

DRAINAGE STUDY for SUNBOW II, PHASE 3(TM)

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CHAPTER 1 - EXECUTIVE SUMMARY

1.1 - Introduction

The Sunbow Planning Area is located in the City of Chula Vista, California, in south of the Olympic Pkwy, north of the Otay Landfill (see the Vicinity Map below).

Sunbow II, Phase 3 Sectional Planning Area (SPA) Plan Amendment encompasses approximately 135.7¹ acres (Project Area) that includes a 67.5 development area comprised of 44.2 acres of residential, a 0.9-acre Community Purpose Facility (CPF) site, 5.9 acres of public streets and 16.5 manufactured slopes/basins. Approximately 4.3 acres of conserved Poggi Creek Easement areas, a 0.3 acre of conserved wetland resource area and 63.6² acres of adjacent MSCP Preserve area are also within the Project Area.

The total drainage area of the project is approximately 117.3 acres. In between with the north side of the site and the south curb of the Olympic Pkwy, the Poggi Canyon creek is running parallel to the road from northwest to southwest. The south boundary of the site is delineated by the natural ridges along landfill boarder.

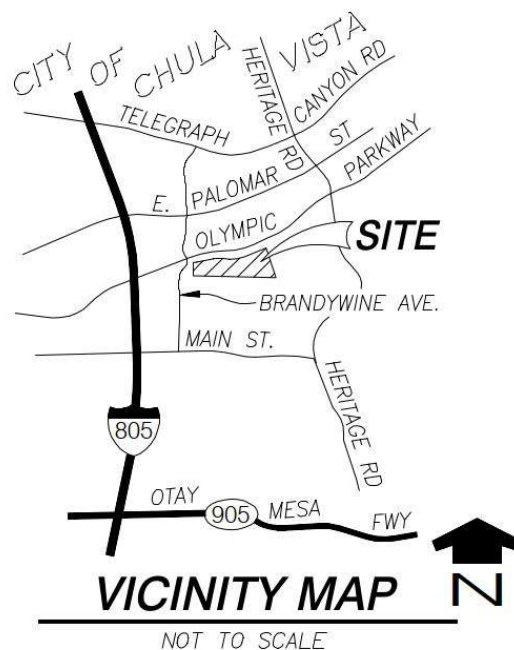
The project will consist of 718 units of multi-story townhomes as well as associated public and private roads, and parking spaces. The storm drain and storm water quality control facilities are proposed to meet the city requirements. This study will be focusing on quantifying the runoff for the 100-year storm event and analyzing the capacity of the storm drain and detention basin to minimize the impact of the proposed development.

Treatment of storm water runoff from the site has been addressed in a separate report – ‘The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Sunbow Planning Area’ dated June 23, 2020 prepared by Hunsaker & Associates San Diego Inc.

Per City’s drainage criteria, the onsite hydrology calculation will be based on 100-year storm event.

¹ Acreages are rounded to the nearest 1/10th acre and may vary slightly from calculated total.

² The Proposed MSCP area includes approximately 1.31 acres of “Mapping Correction Area” and approximately 1.12 acres of MSCP Allowable Use (Basin – Future Facility).



Per County of San Diego drainage criteria, the Modified Rational Method should be used to determine peak design flowrates when the contributing drainage area is less than 1.0 square mile. Since the total watershed area discharging from the site is less than 1.0 square mile, the AES-2015 computer software was used to model the runoff response per the Modified Rational Method. Methodology used for the computation of design rainfall events, runoff coefficients, and rainfall intensity values are consistent with criteria set forth in the "County of San Diego 2003 Hydrology Manual." A more detailed explanation of methodology used for this analysis is listed in Chapter 2 of this report.

Detailed calculations such as storm drain hydraulics, inlet calculations, and street capacity calculations will be addressed during final engineering.

The 50-yr and 100-yr depth provided in Chapter 2 are for P6.

1.2 – Summary of Existing Conditions

The 117.3-acre hydrologic catchment primarily consist of natural grades and hills all covered by native vegetations and shrubs. The site is accessible from Olympic Pkwy through two separate bridges crossing Poggi Canyon creek in north side. The Poggi Canyon creek flows from northeast to southwest and accepts large amount of storm runoff from surrounding area. It is also the downstream of the onsite runoff from both our existing and proposed condition. The local high points are in southern boundary of the site adjacent to the Otay landfill and make the overall on site flow pattern simply south to north.

A small portion of the site in southwest corner was occupied by a water tank which is serving the nearby residential areas.

