PR-HYDROLOGY.dwg[]Mar-23-2023:13:25

Unmitigated

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

           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:




--------------------------------------------------------------------------
  FILE NAME: R:\1714\HYD\DR\CALCS\AES\PR\PR100.DAT
  TIME/DATE OF STUDY: 13:28 03/22/2023
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.730
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   14.0      9.0    0.020/0.018/0.020   0.33    2.00 0.0313 0.125 0.0160
  2   14.0      9.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  3   12.0      6.0    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 =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    402.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  UPSTREAM ELEVATION(FEET) =    134.00
  DOWNSTREAM ELEVATION(FEET) =    105.00
  ELEVATION DIFFERENCE(FEET) =     29.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  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) =  6.218
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

**************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    404.00 IS CODE =  51
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    104.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    58.00   CHANNEL SLOPE =  0.0172
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.35
  FLOW VELOCITY(FEET/SEC.) =   2.21   FLOW DEPTH(FEET) =   0.07
  TRAVEL TIME(MIN.) =   0.44   Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =     223.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    404.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.953
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.02
  TC(MIN.) =    6.70

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    700.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.50  DOWNSTREAM(FEET) =    91.90
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.02
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    7.44
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    700.00 =     383.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 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):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    105.60
  DOWNSTREAM ELEVATION(FEET) =    104.90
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.012
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.65
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  104.90  DOWNSTREAM ELEVATION(FEET) =  102.00
  STREET LENGTH(FEET) =   151.94   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    4.05
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    2.91
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     221.94 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.05
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.56

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    308.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.90
  UPSTREAM ELEVATION(FEET) =    127.00
  DOWNSTREAM ELEVATION(FEET) =    106.00
  ELEVATION DIFFERENCE(FEET) =     21.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.373
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.151
```

```
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    106.00  DOWNSTREAM(FEET) =    104.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   156.70   CHANNEL SLOPE =  0.0128
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.18
  FLOW VELOCITY(FEET/SEC.) =   1.55   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =     247.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.288
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4824
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.79
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.94
  TC(MIN.) =    8.06

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.40  DOWNSTREAM(FEET) =    93.10
  FLOW LENGTH(FEET) =    27.50   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.) =   3.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    304.00 =     275.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 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.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   5.24
  TOTAL STREAM AREA(ACRES) =     0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.56     4.05        7.193          0.55
      2        0.94     8.18        5.236          0.37

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

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.03     4.05       7.193
      2        3.54     8.18       5.236

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.03   Tc(MIN.) =    4.05
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    304.00 =     275.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    700.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.40  DOWNSTREAM(FEET) =    90.30
  FLOW LENGTH(FEET) =   311.20   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.03
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    5.03
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    700.00 =     586.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
  ***MEMORY BANK #  1 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 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        4.03     5.03       7.168        0.92
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    700.00 =     586.30 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.02     7.44       5.568        0.49
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    700.00 =     383.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.72       5.03       7.168
      2       4.15       7.44       5.568

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.72   Tc(MIN.) =    5.03
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   101.40  DOWNSTREAM(FEET) =    86.20
  FLOW LENGTH(FEET) =   419.00   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.) =   8.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.72
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    701.00 =    1005.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    701.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    408.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    140.50
  DOWNSTREAM ELEVATION(FEET) =    114.50
  ELEVATION DIFFERENCE(FEET) =     26.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    114.50  DOWNSTREAM(FEET) =    106.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   239.80   CHANNEL SLOPE =  0.0334
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC.) =   2.13   FLOW DEPTH(FEET) =   0.05
  TRAVEL TIME(MIN.) =   1.87   Tc(MIN.) =    8.14
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    410.00 =     339.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.253
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    0.90
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.08
  TC(MIN.) =    8.14
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.70
  FLOW LENGTH(FEET) =   596.60   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   4.63    Tc(MIN.) =   12.77
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    416.00 =     936.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.928
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.08
  TC(MIN.) =   12.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    701.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    98.70  DOWNSTREAM(FEET) =    86.20
  FLOW LENGTH(FEET) =   524.40   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   1.74    Tc(MIN.) =   14.51
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    701.00 =    1460.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 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        1.08    14.51       3.618        0.67
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    701.00 =    1460.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.72     5.81       6.528        1.41
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    701.00 =    1005.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
```

```
      1       5.15       5.81        6.528
      2       3.70      14.51        3.618

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.15   Tc(MIN.) =    5.81
  TOTAL AREA(ACRES) =        2.1

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    86.20  DOWNSTREAM(FEET) =    84.20
  FLOW LENGTH(FEET) =   202.40   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.15
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    6.41
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    428.00 =    1663.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    428.00 TO NODE    428.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.41
  RAINFALL INTENSITY(INCH/HR) =   6.13
  TOTAL STREAM AREA(ACRES) =     2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.15

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    424.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.55
  UPSTREAM ELEVATION(FEET) =    135.00
  DOWNSTREAM ELEVATION(FEET) =     99.40
  ELEVATION DIFFERENCE(FEET) =     35.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.188
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.023
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    428.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     99.40  DOWNSTREAM(FEET) =     96.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   177.06   CHANNEL SLOPE =  0.0152
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.25
  FLOW VELOCITY(FEET/SEC.) =   1.81   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    414.00 TO NODE    428.00 =     245.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    428.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.887
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.60
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.80
  TC(MIN.) =    6.82

****************************************************************************
  FLOW PROCESS FROM NODE    428.00 TO NODE    428.00 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.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   5.89
  TOTAL STREAM AREA(ACRES) =     0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.15     6.41        6.130          2.08
      2        0.80     6.82        5.887          0.39

  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        5.91     6.41       6.130
      2        5.75     6.82       5.887

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.91   Tc(MIN.) =    6.41
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    428.00 =    1663.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    428.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    84.20  DOWNSTREAM(FEET) =    82.30
  FLOW LENGTH(FEET) =   226.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    7.09
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      2.00 =    1889.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  10
```

```
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    432.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    130.50
  DOWNSTREAM ELEVATION(FEET) =    121.00
  ELEVATION DIFFERENCE(FEET) =      9.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.375
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

******************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    434.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    128.70  DOWNSTREAM(FEET) =     94.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   663.10   CHANNEL SLOPE =  0.0523
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC.) =   2.52   FLOW DEPTH(FEET) =   0.04
  TRAVEL TIME(MIN.) =   4.38   Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    434.00 =     763.10 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    434.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.388
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.81   SUBAREA RUNOFF(CFS) =    2.78
  TOTAL AREA(ACRES) =       1.9   TOTAL RUNOFF(CFS) =       2.93
  TC(MIN.) =   10.76

******************************************************************************
  FLOW PROCESS FROM NODE    434.00 TO NODE      2.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    94.00  DOWNSTREAM(FEET) =    82.30
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.93
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE      2.00 =     887.10 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  11
------------------------------------------------------------------------------
```

```
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.93    10.95       4.339        1.91
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE      2.00 =     887.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.91     7.09       5.740        2.47
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      2.00 =    1889.70 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       7.81       7.09        5.740
      2       7.40      10.95        4.339

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.81   Tc(MIN.) =    7.09
  TOTAL AREA(ACRES) =        4.4

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

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

+--------------------------------------------------------------------------+
| Starting hydrology analysis for area drains towards the biofiltration    |
| \detention basin                                                         |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    84.20
  UPSTREAM ELEVATION(FEET) =    128.00
  DOWNSTREAM ELEVATION(FEET) =    105.00
  ELEVATION DIFFERENCE(FEET) =     23.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.750
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.573
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    105.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    96.00   CHANNEL SLOPE =  0.0208
```

```
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.23
  FLOW VELOCITY(FEET/SEC.) =   1.94   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    6.58
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    134.00 =     180.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.027
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3079
  SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    0.96
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.17
  TC(MIN.) =    6.58

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    97.50  DOWNSTREAM(FEET) =    96.90
  FLOW LENGTH(FEET) =    41.90   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.74
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    104.00 =     222.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.74
  RAINFALL INTENSITY(INCH/HR) =   5.93
  TOTAL STREAM AREA(ACRES) =     0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.30
  UPSTREAM ELEVATION(FEET) =    104.30
  DOWNSTREAM ELEVATION(FEET) =    102.86
  ELEVATION DIFFERENCE(FEET) =      1.44
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.489
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  62
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  102.86  DOWNSTREAM ELEVATION(FEET) =  100.99
  STREET LENGTH(FEET) =    95.40   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
  STREET FLOW TRAVEL TIME(MIN.) =   0.74   Tc(MIN.) =    3.23
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    1.36
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.67
  FLOW VELOCITY(FEET/SEC.) =  2.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     169.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.23
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.17     6.74        5.933          0.63
      2        2.01     3.23        7.193          0.31

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.57     3.23       7.193
      2        2.82     6.74       5.933

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.82   Tc(MIN.) =    6.74
  TOTAL AREA(ACRES) =        0.9
```

```
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    104.00 =     222.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    703.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    96.60  DOWNSTREAM(FEET) =    96.40
 FLOW LENGTH(FEET) =    12.80   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.82
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.78
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    703.00 =     234.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    703.00 TO NODE    703.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.78
 RAINFALL INTENSITY(INCH/HR) =   5.91
 TOTAL STREAM AREA(ACRES) =     0.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.82

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    103.70
 DOWNSTREAM ELEVATION(FEET) =    102.95
 ELEVATION DIFFERENCE(FEET) =      0.75
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.704
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  102.95  DOWNSTREAM ELEVATION(FEET) =  101.17
 STREET LENGTH(FEET) =    95.40   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 14.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    5.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.777
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    1.13
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.11
  FLOW VELOCITY(FEET/SEC.) =  2.18   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     160.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    703.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.60  DOWNSTREAM(FEET) =    96.40
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    703.00 =     184.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    703.00 TO NODE    703.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.59
  RAINFALL INTENSITY(INCH/HR) =   6.70
  TOTAL STREAM AREA(ACRES) =     0.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.65

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.82     6.78        5.912          0.94
      2        1.65     5.59        6.697          0.32

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.14     5.59       6.697
      2        4.28     6.78       5.912

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.28   Tc(MIN.) =    6.78
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    703.00 =     234.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    703.00 TO NODE    706.00 IS CODE =  31
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.40  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =   150.70   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.28
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    7.23
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    706.00 =     385.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =    7.23
  RAINFALL INTENSITY(INCH/HR) =   5.67
  TOTAL STREAM AREA(ACRES) =     1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.28

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    130.00
  DOWNSTREAM ELEVATION(FEET) =    109.50
  ELEVATION DIFFERENCE(FEET) =     20.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    109.50  DOWNSTREAM(FEET) =     96.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    71.70   CHANNEL SLOPE =  0.1883
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC.) =   3.83   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    6.58
  LONGEST FLOWPATH FROM NODE    138.00 TO NODE    142.00 =     171.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.026
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
```

```
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.23
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.44
  TC(MIN.) =    6.58

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.00  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =     7.30   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.44
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.59
  LONGEST FLOWPATH FROM NODE    138.00 TO NODE    108.00 =     179.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.017
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4659
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.81
  TC(MIN.) =    6.59

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    706.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    95.00  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =    13.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.81
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.65
  LONGEST FLOWPATH FROM NODE    138.00 TO NODE    706.00 =     192.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    706.00 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.) =    6.65
  RAINFALL INTENSITY(INCH/HR) =   5.98
  TOTAL STREAM AREA(ACRES) =     0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.81

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    105.65
  DOWNSTREAM ELEVATION(FEET) =    104.80
  ELEVATION DIFFERENCE(FEET) =      0.85
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.247
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  104.80  DOWNSTREAM ELEVATION(FEET) =  102.70
  STREET LENGTH(FEET) =   237.00   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =    6.35
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.164
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    2.36
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.08
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     302.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    706.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    97.10  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =   308.50   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.84
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    7.53
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    706.00 =     610.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =    7.53
  RAINFALL INTENSITY(INCH/HR) =   5.52
  TOTAL STREAM AREA(ACRES) =     0.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.84

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.28     7.23        5.670          1.26
      2        0.81     6.65        5.984          0.29
      3        2.84     7.53        5.523          0.59

  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        7.37     6.65       5.984
      2        7.77     7.23       5.670
      3        7.76     7.53       5.523

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.77   Tc(MIN.) =    7.23
  TOTAL AREA(ACRES) =        2.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    706.00 =     610.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    708.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    97.10  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =    51.75   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.77
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.31
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    708.00 =     662.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    708.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.631
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6011
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.77
  TC(MIN.) =    7.31
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    708.00 TO NODE    712.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    94.20  DOWNSTREAM(FEET) =    93.50
  FLOW LENGTH(FEET) =    70.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.77
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.50
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    712.00 =     732.55 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    712.00 TO NODE    712.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.50
  RAINFALL INTENSITY(INCH/HR) =   5.54
  TOTAL STREAM AREA(ACRES) =     2.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.77

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    103.60
  DOWNSTREAM ELEVATION(FEET) =    102.95
  ELEVATION DIFFERENCE(FEET) =      0.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.644
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    166.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  102.95  DOWNSTREAM ELEVATION(FEET) =   98.60
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =    8.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.066
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.762
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    3.62
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       4.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.25
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    166.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    712.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.60  DOWNSTREAM(FEET) =    93.50
  FLOW LENGTH(FEET) =    13.20   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.01
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.66
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    712.00 =     513.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    712.00 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.) =    8.66
  RAINFALL INTENSITY(INCH/HR) =   5.05
  TOTAL STREAM AREA(ACRES) =     1.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.77     7.50        5.539          2.24
      2        4.01     8.66        5.048          1.04

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.25     7.50       5.539
      2       11.10     8.66       5.048

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.25   Tc(MIN.) =    7.50
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    712.00 =     732.55 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    712.00 TO NODE    718.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.60  DOWNSTREAM(FEET) =    93.50
  FLOW LENGTH(FEET) =    45.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.87
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      11.25
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    718.00 =     777.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    718.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    130.20
  DOWNSTREAM ELEVATION(FEET) =    129.00
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.576
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.704
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    174.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  129.00  DOWNSTREAM ELEVATION(FEET) =   98.80
  STREET LENGTH(FEET) =   405.70   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.18
    HALFSTREET FLOOD WIDTH(FEET) =    3.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =    7.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.729
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.86
  FLOW VELOCITY(FEET/SEC.) =  4.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    174.00 =     480.70 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    718.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.90  DOWNSTREAM(FEET) =    92.20
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.56
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    7.27
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    718.00 =     535.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    718.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.56     7.27       5.652        0.39
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    718.00 =     535.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.25     7.69       5.448        3.28
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    718.00 =     777.85 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      12.19       7.27        5.652
      2      12.76       7.69        5.448

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.76   Tc(MIN.) =    7.69
  TOTAL AREA(ACRES) =        3.7

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    718.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    180.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    92.20  DOWNSTREAM(FEET) =    91.90
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.76
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.83
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    180.00 =     825.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.83
  RAINFALL INTENSITY(INCH/HR) =   5.39
  TOTAL STREAM AREA(ACRES) =     3.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.76

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    131.20
  DOWNSTREAM ELEVATION(FEET) =    129.00
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.683
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    180.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  129.00  DOWNSTREAM ELEVATION(FEET) =   97.50
  STREET LENGTH(FEET) =   452.00   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.40
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =    6.39
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.138
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.705
  SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    2.96
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.57
  FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    180.00 =     527.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 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.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   6.14
  TOTAL STREAM AREA(ACRES) =     0.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.37

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.76     7.83        5.388          3.67
      2        3.37     6.39        6.138          0.78

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       13.80     6.39       6.138
      2       15.72     7.83       5.388

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.72   Tc(MIN.) =    7.83
  TOTAL AREA(ACRES) =        4.4
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    180.00 =     825.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    722.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    91.90  DOWNSTREAM(FEET) =    91.00
  FLOW LENGTH(FEET) =   159.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.72
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.28
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    722.00 =     984.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    722.00 TO NODE    722.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    103.00
  DOWNSTREAM ELEVATION(FEET) =    102.35
  ELEVATION DIFFERENCE(FEET) =      0.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.644
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  102.40  DOWNSTREAM ELEVATION(FEET) =   96.80
  STREET LENGTH(FEET) =   566.50   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =    8.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.066
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    1.84      SUBAREA RUNOFF(CFS) =    7.27
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  16.82
  FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  566.5 FT WITH ELEVATION-DROP =   5.6 FT, IS   10.3 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    210.00
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    210.00 =     631.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    720.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    91.90  DOWNSTREAM(FEET) =    91.70
  FLOW LENGTH(FEET) =    13.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.67
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.64
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    720.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.64
  RAINFALL INTENSITY(INCH/HR) =   5.05
  TOTAL STREAM AREA(ACRES) =     1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.67
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =     99.70
  DOWNSTREAM ELEVATION(FEET) =     98.90
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.568
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    65.67
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    216.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   98.90  DOWNSTREAM ELEVATION(FEET) =   96.70
  STREET LENGTH(FEET) =   186.95   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    6.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.245
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.773
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.85
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE    212.00 TO NODE    216.00 =     261.95 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    720.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    91.90  DOWNSTREAM(FEET) =    91.70
  FLOW LENGTH(FEET) =    13.50   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.) =   4.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.50
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.27
 LONGEST FLOWPATH FROM NODE    212.00 TO NODE    720.00 =     275.45 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 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.) =    6.27
 RAINFALL INTENSITY(INCH/HR) =   6.21
 TOTAL STREAM AREA(ACRES) =     0.31
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.50

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.67     8.64        5.054          1.94
     2        1.50     6.27        6.214          0.31

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        7.06     6.27       6.214
     2        8.88     8.64       5.054

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.88   Tc(MIN.) =    8.64
 TOTAL AREA(ACRES) =        2.2
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    720.00 =     645.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    722.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    91.70  DOWNSTREAM(FEET) =    90.40
 FLOW LENGTH(FEET) =   146.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.88
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.04
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    722.00 =     791.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    722.00 TO NODE    722.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        8.88     9.04       4.908        2.25
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    722.00 =     791.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       15.72     8.28       5.196        4.45
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    722.00 =     984.85 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      23.85       8.28        5.196
      2      23.73       9.04        4.908

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.85   Tc(MIN.) =    8.28
  TOTAL AREA(ACRES) =        6.7

****************************************************************************
  FLOW PROCESS FROM NODE    722.00 TO NODE    722.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    722.00 TO NODE    724.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    90.40  DOWNSTREAM(FEET) =    89.50
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.55
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.85
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.44
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    724.00 =    1066.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    724.00 TO NODE    724.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.44
  RAINFALL INTENSITY(INCH/HR) =   5.13
  TOTAL STREAM AREA(ACRES) =     6.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.85

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    220.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    101.55
  DOWNSTREAM ELEVATION(FEET) =    100.90
  ELEVATION DIFFERENCE(FEET) =      0.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.644
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    724.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  101.90  DOWNSTREAM ELEVATION(FEET) =   95.40
 STREET LENGTH(FEET) =   650.00   CURB HEIGHT(INCHES) =  4.0
 STREET HALFWIDTH(FEET) = 14.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    9.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
 STREET FLOW TRAVEL TIME(MIN.) =   5.38   Tc(MIN.) =   10.02
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.593
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.761
 SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.28
 TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.64

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  11.83
 FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
        AND L =  650.0 FT WITH ELEVATION-DROP =   6.5 FT, IS    9.8 CFS,
        WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    724.00
 LONGEST FLOWPATH FROM NODE    218.00 TO NODE    724.00 =     715.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    724.00 TO NODE    724.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   4.59
 TOTAL STREAM AREA(ACRES) =     1.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.64

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       23.85     8.44        5.132          6.70
     2        6.64    10.02        4.593          1.90

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       29.44     8.44       5.132
     2       27.99    10.02       4.593

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      29.44   Tc(MIN.) =    8.44
```

```
  TOTAL AREA(ACRES) =        8.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    724.00 =    1066.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    724.00 TO NODE      1.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    89.40  DOWNSTREAM(FEET) =    88.00
  FLOW LENGTH(FEET) =    53.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.43
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.44
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE      1.00 =    1120.05 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    723.00 TO NODE    724.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.104
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7208
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    2.59
  TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      34.03
  TC(MIN.) =    8.51

****************************************************************************
  FLOW PROCESS FROM NODE    436.00 TO NODE      1.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.104
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6804
  SUBAREA AREA(ACRES) =    1.13   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =       10.4   TOTAL RUNOFF(CFS) =      36.05
  TC(MIN.) =    8.51

+----------------------------------------------------------------------------+
| Discharge from basin                                                       |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    83.00  DOWNSTREAM(FEET) =    82.30
  FLOW LENGTH(FEET) =    35.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.05
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE      2.00 =    1155.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  11
```

```
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       36.05     8.56       5.085       10.38
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE      2.00 =    1155.45 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.81     7.09       5.740        4.38
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      2.00 =    1889.70 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      37.68       7.09        5.740
      2      42.97       8.56        5.085

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.97   Tc(MIN.) =    8.56
  TOTAL AREA(ACRES) =       14.8

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  12
------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     72.60  DOWNSTREAM(FEET) =     67.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   377.00   CHANNEL SLOPE =  0.0125
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =  29.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.338
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      44.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.63
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   2.39
  Tc(MIN.) =   10.95
  SUBAREA AREA(ACRES) =     2.25       SUBAREA RUNOFF(CFS) =    2.83
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.564
  TOTAL AREA(ACRES) =       17.0         PEAK FLOW RATE(CFS) =      42.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   2.60
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      3.00 =    2266.70 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      3.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.338
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5528
  SUBAREA AREA(ACRES) =    0.88   SUBAREA RUNOFF(CFS) =    1.26
```

```
  TOTAL AREA(ACRES) =       17.9   TOTAL RUNOFF(CFS) =      42.97
  TC(MIN.) =   10.95
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       17.9  TC(MIN.) =     10.95
  PEAK FLOW RATE(CFS)   =      42.97
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Mitigated

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

            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 *************************
* Pacifica Elementry Proposed hydrology Analysis                         *
* 100 Year                                                               *
*                                                                        *
 **************************************************************************

  FILE NAME: R:\1714\HYD\DR\CALCS\AES\PR-MIT\MIT.DAT
  TIME/DATE OF STUDY: 10:54 03/23/2023
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.730
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   14.0      9.0    0.020/0.018/0.020   0.33    2.00 0.0313 0.125 0.0160
  2   14.0      9.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  3   12.0      6.0    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 =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    402.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  UPSTREAM ELEVATION(FEET) =    134.00
  DOWNSTREAM ELEVATION(FEET) =    105.00
  ELEVATION DIFFERENCE(FEET) =     29.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  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) =  6.218
```

```
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    404.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    104.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    58.00   CHANNEL SLOPE =  0.0172
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.35
  FLOW VELOCITY(FEET/SEC.) =   2.21   FLOW DEPTH(FEET) =   0.07
  TRAVEL TIME(MIN.) =   0.44   Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =     223.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.953
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.02
  TC(MIN.) =    6.70

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    700.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.50  DOWNSTREAM(FEET) =    91.90
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.02
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    7.44
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    700.00 =     383.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 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):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    105.60
  DOWNSTREAM ELEVATION(FEET) =    104.90
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.012
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
```

```
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  104.90  DOWNSTREAM ELEVATION(FEET) =  102.00
  STREET LENGTH(FEET) =   151.94   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    4.05
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    2.91
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     221.94 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.05
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.56

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    308.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.90
  UPSTREAM ELEVATION(FEET) =    127.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    106.00
  ELEVATION DIFFERENCE(FEET) =     21.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.373
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.151
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    106.00  DOWNSTREAM(FEET) =    104.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   156.70   CHANNEL SLOPE =  0.0128
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.18
  FLOW VELOCITY(FEET/SEC.) =   1.55   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =     247.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.288
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4824
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.79
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.94
  TC(MIN.) =    8.06

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.40  DOWNSTREAM(FEET) =    93.10
  FLOW LENGTH(FEET) =    27.50   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.) =   3.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    304.00 =     275.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 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.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   5.24
  TOTAL STREAM AREA(ACRES) =     0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1        3.56     4.05        7.193          0.55
     2        0.94     8.18        5.236          0.37

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.03     4.05       7.193
      2        3.54     8.18       5.236

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.03   Tc(MIN.) =    4.05
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    304.00 =     275.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    700.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.40  DOWNSTREAM(FEET) =    90.30
  FLOW LENGTH(FEET) =   311.20   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.03
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    5.03
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    700.00 =     586.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
  ***MEMORY BANK #  1 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 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        4.03     5.03       7.168        0.92
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    700.00 =     586.30 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.02     7.44       5.568        0.49
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    700.00 =     383.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.72       5.03       7.168
      2       4.15       7.44       5.568

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.72   Tc(MIN.) =    5.03
  TOTAL AREA(ACRES) =        1.4
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    700.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   101.40  DOWNSTREAM(FEET) =    86.20
  FLOW LENGTH(FEET) =   419.00   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.) =   8.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.72
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    701.00 =    1005.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    701.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    408.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    140.50
  DOWNSTREAM ELEVATION(FEET) =    114.50
  ELEVATION DIFFERENCE(FEET) =     26.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    114.50  DOWNSTREAM(FEET) =    106.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   239.80   CHANNEL SLOPE =  0.0334
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC.) =   2.13   FLOW DEPTH(FEET) =   0.05
  TRAVEL TIME(MIN.) =   1.87   Tc(MIN.) =    8.14
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    410.00 =     339.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.253
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    0.90
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.08
  TC(MIN.) =    8.14

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.70
  FLOW LENGTH(FEET) =   596.60   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   4.63    Tc(MIN.) =   12.77
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    416.00 =     936.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.928
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.08
  TC(MIN.) =   12.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    701.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    98.70  DOWNSTREAM(FEET) =    86.20
  FLOW LENGTH(FEET) =   524.40   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   1.74    Tc(MIN.) =   14.51
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    701.00 =    1460.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 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        1.08    14.51       3.618        0.67
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    701.00 =    1460.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.72     5.81       6.528        1.41
```

```
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    701.00 =    1005.30 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       5.15       5.81        6.528
     2       3.70      14.51        3.618

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.15   Tc(MIN.) =    5.81
 TOTAL AREA(ACRES) =        2.1

****************************************************************************
 FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    701.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    86.20  DOWNSTREAM(FEET) =    84.20
 FLOW LENGTH(FEET) =   202.40   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.15
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    6.41
 LONGEST FLOWPATH FROM NODE    406.00 TO NODE    428.00 =    1663.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    428.00 TO NODE    428.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.41
 RAINFALL INTENSITY(INCH/HR) =   6.13
 TOTAL STREAM AREA(ACRES) =     2.08
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.15

****************************************************************************
 FLOW PROCESS FROM NODE    414.00 TO NODE    424.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.55
 UPSTREAM ELEVATION(FEET) =    135.00
 DOWNSTREAM ELEVATION(FEET) =     99.40
 ELEVATION DIFFERENCE(FEET) =     35.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.188
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.023
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE    424.00 TO NODE    428.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     99.40  DOWNSTREAM(FEET) =     96.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   177.06   CHANNEL SLOPE =  0.0152
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.25
  FLOW VELOCITY(FEET/SEC.) =   1.81   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    414.00 TO NODE    428.00 =     245.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    428.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.887
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.60
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.80
  TC(MIN.) =    6.82

****************************************************************************
  FLOW PROCESS FROM NODE    428.00 TO NODE    428.00 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.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   5.89
  TOTAL STREAM AREA(ACRES) =     0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.15     6.41        6.130          2.08
      2        0.80     6.82        5.887          0.39

  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        5.91     6.41       6.130
      2        5.75     6.82       5.887

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.91   Tc(MIN.) =    6.41
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE    428.00 =    1663.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    428.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    84.20  DOWNSTREAM(FEET) =    82.30
  FLOW LENGTH(FEET) =   226.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
```

```
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    7.09
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      2.00 =    1889.70 FEET.

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

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    432.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    130.50
  DOWNSTREAM ELEVATION(FEET) =    121.00
  ELEVATION DIFFERENCE(FEET) =      9.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.375
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    434.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    128.70  DOWNSTREAM(FEET) =     94.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   663.10   CHANNEL SLOPE =  0.0523
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC.) =   2.52   FLOW DEPTH(FEET) =   0.04
  TRAVEL TIME(MIN.) =   4.38   Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    434.00 =     763.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    434.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.388
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.81   SUBAREA RUNOFF(CFS) =    2.78
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       2.93
  TC(MIN.) =   10.76

****************************************************************************
  FLOW PROCESS FROM NODE    434.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    94.00  DOWNSTREAM(FEET) =    82.30
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.93
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.95
```

```
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE      2.00 =     887.10 FEET.

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

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        2.93    10.95       4.339        1.91
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE      2.00 =     887.10 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        5.91     7.09       5.740        2.47
 LONGEST FLOWPATH FROM NODE    406.00 TO NODE      2.00 =    1889.70 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       7.81       7.09        5.740
     2       7.40      10.95        4.339

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.81   Tc(MIN.) =    7.09
 TOTAL AREA(ACRES) =        4.4

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

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

+--------------------------------------------------------------------------+
| Starting hydrology analysis for area drains towards the biofiltration    |
| \detention basin                                                         |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    84.20
 UPSTREAM ELEVATION(FEET) =    128.00
 DOWNSTREAM ELEVATION(FEET) =    105.00
 ELEVATION DIFFERENCE(FEET) =     23.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.750
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.573
 SUBAREA RUNOFF(CFS) =      0.23
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =    105.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    96.00   CHANNEL SLOPE =  0.0208
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.23
  FLOW VELOCITY(FEET/SEC.) =   1.94   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    6.58
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    134.00 =     180.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.027
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3079
  SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    0.96
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.17
  TC(MIN.) =    6.58

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    97.50  DOWNSTREAM(FEET) =    96.90
  FLOW LENGTH(FEET) =    41.90   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.74
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    104.00 =     222.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.74
  RAINFALL INTENSITY(INCH/HR) =   5.93
  TOTAL STREAM AREA(ACRES) =     0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.30
  UPSTREAM ELEVATION(FEET) =    104.30
  DOWNSTREAM ELEVATION(FEET) =    102.86
  ELEVATION DIFFERENCE(FEET) =      1.44
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.489
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  102.86  DOWNSTREAM ELEVATION(FEET) =  100.99
  STREET LENGTH(FEET) =    95.40   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
  STREET FLOW TRAVEL TIME(MIN.) =   0.74   Tc(MIN.) =    3.23
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    1.36
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.67
  FLOW VELOCITY(FEET/SEC.) =  2.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     169.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.23
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.17     6.74        5.933          0.63
      2        2.01     3.23        7.193          0.31

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.57     3.23       7.193
```

```
     2        2.82     6.74       5.933

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.82   Tc(MIN.) =    6.74
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    104.00 =     222.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    703.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.60  DOWNSTREAM(FEET) =    96.40
  FLOW LENGTH(FEET) =    12.80   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.82
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.78
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    703.00 =     234.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    703.00 TO NODE    703.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.78
  RAINFALL INTENSITY(INCH/HR) =   5.91
  TOTAL STREAM AREA(ACRES) =     0.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.82

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    103.70
  DOWNSTREAM ELEVATION(FEET) =    102.95
  ELEVATION DIFFERENCE(FEET) =      0.75
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.704
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  102.95  DOWNSTREAM ELEVATION(FEET) =  101.17
  STREET LENGTH(FEET) =    95.40   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    5.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.777
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    1.13
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.11
  FLOW VELOCITY(FEET/SEC.) =  2.18   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     160.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    703.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.60  DOWNSTREAM(FEET) =    96.40
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    703.00 =     184.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    703.00 TO NODE    703.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.59
  RAINFALL INTENSITY(INCH/HR) =   6.70
  TOTAL STREAM AREA(ACRES) =     0.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.65

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.82     6.78        5.912          0.94
      2        1.65     5.59        6.697          0.32

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.14     5.59       6.697
      2        4.28     6.78       5.912

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.28   Tc(MIN.) =    6.78
```

```
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    703.00 =     234.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    703.00 TO NODE    706.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.40  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =   150.70   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.28
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    7.23
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    706.00 =     385.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =    7.23
  RAINFALL INTENSITY(INCH/HR) =   5.67
  TOTAL STREAM AREA(ACRES) =     1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.28

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    130.00
  DOWNSTREAM ELEVATION(FEET) =    109.50
  ELEVATION DIFFERENCE(FEET) =     20.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.218
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    109.50  DOWNSTREAM(FEET) =     96.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    71.70   CHANNEL SLOPE =  0.1883
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
  FLOW VELOCITY(FEET/SEC.) =   3.83   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    6.58
  LONGEST FLOWPATH FROM NODE    138.00 TO NODE    142.00 =     171.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.026
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.23
 TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.44
 TC(MIN.) =    6.58

****************************************************************************
 FLOW PROCESS FROM NODE    142.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    96.00  DOWNSTREAM(FEET) =    94.80
 FLOW LENGTH(FEET) =     7.30   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.44
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.59
 LONGEST FLOWPATH FROM NODE    138.00 TO NODE    108.00 =     179.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.017
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.4659
 SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.37
 TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.81
 TC(MIN.) =    6.59

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    706.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    95.00  DOWNSTREAM(FEET) =    94.80
 FLOW LENGTH(FEET) =    13.10   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.95
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.81
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.65
 LONGEST FLOWPATH FROM NODE    138.00 TO NODE    706.00 =     192.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    706.00 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.) =    6.65
 RAINFALL INTENSITY(INCH/HR) =   5.98
 TOTAL STREAM AREA(ACRES) =     0.29
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.81

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
```

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    105.65
  DOWNSTREAM ELEVATION(FEET) =    104.80
  ELEVATION DIFFERENCE(FEET) =      0.85
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.247
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  104.80  DOWNSTREAM ELEVATION(FEET) =  102.70
  STREET LENGTH(FEET) =   237.00   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =    6.35
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.164
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    2.36
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.08
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     302.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    706.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    97.10  DOWNSTREAM(FEET) =    94.80
  FLOW LENGTH(FEET) =   308.50   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.84
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    7.53
```

 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   706.00 =   610.50 FEET.

****
 FLOW PROCESS FROM NODE   706.00 TO NODE   706.00 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.) =   7.53
 RAINFALL INTENSITY(INCH/HR) =   5.52
 TOTAL STREAM AREA(ACRES) =   0.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =   2.84

 ** CONFLUENCE DATA **
 STREAM   RUNOFF   Tc   INTENSITY   AREA
 NUMBER   (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1   4.28   7.23   5.670   1.26
     2   0.81   6.65   5.984   0.29
     3   2.84   7.53   5.523   0.59

 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   7.37   6.65   5.984
     2   7.77   7.23   5.670
     3   7.76   7.53   5.523

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   7.77   Tc(MIN.) =   7.23
 TOTAL AREA(ACRES) =   2.1
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   706.00 =   610.50 FEET.

****
 FLOW PROCESS FROM NODE   706.00 TO NODE   708.00 IS CODE = 31

 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
 ELEVATION DATA: UPSTREAM(FEET) =   97.10 DOWNSTREAM(FEET) =   94.80
 FLOW LENGTH(FEET) =   51.75   MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS   7.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.00
 ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =   7.77
 PIPE TRAVEL TIME(MIN.) =   0.08   Tc(MIN.) =   7.31
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   708.00 =   662.25 FEET.

****
 FLOW PROCESS FROM NODE   144.00 TO NODE   708.00 IS CODE = 81

 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.631
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6011
 SUBAREA AREA(ACRES) =   0.10   SUBAREA RUNOFF(CFS) =   0.20
 TOTAL AREA(ACRES) =   2.2   TOTAL RUNOFF(CFS) =   7.77
 TC(MIN.) =   7.31
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****

```
 FLOW PROCESS FROM NODE    708.00 TO NODE    712.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    94.20  DOWNSTREAM(FEET) =    93.50
 FLOW LENGTH(FEET) =    70.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.77
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.50
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    712.00 =     732.55 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    712.00 TO NODE    712.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.50
 RAINFALL INTENSITY(INCH/HR) =   5.54
 TOTAL STREAM AREA(ACRES) =     2.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.77

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7800
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    103.60
 DOWNSTREAM ELEVATION(FEET) =    102.95
 ELEVATION DIFFERENCE(FEET) =      0.65
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.644
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE    164.00 TO NODE    166.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  102.95  DOWNSTREAM ELEVATION(FEET) =   98.60
 STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  4.0
 STREET HALFWIDTH(FEET) = 14.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.40
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.29
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =    8.61
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.066
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.762
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    3.62
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       4.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.25
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    166.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    712.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.60  DOWNSTREAM(FEET) =    93.50
  FLOW LENGTH(FEET) =    13.20   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.01
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.66
  LONGEST FLOWPATH FROM NODE    162.00 TO NODE    712.00 =     513.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    712.00 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.) =    8.66
  RAINFALL INTENSITY(INCH/HR) =   5.05
  TOTAL STREAM AREA(ACRES) =     1.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.77     7.50        5.539          2.24
      2        4.01     8.66        5.048          1.04

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.25     7.50       5.539
      2       11.10     8.66       5.048

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.25   Tc(MIN.) =    7.50
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    712.00 =     732.55 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    712.00 TO NODE    718.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    93.60  DOWNSTREAM(FEET) =    93.50
  FLOW LENGTH(FEET) =    45.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.87
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.25
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    718.00 =     777.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    718.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    130.20
  DOWNSTREAM ELEVATION(FEET) =    129.00
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.576
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.704
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    174.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  129.00  DOWNSTREAM ELEVATION(FEET) =   98.80
  STREET LENGTH(FEET) =   405.70   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.18
    HALFSTREET FLOOD WIDTH(FEET) =    3.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =    7.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.729
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.56
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.86
  FLOW VELOCITY(FEET/SEC.) =  4.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    174.00 =     480.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    718.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    93.90  DOWNSTREAM(FEET) =    92.20
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.56
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    7.27
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    718.00 =     535.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    718.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.56     7.27       5.652        0.39
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    718.00 =     535.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.25     7.69       5.448        3.28
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    718.00 =     777.85 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      12.19       7.27        5.652
      2      12.76       7.69        5.448

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.76   Tc(MIN.) =    7.69
  TOTAL AREA(ACRES) =        3.7

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    718.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    718.00 TO NODE    180.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    92.20  DOWNSTREAM(FEET) =    91.90
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.76
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.83
```

```
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    180.00 =     825.85 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    180.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.83
 RAINFALL INTENSITY(INCH/HR) =   5.39
 TOTAL STREAM AREA(ACRES) =     3.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.76

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .6700
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    131.20
 DOWNSTREAM ELEVATION(FEET) =    129.00
 ELEVATION DIFFERENCE(FEET) =      2.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.683
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.48
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
 FLOW PROCESS FROM NODE    178.00 TO NODE    180.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  129.00  DOWNSTREAM ELEVATION(FEET) =   97.50
 STREET LENGTH(FEET) =   452.00   CURB HEIGHT(INCHES) =  4.0
 STREET HALFWIDTH(FEET) = 14.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    5.67
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
 STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =    6.39
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.138
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7100
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.705
 SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    2.96
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.37

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.57
 FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
```

 LONGEST FLOWPATH FROM NODE   176.00 TO NODE   180.00 =   527.00 FEET.

****
 FLOW PROCESS FROM NODE   180.00 TO NODE   180.00 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.) =   6.39
 RAINFALL INTENSITY(INCH/HR) =   6.14
 TOTAL STREAM AREA(ACRES) =   0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =   3.37

 ** CONFLUENCE DATA **
 STREAM   RUNOFF   Tc   INTENSITY   AREA
 NUMBER   (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1   12.76   7.83   5.388   3.67
     2   3.37   6.39   6.138   0.78

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

 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF   Tc   INTENSITY
 NUMBER   (CFS)   (MIN.)   (INCH/HOUR)
     1   13.80   6.39   6.138
     2   15.72   7.83   5.388

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   15.72   Tc(MIN.) =   7.83
 TOTAL AREA(ACRES) =   4.4
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   180.00 =   825.85 FEET.

****
 FLOW PROCESS FROM NODE   180.00 TO NODE   722.00 IS CODE = 31

 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
 ELEVATION DATA: UPSTREAM(FEET) =   91.90 DOWNSTREAM(FEET) =   91.00
 FLOW LENGTH(FEET) =   159.00   MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
 ESTIMATED PIPE DIAMETER(INCH) = 24.00   NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =   15.72
 PIPE TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =   8.28
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   722.00 =   984.85 FEET.

****
 FLOW PROCESS FROM NODE   722.00 TO NODE   722.00 IS CODE = 10

 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==

****
 FLOW PROCESS FROM NODE   206.00 TO NODE   208.00 IS CODE = 21

 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7800
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   65.00
 UPSTREAM ELEVATION(FEET) =   103.00
 DOWNSTREAM ELEVATION(FEET) =   102.35
 ELEVATION DIFFERENCE(FEET) =   0.65
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   4.644

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.56
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  102.40  DOWNSTREAM ELEVATION(FEET) =   96.80
 STREET LENGTH(FEET) =   566.50   CURB HEIGHT(INCHES) =  4.0
 STREET HALFWIDTH(FEET) = 14.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.24
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.36
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
 STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =    8.61
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.066
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    1.84      SUBAREA RUNOFF(CFS) =    7.27
 TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  16.82
 FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
        AND L =  566.5 FT WITH ELEVATION-DROP =   5.6 FT, IS   10.3 CFS,
        WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    210.00
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    210.00 =     631.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    720.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    91.90  DOWNSTREAM(FEET) =    91.70
 FLOW LENGTH(FEET) =    13.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.67
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.64
 LONGEST FLOWPATH FROM NODE    206.00 TO NODE    720.00 =     645.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    8.64
  RAINFALL INTENSITY(INCH/HR) =   5.05
  TOTAL STREAM AREA(ACRES) =     1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.67

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =     99.70
  DOWNSTREAM ELEVATION(FEET) =     98.90
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.568
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    65.67
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    216.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   98.90  DOWNSTREAM ELEVATION(FEET) =   96.70
  STREET LENGTH(FEET) =   186.95   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    6.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.245
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.773
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.85
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE    212.00 TO NODE    216.00 =     261.95 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    720.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    91.90  DOWNSTREAM(FEET) =    91.70
  FLOW LENGTH(FEET) =    13.50   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.) =   4.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE    212.00 TO NODE    720.00 =     275.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 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.) =    6.27
  RAINFALL INTENSITY(INCH/HR) =   6.21
  TOTAL STREAM AREA(ACRES) =     0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.67     8.64        5.054          1.94
      2        1.50     6.27        6.214          0.31

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.06     6.27       6.214
      2        8.88     8.64       5.054

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.88   Tc(MIN.) =    8.64
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    720.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    720.00 TO NODE    722.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    91.70  DOWNSTREAM(FEET) =    90.40
  FLOW LENGTH(FEET) =   146.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.88
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    722.00 =     791.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    722.00 TO NODE    722.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

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

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.88     9.04       4.908        2.25
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    722.00 =     791.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       15.72     8.28       5.196        4.45
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    722.00 =     984.85 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      23.85       8.28        5.196
      2      23.73       9.04        4.908

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.85   Tc(MIN.) =    8.28
  TOTAL AREA(ACRES) =        6.7

****************************************************************************
  FLOW PROCESS FROM NODE    722.00 TO NODE    722.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    722.00 TO NODE    724.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    90.40  DOWNSTREAM(FEET) =    89.50
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.55
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.85
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.44
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    724.00 =    1066.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    724.00 TO NODE    724.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.44
  RAINFALL INTENSITY(INCH/HR) =   5.13
  TOTAL STREAM AREA(ACRES) =     6.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.85

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    220.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    101.55
  DOWNSTREAM ELEVATION(FEET) =    100.90
  ELEVATION DIFFERENCE(FEET) =      0.65
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.644
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.193
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.56
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    724.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  101.90  DOWNSTREAM ELEVATION(FEET) =   95.40
  STREET LENGTH(FEET) =   650.00   CURB HEIGHT(INCHES) =  4.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
  STREET FLOW TRAVEL TIME(MIN.) =   5.38   Tc(MIN.) =   10.02
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.593
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.761
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.28
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  11.83
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  650.0 FT WITH ELEVATION-DROP =   6.5 FT, IS    9.8 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    724.00
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    724.00 =     715.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    724.00 TO NODE    724.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.02
  RAINFALL INTENSITY(INCH/HR) =   4.59
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       23.85     8.44        5.132          6.70
      2        6.64    10.02        4.593          1.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
```

```
      1       29.44     8.44       5.132
      2       27.99    10.02       4.593

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.44   Tc(MIN.) =    8.44
  TOTAL AREA(ACRES) =        8.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    724.00 =    1066.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    724.00 TO NODE      1.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    89.40  DOWNSTREAM(FEET) =    88.00
  FLOW LENGTH(FEET) =    53.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.43
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.44
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE      1.00 =    1120.05 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    723.00 TO NODE    724.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.104
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7208
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    2.59
  TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      34.03
  TC(MIN.) =    8.51

****************************************************************************
  FLOW PROCESS FROM NODE    436.00 TO NODE      1.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.104
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6804
  SUBAREA AREA(ACRES) =    1.13   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =       10.4   TOTAL RUNOFF(CFS) =      36.05
  TC(MIN.) =    8.51

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  31.51   RAIN INTENSITY(INCH/HOUR) =  2.19
  TOTAL AREA(ACRES) =    10.40   TOTAL RUNOFF(CFS) =      3.32

+----------------------------------------------------------------------------+
| Discharge from basin                                                       |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    83.00  DOWNSTREAM(FEET) =    82.30
  FLOW LENGTH(FEET) =    35.40   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.32
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   31.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE      2.00 =    1155.45 FEET.

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.32    31.60       2.190       10.40
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE      2.00 =    1155.45 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.81     7.09       5.740        4.38
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      2.00 =    1889.70 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       8.55       7.09        5.740
      2       6.30      31.60        2.190

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.55   Tc(MIN.) =    7.09
  TOTAL AREA(ACRES) =       14.8

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     72.60  DOWNSTREAM(FEET) =     67.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   377.00   CHANNEL SLOPE =  0.0125
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =  29.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.358
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.66
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   3.78
  Tc(MIN.) =   10.87
  SUBAREA AREA(ACRES) =     2.25       SUBAREA RUNOFF(CFS) =    2.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.238
  TOTAL AREA(ACRES) =       17.0         PEAK FLOW RATE(CFS) =      17.65
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   1.99
  LONGEST FLOWPATH FROM NODE    406.00 TO NODE      3.00 =    2266.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.358
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2424
  SUBAREA AREA(ACRES) =    0.88   SUBAREA RUNOFF(CFS) =    1.27
  TOTAL AREA(ACRES) =       17.9   TOTAL RUNOFF(CFS) =      18.92
  TC(MIN.) =   10.87
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       17.9  TC(MIN.) =     10.87
  PEAK FLOW RATE(CFS)   =      18.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 3/22/2023
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 9 MIN.
6 HOUR RAINFALL 2.73 INCHES
BASIN AREA 10.4 ACRES
RUNOFF COEFFICIENT 0.6804
PEAK DISCHARGE 36.05 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 9	DISCHARGE (CFS) = 0
TIME (MIN) = 18	DISCHARGE (CFS) = 1.2
TIME (MIN) = 27	DISCHARGE (CFS) = 1.2
TIME (MIN) = 36	DISCHARGE (CFS) = 1.2
TIME (MIN) = 45	DISCHARGE (CFS) = 1.3
TIME (MIN) = 54	DISCHARGE (CFS) = 1.3
TIME (MIN) = 63	DISCHARGE (CFS) = 1.3
TIME (MIN) = 72	DISCHARGE (CFS) = 1.4
TIME (MIN) = 81	DISCHARGE (CFS) = 1.4
TIME (MIN) = 90	DISCHARGE (CFS) = 1.5
TIME (MIN) = 99	DISCHARGE (CFS) = 1.5
TIME (MIN) = 108	DISCHARGE (CFS) = 1.6
TIME (MIN) = 117	DISCHARGE (CFS) = 1.7
TIME (MIN) = 126	DISCHARGE (CFS) = 1.8
TIME (MIN) = 135	DISCHARGE (CFS) = 1.8
TIME (MIN) = 144	DISCHARGE (CFS) = 2
TIME (MIN) = 153	DISCHARGE (CFS) = 2
TIME (MIN) = 162	DISCHARGE (CFS) = 2.2
TIME (MIN) = 171	DISCHARGE (CFS) = 2.3
TIME (MIN) = 180	DISCHARGE (CFS) = 2.6
TIME (MIN) = 189	DISCHARGE (CFS) = 2.7
TIME (MIN) = 198	DISCHARGE (CFS) = 3.1
TIME (MIN) = 207	DISCHARGE (CFS) = 3.4
TIME (MIN) = 216	DISCHARGE (CFS) = 4.1
TIME (MIN) = 225	DISCHARGE (CFS) = 4.7
TIME (MIN) = 234	DISCHARGE (CFS) = 6.9
TIME (MIN) = 243	DISCHARGE (CFS) = 8.5
TIME (MIN) = 252	DISCHARGE (CFS) = 36.05
TIME (MIN) = 261	DISCHARGE (CFS) = 5.5
TIME (MIN) = 270	DISCHARGE (CFS) = 3.7
TIME (MIN) = 279	DISCHARGE (CFS) = 2.9
TIME (MIN) = 288	DISCHARGE (CFS) = 2.4
TIME (MIN) = 297	DISCHARGE (CFS) = 2.1
TIME (MIN) = 306	DISCHARGE (CFS) = 1.9
TIME (MIN) = 315	DISCHARGE (CFS) = 1.7
TIME (MIN) = 324	DISCHARGE (CFS) = 1.6
TIME (MIN) = 333	DISCHARGE (CFS) = 1.5
TIME (MIN) = 342	DISCHARGE (CFS) = 1.4
TIME (MIN) = 351	DISCHARGE (CFS) = 1.3
TIME (MIN) = 360	DISCHARGE (CFS) = 1.2
TIME (MIN) = 369	DISCHARGE (CFS) = 0

Basin BF-1-1

Discharge vs Elevation Table

Bottom orifice diameter:	1.5 "	Top orifice diameter:	3 "
Number:	1	Number:	2
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	3.50 ft
Middle orifice diameter:	2 "	Emergency weir:	
number of orif:	1	Invert:	4.50 ft
Cg-middle:	0.61	Weir Length (ft)	10.0 ft
invert elev:	1.50 ft		

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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00
0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00
0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00
0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00
0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00
0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
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	0.0028
0.6	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	0.0099
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	0.0178
0.7	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	0.0223
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	0.0260
0.8	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	0.0293
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	0.0322
0.9	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	0.0349
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	0.0374
1	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	0.0397
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	0.0419
1.1	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	0.0440
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	0.0460
1.2	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	0.0480
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	0.0498
1.3	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	0.0516
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	0.0533
1.4	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	0.0550
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	0.0566
1.5	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	0.0582
1.55	8.40	0.30	0.00	0.00	0.06	8.34	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0630
1.6	8.80	0.60	0.00	0.00	0.06	11.06	0.06	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.0733
1.65	9.20	0.90	0.00	0.00	0.06	14.44	0.06	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.0874
1.7	9.60	1.20	0.00	0.00	0.06	18.58	0.06	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.1005
1.75	10.00	1.50	0.00	0.00	0.07	23.61	0.07	0.04	0.05	0.04	0.00	0.00	0.00	0.00	0.1091
1.8	10.40	1.80	0.00	0.00	0.07	29.65	0.07	0.05	0.06	0.05	0.00	0.00	0.00	0.00	0.1165
1.85	10.80	2.10	0.00	0.00	0.07	36.86	0.07	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.1233
1.9	11.20	2.40	0.00	0.00	0.07	45.39	0.07	0.06	0.08	0.06	0.00	0.00	0.00	0.00	0.1296
1.95	11.60	2.70	0.00	0.00	0.07	55.41	0.07	0.06	0.08	0.06	0.00	0.00	0.00	0.00	0.1354
2	12.00	3.00	0.00	0.00	0.07	67.11	0.07	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.1410
2.05	12.40	3.30	0.00	0.00	0.07	80.69	0.07	0.07	0.08	0.07	0.00	0.00	0.00	0.00	0.1462
2.1	12.80	3.60	0.00	0.00	0.07	96.36	0.07	0.08	0.09	0.08	0.00	0.00	0.00	0.00	0.1513
2.15	13.20	3.90	0.00	0.00	0.08	114.36	0.08	0.08	0.12	0.08	0.00	0.00	0.00	0.00	0.1561
2.2	13.60	4.20	0.00	0.00	0.08	134.92	0.08	0.08	0.17	0.08	0.00	0.00	0.00	0.00	0.1607
2.25	14.00	4.50	0.00	0.00	0.08	158.32	0.08	0.09	0.26	0.09	0.00	0.00	0.00	0.00	0.1652
2.3	14.40	4.80	0.00	0.00	0.08	184.84	0.08	0.09	0.41	0.09	0.00	0.00	0.00	0.00	0.1696
2.35	14.80	5.10	0.00	0.00	0.08	214.77	0.08	0.09	0.62	0.09	0.00	0.00	0.00	0.00	0.1738
2.4	15.20	5.40	0.00	0.00	0.08	248.43	0.08	0.10	0.93	0.10	0.00	0.00	0.00	0.00	0.1779
2.45	15.60	5.70	0.00	0.00	0.08	286.15	0.08	0.10	1.36	0.10	0.00	0.00	0.00	0.00	0.1820
2.5	16.00	6.00	0.00	0.00	0.08	328.30	0.08	0.10	1.94	0.10	0.00	0.00	0.00	0.00	0.1859
2.55	16.40	6.30	0.00	0.00	0.08	375.25	0.08	0.11	2.71	0.11	0.00	0.00	0.00	0.00	0.1897
2.6	16.80	6.60	0.00	0.00	0.09	427.39	0.09	0.11	3.70	0.11	0.00	0.00	0.00	0.00	0.1934
2.65	17.20	6.90	0.00	0.00	0.09	485.14	0.09	0.11	4.96	0.11	0.00	0.00	0.00	0.00	0.1971
2.7	17.60	7.20	0.00	0.00	0.09	548.94	0.09	0.11	6.53	0.11	0.00	0.00	0.00	0.00	0.2007
2.75	18.00	7.50	0.00	0.00	0.09	619.25	0.09	0.12	8.47	0.12	0.00	0.00	0.00	0.00	0.2042
2.8	18.40	7.80	0.00	0.00	0.09	696.55	0.09	0.12	10.84	0.12	0.00	0.00	0.00	0.00	0.2077
2.85	18.80	8.10	0.00	0.00	0.09	781.35	0.09	0.12	13.70	0.12	0.00	0.00	0.00	0.00	0.2111
2.9	19.20	8.40	0.00	0.00	0.09	874.19	0.09	0.12	17.13	0.12	0.00	0.00	0.00	0.00	0.2144
2.95	19.60	8.70	0.00	0.00	0.09	975.61	0.09	0.12	21.20	0.12	0.00	0.00	0.00	0.00	0.2177
3	20.00	9.00	0.00	0.00	0.09	1086.19	0.09	0.13	26.00	0.13	0.00	0.00	0.00	0.00	0.2209
3.05	20.40	9.30	0.00	0.00	0.09	1206.55	0.09	0.13	31.61	0.13	0.00	0.00	0.00	0.00	0.2241
3.1	20.80	9.60	0.00	0.00	0.10	1337.31	0.10	0.13	38.14	0.13	0.00	0.00	0.00	0.00	0.2272
3.15	21.20	9.90	0.00	0.00	0.10	1479.13	0.10	0.13	45.70	0.13	0.00	0.00	0.00	0.00	0.2303
3.2	21.60	10.20	0.00	0.00	0.10	1632.69	0.10	0.14	54.39	0.14	0.00	0.00	0.00	0.00	0.2334
3.25	22.00	10.50	0.00	0.00	0.10	1798.71	0.10	0.14	64.34	0.14	0.00	0.00	0.00	0.00	0.2364
3.3	22.40	10.80	0.00	0.00	0.10	1977.93	0.10	0.14	75.67	0.14	0.00	0.00	0.00	0.00	0.2393
3.35	22.80	11.10	0.00	0.00	0.10	2171.11	0.10	0.14	88.53	0.14	0.00	0.00	0.00	0.00	0.2422
3.4	23.20	11.40	0.00	0.00	0.10	2379.06	0.10	0.14	103.06	0.14	0.00	0.00	0.00	0.00	0.2451
3.45	23.60	11.70	0.00	0.00	0.10	2602.61	0.10	0.15	119.42	0.15	0.00	0.00	0.00	0.00	0.2480
3.5	24.00	12.00	0.00	0.00	0.10	2842.60	0.10	0.15	137.77	0.15	0.00	0.00	0.00	0.00	0.2508
3.55	24.40	12.30	0.20	0.00	0.10	3099.94	0.10	0.15	158.29	0.15	0.00	0.01	0.01	0.00	0.2619
3.6	24.80	12.60	0.40	0.00	0.10	3375.54	0.10	0.15	181.17	0.15	0.00	0.03	0.03	0.00	0.2879
3.65	25.20	12.90	0.60	0.00	0.11	3670.36	0.11	0.15	206.59	0.15	0.08	0.07	0.07	0.00	0.3261
3.7	25.60	13.20	0.80	0.00	0.11	3985.37	0.11	0.16	234.76	0.16	0.13	0.11	0.11	0.00	0.3735
3.75	26.00	13.50	1.00	0.00	0.11	4321.61	0.11	0.16	265.90	0.16	0.17	0.16	0.16	0.00	0.4268
3.8	26.40	13.80	1.20	0.00	0.11	4680.11	0.11	0.16	300.23	0.16	0.20	0.22	0.20	0.00	0.4681
3.85	26.80	14.10	1.40	0.00	0.11	5061.97	0.11	0.16	337.99	0.16	0.23	0.27	0.23	0.00	0.4977
3.9	27.20	14.40	1.60	0.00	0.11	5468.31	0.11	0.16	379.44	0.16	0.25	0.32	0.25	0.00	0.5243
3.95	27.60	14.70	1.80	0.00	0.11	5900.28	0.11	0.16	424.82	0.16	0.27	0.36	0.27	0.00	0.5488
4	28.00	15.00	2.00	0.00	0.11	6359.08	0.11	0.17	474.42	0.17	0.29	0.39	0.29	0.00	0.5717

Basin BF-1-1

Discharge vs Elevation Table

Bottom orifice diameter:	1.5 "	Top orifice diameter:	3 "		
Number:	1	Number:	2		
Cg-low:	0.61	Cg-low:	0.61		
invert elev:	0.50 ft	invert elev:	3.50 ft		0.125
Middle orifice diameter:	2 "	Emergency weir:			
number of orif:	1	Invert:	4.50 ft		0.166667
Cg-middle:	0.61	Weir Length (ft)	10.0 ft		
invert elev:	1.50 ft				

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)
4.05	28.40	15.30	2.20	0.00	0.11	6845.93	0.11	0.17	528.52	0.17	0.31	0.42	0.31	0.00	0.5932
4.1	28.80	15.60	2.40	0.00	0.11	7362.10	0.11	0.17	587.42	0.17	0.33	0.43	0.33	0.00	0.6136
4.15	29.20	15.90	2.60	0.00	0.11	7908.88	0.11	0.17	651.41	0.17	0.35	0.44	0.35	0.00	0.6331
4.2	29.60	16.20	2.80	0.00	0.11	8487.63	0.11	0.17	720.84	0.17	0.36	0.44	0.36	0.00	0.6518
4.25	30.00	16.50	3.00	0.00	0.12	9099.71	0.12	0.17	796.03	0.17	0.38	0.44	0.38	0.00	0.6697
4.3	30.40	16.80	3.20	0.00	0.12	9746.55	0.12	0.18	877.34	0.18	0.39	0.45	0.39	0.00	0.6870
4.35	30.80	17.10	3.40	0.00	0.12	10429.61	0.12	0.18	965.12	0.18	0.41	0.47	0.41	0.00	0.7038
4.4	31.20	17.40	3.60	0.00	0.12	11150.37	0.12	0.18	1059.76	0.18	0.42	0.52	0.42	0.00	0.7200
4.45	31.60	17.70	3.80	0.00	0.12	11910.39	0.12	0.18	1161.65	0.18	0.44	0.60	0.44	0.00	0.7358
4.5	32.00	18.00	4.00	0.00	0.12	12711.23	0.12	0.18	1271.19	0.18	0.45	0.74	0.45	0.00	0.7511
4.55	32.40	18.30	4.20	0.06	0.12	13554.52	0.12	0.18	1388.80	0.18	0.46	0.95	0.46	0.37	1.1384
4.6	32.80	18.60	4.40	0.12	0.12	14441.92	0.12	0.19	1514.93	0.19	0.47	1.25	0.47	1.05	1.8338
4.65	33.20	18.90	4.60	0.18	0.12	15375.13	0.12	0.19	1650.01	0.19	0.49	1.67	0.49	1.93	2.7296
4.7	33.60	19.20	4.80	0.24	0.12	16355.92	0.12	0.19	1794.53	0.19	0.50	2.23	0.50	2.98	3.7875
4.75	34.00	19.50	5.00	0.30	0.12	17386.06	0.12	0.19	1948.96	0.19	0.51	2.98	0.51	4.16	4.9852
4.8	34.40	19.80	5.20	0.36	0.12	18467.40	0.12	0.19	2113.80	0.19	0.52	3.93	0.52	5.47	6.3079
4.85	34.80	20.10	5.40	0.42	0.12	19601.82	0.12	0.19	2289.57	0.19	0.53	5.14	0.53	6.90	7.7445
4.9	35.20	20.40	5.60	0.48	0.13	20791.25	0.13	0.19	2476.80	0.19	0.54	6.64	0.54	8.42	9.2866
4.95	35.60	20.70	5.80	0.54	0.13	22037.66	0.13	0.20	2676.05	0.20	0.55	8.48	0.55	10.05	10.9272
5	36.00	21.00	6.00	0.60	0.13	23343.08	0.13	0.20	2887.86	0.20	0.56	10.72	0.56	11.77	12.6608
5.05	36.40	21.30	6.20	0.66	0.13	24709.57	0.13	0.20	3112.84	0.20	0.57	13.41	0.57	13.58	14.4826
5.1	36.80	21.60	6.40	0.72	0.13	26139.24	0.13	0.20	3351.59	0.20	0.58	16.61	0.58	15.48	16.3884
5.15	37.20	21.90	6.60	0.78	0.13	27634.27	0.13	0.20	3604.71	0.20	0.59	20.39	0.59	17.45	18.3746
5.2	37.60	22.20	6.80	0.84	0.13	29196.86	0.13	0.20	3872.86	0.20	0.60	24.83	0.60	19.50	20.4381
5.25	38.00	22.50	7.00	0.90	0.13	30829.27	0.13	0.20	4156.69	0.20	0.61	30.00	0.61	21.63	22.5762
5.3	38.40	22.80	7.20	0.96	0.13	32533.83	0.13	0.21	4456.87	0.21	0.62	35.98	0.62	23.83	24.7862
5.35	38.80	23.10	7.40	1.02	0.13	34312.88	0.13	0.21	4774.09	0.21	0.63	42.87	0.63	26.10	27.0658
5.4	39.20	23.40	7.60	1.08	0.13	36168.85	0.13	0.21	5109.08	0.21	0.64	50.75	0.64	28.43	29.4131
5.45	39.60	23.70	7.80	1.14	0.13	38104.20	0.13	0.21	5462.57	0.21	0.65	59.73	0.65	30.83	31.8260
5.5	40.00	24.00	8.00	1.20	0.13	40121.45	0.13	0.21	5835.30	0.21	0.66	69.93	0.66	33.30	34.3029
5.55	40.40	24.30	8.20	1.26	0.13	42223.16	0.13	0.21	6228.06	0.21	0.67	81.44	0.67	35.83	36.8421
5.6	40.80	24.60	8.40	1.32	0.13	44411.96	0.13	0.21	6641.63	0.21	0.68	94.40	0.68	38.42	39.4421
5.65	41.20	24.90	8.60	1.38	0.14	46690.52	0.14	0.22	7076.84	0.22	0.68	108.94	0.68	41.07	42.1016
5.7	41.60	25.20	8.80	1.44	0.14	49061.58	0.14	0.22	7534.51	0.22	0.69	125.18	0.69	43.77	44.8191
5.75	42.00	25.50	9.00	1.50	0.14	51527.93	0.14	0.22	8015.51	0.22	0.70	143.28	0.70	46.54	47.5936
5.8	42.40	25.80	9.20	1.56	0.14	54092.39	0.14	0.22	8520.71	0.22	0.71	163.37	0.71	49.36	50.4237
5.85	42.80	26.10	9.40	1.62	0.14	56757.87	0.14	0.22	9051.01	0.22	0.72	185.64	0.72	52.23	53.3086
5.9	43.20	26.40	9.60	1.68	0.14	59527.33	0.14	0.22	9607.34	0.22	0.72	210.22	0.72	55.16	56.2471
5.95	43.60	26.70	9.80	1.74	0.14	62403.77	0.14	0.22	10190.63	0.22	0.73	237.32	0.73	58.14	59.2382
6	44.00	27.00	10.00	1.80	0.14	65390.26	0.14	0.22	10801.86	0.22	0.74	267.10	0.74	61.18	62.2812

depth	area	area (ac)	volume (cf)
0	9100	0.209	0
0.05	9176	0.211	456.9
0.1	9253	0.212	917.6
0.15	9329	0.214	1382.2
0.2	9405	0.216	1850.5
0.25	9481	0.218	2322.7
0.3	9558	0.219	2798.6
0.35	9634	0.221	3278.4
0.4	9710	0.223	3762.0
0.45	9786	0.225	4249.4
0.5	9863	0.226	4740.6
0.55	9939	0.228	5235.7
0.6	10015	0.230	5734.5
0.65	10091	0.232	6237.2
0.7	10168	0.233	6743.6
0.75	10244	0.235	7253.9
0.8	10320	0.237	7768.0
0.85	10396	0.239	8285.9
0.9	10473	0.240	8807.6
0.95	10549	0.242	9333.2
1	10625	0.244	9862.5
1.05	10704	0.246	10395.7
1.1	10782	0.248	10932.9
1.15	10861	0.249	11474.0
1.2	10940	0.251	12019.0
1.25	11019	0.253	12567.9
1.3	11097	0.255	13120.8
1.35	11176	0.257	13677.7
1.4	11255	0.258	14238.4
1.45	11333	0.260	14803.1
1.5	11412	0.262	15371.8
1.55	11491	0.264	15944.3
1.6	11569	0.266	16520.8
1.65	11648	0.267	17101.3
1.7	11727	0.269	17685.6
1.75	11806	0.271	18273.9
1.8	11884	0.273	18866.2
1.85	11963	0.275	19462.4
1.9	12042	0.276	20062.5
1.95	12120	0.278	20666.5
2	12199	0.280	21274.5
2.05	12281	0.282	21886.5
2.1	12362	0.284	22502.6
2.15	12444	0.286	23122.7
2.2	12525	0.288	23746.9

depth	area	area (ac)	volume (cf)
0	9100	0.209	0
2.25	12607	0.289	24375.2
2.3	12688	0.291	25007.6
2.35	12770	0.293	25644.0
2.4	12851	0.295	26284.6
2.45	12933	0.297	26929.2
2.5	13015	0.299	27577.9
2.55	13096	0.301	28230.6
2.6	13178	0.303	28887.5
2.65	13259	0.304	29548.4
2.7	13341	0.306	30213.4
2.75	13422	0.308	30882.5
2.8	13504	0.310	31555.6
2.85	13585	0.312	32232.8
2.9	13667	0.314	32914.2
2.95	13748	0.316	33599.5
3	13830	0.317	34289.0
3.05	13915	0.319	34982.6
3.1	13999	0.321	35680.5
3.15	14084	0.323	36382.5
3.2	14168	0.325	37088.8
3.25	14253	0.327	37799.3
3.3	14337	0.329	38514.1
3.35	14422	0.331	39233.0
3.4	14506	0.333	39956.2
3.45	14591	0.335	40683.6
3.5	14675	0.337	41415.3
3.55	14760	0.339	42151.1
3.6	14844	0.341	42891.2
3.65	14929	0.343	43635.5
3.7	15013	0.345	44384.1
3.75	15098	0.347	45136.8
3.8	15182	0.349	45893.8
3.85	15267	0.350	46655.0
3.9	15351	0.352	47420.5
3.95	15436	0.354	48190.1
4	15520	0.356	48964.0
4.05	15607	0.358	49742.2
4.1	15695	0.360	50524.7
4.15	15782	0.362	51311.7
4.2	15869	0.364	52102.9
4.25	15957	0.366	52898.6
4.3	16044	0.368	53698.6
4.35	16131	0.370	54503.0
4.4	16219	0.372	55311.8

depth	area	area (ac)	volume (cf)
0	9100	0.209	0
4.45	16306	0.374	56124.9
4.5	16394	0.376	56942.4
4.55	16481	0.378	57764.2
4.6	16568	0.380	58590.5
4.65	16656	0.382	59421.1
4.7	16743	0.384	60256.0
4.75	16830	0.386	61095.3
4.8	16918	0.388	61939.0
4.85	17005	0.390	62787.1
4.9	17092	0.392	63639.5
4.95	17180	0.394	64496.3
5	17267	0.396	65357.5
5.05	17356	0.398	66223.1
5.1	17446	0.400	67093.1
5.15	17535	0.403	67967.6
5.2	17624	0.405	68846.6
5.25	17713	0.407	69730.0
5.3	17803	0.409	70617.9
5.35	17892	0.411	71510.3
5.4	17981	0.413	72407.1
5.45	18070	0.415	73308.4
5.5	18160	0.417	74214.1
5.55	18249	0.419	75124.3
5.6	18338	0.421	76039.0
5.65	18427	0.423	76958.1
5.7	18517	0.425	77881.7
5.75	18606	0.427	78809.8
5.8	18695	0.429	79742.3
5.85	18784	0.431	80679.3
5.9	18874	0.433	81620.7
5.95	18963	0.435	82566.6
6	19052	0.437	83517.0

BASIN DRAWDOWN			
Ponding Depth (FT)	Qout Total (CFS)	V in basin (CU FT)	Total Drawdown Time (HR)
6.00	62.391	83517	0.00
5.90	56.357	81621	0.01
5.80	50.533	79742	0.02
5.70	44.929	77882	0.03
5.60	39.552	76039	0.04
5.50	34.412	74214	0.06
5.40	29.523	72407	0.07
5.30	24.896	70618	0.09
5.20	20.548	68847	0.11
5.10	16.498	67093	0.14
5.00	12.770	65358	0.17
4.90	9.396	63640	0.21
4.80	6.417	61939	0.27
4.70	3.897	60256	0.36
4.60	1.943	58590	0.52
4.50	0.861	56942	0.85
4.40	0.830	55312	1.38
4.30	0.797	53699	1.94
4.20	0.761	52103	2.50
4.10	0.723	50525	3.10
4.00	0.681	48964	3.71
3.90	0.634	47420	4.36
3.80	0.578	45894	5.06
3.70	0.483	44384	5.86
3.60	0.397	42891	6.80
3.50	0.360	41415	7.88
3.40	0.355	39956	9.01
3.30	0.349	38514	10.15
3.20	0.343	37089	11.30
3.10	0.337	35680	12.45
3.00	0.330	34289	13.61
2.90	0.324	32914	14.77
2.80	0.317	31556	15.95
2.70	0.310	30213	17.14
2.60	0.303	28887	18.34
2.50	0.295	27578	19.56
2.40	0.287	26285	20.79
2.30	0.279	25008	22.04
2.20	0.270	23747	23.32
2.10	0.261	22503	24.62
2.00	0.251	21275	25.95
1.90	0.239	20062	27.33

1.80	0.226	18866	28.75
1.70	0.210	17686	30.26
1.60	0.183	16521	31.91
1.50	0.168	15372	33.73
1.40	0.165	14238	35.62
1.30	0.161	13121	37.53
1.20	0.158	12019	39.45
1.10	0.154	10933	41.39
1.00	0.149	9863	43.35
0.90	0.144	8808	45.35
0.80	0.139	7768	47.38
0.70	0.132	6744	49.49
0.60	0.119	5735	51.72
0.50	0.110	4741	54.13
0.40	0.110	3762	56.61
0.30	0.110	2799	59.05
0.20	0.110	1851	61.46
0.10	0.110	918	63.82
0.00	0.110	0	66.15

```
[TITLE]
;;Project Title/Notes
PACIFICA SITE-DEVELOPED

[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           08/28/1951
START_TIME           00:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
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         12.557
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
;;-------------- ----------------
MONTHLY          0.060  0.080  0.11   0.15   0.17   0.19   0.19   0.18   0.15   0.11   0.08   0.06
DRY_ONLY         NO

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
bf-1-1-DISCHARGE 0          FREE                        NO
```

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[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------          -------- --------
;THE STORAGE AVAILABE WITHIN THE BASIN ABOVE WATER QUALITY PONDING DEPTH
DETENTION-BASIN  0        5.5        0          TABULAR    BF-1-1-storage               0        0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
DETENTION-BASIN-DISCHARGE DETENTION-BASIN  bf-1-1-DISCHARGE 0          TABULAR/DEPTH   BF-1-1                     NO

[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
DETENTION-BASIN  FLOW             100-YEAR-INFLOW-HYDROGRAPH FLOW     1.0      1.0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
BF-1-1           Rating     0          0.0000
BF-1-1                      0.05       0.0028
BF-1-1                      0.1        0.0099
BF-1-1                      0.15       0.0178
BF-1-1                      0.2        0.0223
BF-1-1                      0.25       0.0260
BF-1-1                      0.3        0.0293
BF-1-1                      0.35       0.0322
BF-1-1                      0.4        0.0349
BF-1-1                      0.45       0.0374
BF-1-1                      0.5        0.0397
BF-1-1                      0.55       0.0419
BF-1-1                      0.6        0.0440
BF-1-1                      0.65       0.0460
BF-1-1                      0.7        0.0480
BF-1-1                      0.75       0.0498
BF-1-1                      0.8        0.0516
BF-1-1                      0.85       0.0533
BF-1-1                      0.9        0.0550
BF-1-1                      0.95       0.0566
BF-1-1                      1          0.0582
BF-1-1                      1.05       0.0630
BF-1-1                      1.1        0.0733
BF-1-1                      1.15       0.0874
BF-1-1                      1.2        0.1005
BF-1-1                      1.25       0.1091
BF-1-1                      1.3        0.1165
BF-1-1                      1.35       0.1233
BF-1-1                      1.4        0.1296
BF-1-1                      1.45       0.1354
BF-1-1                      1.5        0.1410
BF-1-1                      1.55       0.1462
```

BF-1-1	1.6	0.1513
BF-1-1	1.65	0.1561
BF-1-1	1.7	0.1607
BF-1-1	1.75	0.1652
BF-1-1	1.8	0.1696
BF-1-1	1.85	0.1738
BF-1-1	1.9	0.1779
BF-1-1	1.95	0.1820
BF-1-1	2	0.1859
BF-1-1	2.05	0.1897
BF-1-1	2.1	0.1934
BF-1-1	2.15	0.1971
BF-1-1	2.2	0.2007
BF-1-1	2.25	0.2042
BF-1-1	2.3	0.2077
BF-1-1	2.35	0.2111
BF-1-1	2.4	0.2144
BF-1-1	2.45	0.2177
BF-1-1	2.5	0.2209
BF-1-1	2.55	0.2241
BF-1-1	2.6	0.2272
BF-1-1	2.65	0.2303
BF-1-1	2.7	0.2334
BF-1-1	2.75	0.2364
BF-1-1	2.8	0.2393
BF-1-1	2.85	0.2422
BF-1-1	2.9	0.2451
BF-1-1	2.95	0.2480
BF-1-1	3	0.2508
BF-1-1	3.05	0.2619
BF-1-1	3.1	0.2879
BF-1-1	3.15	0.3261
BF-1-1	3.2	0.3735
BF-1-1	3.25	0.4268
BF-1-1	3.3	0.4681
BF-1-1	3.35	0.4977
BF-1-1	3.4	0.5243
BF-1-1	3.45	0.5488
BF-1-1	3.5	0.5717
BF-1-1	3.55	0.5932
BF-1-1	3.6	0.6136
BF-1-1	3.65	0.6331
BF-1-1	3.7	0.6518
BF-1-1	3.75	0.6697
BF-1-1	3.8	0.6870
BF-1-1	3.85	0.7038
BF-1-1	3.9	0.7200
BF-1-1	3.95	0.7358
BF-1-1	4	0.7511
BF-1-1	4.05	1.1384
BF-1-1	4.1	1.8338
BF-1-1	4.15	2.7296

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BF-1-1                     4.2         3.7875
BF-1-1                     4.25        4.9852
BF-1-1                     4.3         6.3079
BF-1-1                     4.35        7.7445
BF-1-1                     4.4         9.2866
BF-1-1                     4.45        10.9272
BF-1-1                     4.5         12.6608
BF-1-1                     4.55        14.4826
BF-1-1                     4.6         16.3884
BF-1-1                     4.65        18.3746
BF-1-1                     4.7         20.4381
BF-1-1                     4.75        22.5762
BF-1-1                     4.8         24.7862
BF-1-1                     4.85        27.0658
BF-1-1                     4.9         29.4131
BF-1-1                     4.95        31.8260
BF-1-1                     5           34.3029
BF-1-1                     5.05        36.8421
BF-1-1                     5.1         39.4421
BF-1-1                     5.15        42.1016
BF-1-1                     5.2         44.8191
BF-1-1                     5.25        47.5936
BF-1-1                     5.3         50.4237
BF-1-1                     5.35        53.3086
BF-1-1                     5.4         56.2471
BF-1-1                     5.45        59.2382
BF-1-1                     5.5         62.2812
;
BF-1-1-storage   Storage    0           9863
BF-1-1-storage              0.05        9939
BF-1-1-storage              0.1         10015
BF-1-1-storage              0.15        10091
BF-1-1-storage              0.2         10168
BF-1-1-storage              0.25        10244
BF-1-1-storage              0.3         10320
BF-1-1-storage              0.35        10396
BF-1-1-storage              0.4         10473
BF-1-1-storage              0.45        10549
BF-1-1-storage              0.5         10625
BF-1-1-storage              0.55        10704
BF-1-1-storage              0.6         10782
BF-1-1-storage              0.65        10861
BF-1-1-storage              0.7         10940
BF-1-1-storage              0.75        11019
BF-1-1-storage              0.8         11097
BF-1-1-storage              0.85        11176
BF-1-1-storage              0.9         11255
BF-1-1-storage              0.95        11333
BF-1-1-storage              1           11412
BF-1-1-storage              1.05        11491
BF-1-1-storage              1.1         11569
BF-1-1-storage              1.15        11648
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BF-1-1-storage	1.2	11727
BF-1-1-storage	1.25	11806
BF-1-1-storage	1.3	11884
BF-1-1-storage	1.35	11963
BF-1-1-storage	1.4	12042
BF-1-1-storage	1.45	12120
BF-1-1-storage	1.5	12199
BF-1-1-storage	1.55	12281
BF-1-1-storage	1.6	12362
BF-1-1-storage	1.65	12444
BF-1-1-storage	1.7	12525
BF-1-1-storage	1.75	12607
BF-1-1-storage	1.8	12688
BF-1-1-storage	1.85	12770
BF-1-1-storage	1.9	12851
BF-1-1-storage	1.95	12933
BF-1-1-storage	2	13015
BF-1-1-storage	2.05	13096
BF-1-1-storage	2.1	13178
BF-1-1-storage	2.15	13259
BF-1-1-storage	2.2	13341
BF-1-1-storage	2.25	13422
BF-1-1-storage	2.3	13504
BF-1-1-storage	2.35	13585
BF-1-1-storage	2.4	13667
BF-1-1-storage	2.45	13748
BF-1-1-storage	2.5	13830
BF-1-1-storage	2.55	13915
BF-1-1-storage	2.6	13999
BF-1-1-storage	2.65	14084
BF-1-1-storage	2.7	14168
BF-1-1-storage	2.75	14253
BF-1-1-storage	2.8	14337
BF-1-1-storage	2.85	14422
BF-1-1-storage	2.9	14506
BF-1-1-storage	2.95	14591
BF-1-1-storage	3	14675
BF-1-1-storage	3.05	14760
BF-1-1-storage	3.1	14844
BF-1-1-storage	3.15	14929
BF-1-1-storage	3.2	15013
BF-1-1-storage	3.25	15098
BF-1-1-storage	3.3	15182
BF-1-1-storage	3.35	15267
BF-1-1-storage	3.4	15351
BF-1-1-storage	3.45	15436
BF-1-1-storage	3.5	15520
BF-1-1-storage	3.55	15607
BF-1-1-storage	3.6	15695
BF-1-1-storage	3.65	15782
BF-1-1-storage	3.7	15869
BF-1-1-storage	3.75	15957

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BF-1-1-storage              3.8        16044
BF-1-1-storage              3.85       16131
BF-1-1-storage              3.9        16219
BF-1-1-storage              3.95       16306
BF-1-1-storage              4          16394
BF-1-1-storage              4.05       16481
BF-1-1-storage              4.1        16568
BF-1-1-storage              4.15       16656
BF-1-1-storage              4.2        16743
BF-1-1-storage              4.25       16830
BF-1-1-storage              4.3        16918
BF-1-1-storage              4.35       17005
BF-1-1-storage              4.4        17092
BF-1-1-storage              4.45       17180
BF-1-1-storage              4.5        17267
BF-1-1-storage              4.55       17356
BF-1-1-storage              4.6        17446
BF-1-1-storage              4.65       17535
BF-1-1-storage              4.7        17624
BF-1-1-storage              4.75       17713
BF-1-1-storage              4.8        17803
BF-1-1-storage              4.85       17892
BF-1-1-storage              4.9        17981
BF-1-1-storage              4.95       18070
BF-1-1-storage              5          18160
BF-1-1-storage              5.05       18249
BF-1-1-storage              5.1        18338
BF-1-1-storage              5.15       18427
BF-1-1-storage              5.2        18517
BF-1-1-storage              5.25       18606
BF-1-1-storage              5.3        18695
BF-1-1-storage              5.35       18784
BF-1-1-storage              5.4        18874
BF-1-1-storage              5.45       18963
BF-1-1-storage              5.5        19052

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:00       0
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:09       0
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:18       1.2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:27       1.2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:36       1.2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:45       1.3
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  0:54       1.3
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:03       1.3
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:12       1.4
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:21       1.4
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:30       1.5
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:39       1.5
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:48       1.6
```

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100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  1:57       1.7
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  2:06       1.8
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  2:15       1.8
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  2:24       2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  2:33       2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  2:42       2.2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  2:51       2.3
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:00       2.6
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:09       2.7
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:18       3.1
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:27       3.4
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:36       4.1
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:45       4.7
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  3:54       6.9
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:03       8.5
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:12       36.05
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:21       5.5
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:30       3.7
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:39       2.9
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:48       2.4
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  4:57       2.1
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  5:06       1.9
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  5:15       1.7
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  5:24       1.6
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  5:33       1.5
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  5:42       1.4
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  5:51       1.3
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  6:00       1.2
100-YEAR-INFLOW-HYDROGRAPH 8/28/1951  6:09       0

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

[TAGS]

[MAP]
DIMENSIONS 664.453 4315.668 1694.096 5505.165
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
bf-1-1-DISCHARGE 214.578            4887.995
DETENTION-BASIN  220.479            5031.962

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.014)

PACIFICA SITE-DEVELOPED

****
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 08/28/1951 00:00:00
Ending Date 05/23/2008 23:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Routing Time Step ..... 60.00 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	1.586	0.517
External Outflow	1.584	0.516
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	0.000	0.000
Continuity Error (%)	0.104	

****
Highest Flow Instability Indexes

****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step : 60.00 sec
Average Time Step : 60.00 sec
Maximum Time Step : 60.00 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	Time of Max Occurrence hr:min	Reported Max Depth Feet
bf-1-1-DISCHARGE	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
DETENTION-BASIN	STORAGE	0.00	4.18	4.18	0	04:36	4.14

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
bf-1-1-DISCHARGE	OUTFALL	0.00	3.32	0	04:36	0	0.516	0.000
DETENTION-BASIN	STORAGE	36.05	36.05	0	04:13	0.517	0.517	0.104

****
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
DETENTION-BASIN	0.005	0	0	0	55.151	70	0 04:35	3.32

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
bf-1-1-DISCHARGE	0.04	0.09	3.32	0.516
System	0.04	0.09	3.32	0.516

****
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-BASIN-DISCHARGE	DUMMY	3.32	0 04:36			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Thu Mar 23 10:51:08 2023
Analysis ended on: Thu Mar 23 10:51:44 2023
Total elapsed time: 00:00:36