Based on the site topo, the existing condition catchment was divided into 7 sub-catchments. All onsite runoff from sub-catchment under design event will flow from south to north into Poggi Canyon creek and eventually confluence at the northwest corner of our catchment (hydrologic node 126).

1.3 – Summary of Developed Condition

The Proposed Project's residential land use includes four unique multi-family attached residential product types with 15 unique floor plans, ranging in square footage from approximately 1,100 to 2,050 square feet in two- and three-story units. Each home includes a two-car garage and two to four bedrooms.

The Proposed Project includes a Chula Vista General Plan Amendment, Sunbow General Development Plan Amendment, Sunbow II SPA Plan Amendment, a rezone, and a Tentative Map. The Proposed Project also includes a Chula Vista MSCP Boundary Adjustment to implement minor adjustments to the development limits and the adjacent MSCP Preserve areas that would result in a 0.09-acre increase to MSCP Preserve Area and an MSCP Minor Amendment to address off-site grading adjacent to the southwestern boundary of the development area.

The development of the site will include adding the storm drains, curb inlets, cleanouts along the proposed onsite private roads and parking spaces to collect and convey the storm runoff to the two proposed detention and water quality control basins located at northeast and northwest part of the development area.

The project also proposed bypassing storm drains running from south into Poggi Canyon creek in north to collect and bypass the offsite flow primarily from south and east side of the catchment.

After the majority of the onsite runoff is treated and detained by the biofiltration basin, the outflow will confluence with the bypass storm drain and discharge into the Poggi Canyon creek. For small amount of runoff generated from the north portion of proposed public roads which will be connecting with Olympic Pkwy, only the water quality control measurements are proposed, i.e., multiple Modular Wetland structures will be installed to control the water quality. The outflow from Modular Wetlands then discharges into Poggi Canyon creek without detention.

A calculation node 126 (similar as the one in existing condition hydrology) has been assigned at the ultimate downstream point of our development area. The hydrology results from existing and proposed conditions at this point will be compared to ensure no impact exists after implementing attenuation measurements.

Pollution Control and Hydromodification Flow Control of the overall site will be addressed in the separate report 'The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Sunbow Planning Area' dated June 15, 2020 prepared by Hunsaker & Associates San Diego Inc.

1.4 – Results and Recommendations

Table 1 below summarizes the existing and proposed peak flows from the site. The developed peak flows consider the flow attenuation from the proposed detention basin. Per the San Diego County rainfall isopleth maps, the design rainfall depth for the 50-year flow event at the project site area is 2.10-inches, 100-year flow event at the project site area is 2.40-inches.

Table 1 - Summary of 100 Year Peak Flows

POC	Existing Condition			Developed Condition				Flow Reduction between EX and PR(ATT)
	EX NODE	AREA (acres)	Q100 (cfs)	PR NODE	AREA (acres)	Q100 (cfs) Unattenuated	Q100 (cfs) Attenuated**	
1	126	117.3		126	117.5*	165.62	60.81	
Total	-	117.3	90.81	-	117.5*	165.62	60.81	90.81-60.81=30

* The 0.2 acres of increase is due to the rounding error. Offsite letter of permission to grade to be provided during final engineering.

** Design flows used for storm drain design.

Since the proposed development will increase runoff generated by the project site, the project will utilize onsite detention facilities to mitigate for the increase in peak flow. As a result, the mitigated Q100 of proposed condition demonstrates 30 cfs flow rate reduction compare to that of the existing condition. Runoff generated by the project will not exceed pre-project peak flow rates, and runoff velocities will be dissipated by rock riprap at storm drain outfalls. Riprap design (per SDRSD D-40) will be provided with hydraulics during final engineering stage.

The project has been designed to honor pre-project watershed basins and outfall locations. Considering the limitations which result from Subdivision layout and design, minor exchanges in watershed areas occur but are minimized to the maximum extent practicable.

Since the project site is located outside any FEMA floodplain zones (#06073C2157G), there is no requirement for a Letter of Map Revision.

For the HEC-HMS detention calculation for flows through the basin, refer to the calculations in Chapter 5.

The above results show there is no adverse impact from the proposed development after the attenuation because there is reduction in flows.

Peak flow rates listed above were generated based on the criteria set forth in the "2003 San Diego County Hydrology Manual" (methodology presented in Chapter 2 of this report). The Modified Rational Method output is located in Chapter 3.

1.5 - References

"San Diego County Hydrology Manual"; Department of Public Works – Flood Control Division; County of San Diego, California; Revised June 2003.

"The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Sunbow II, Phase 3" dated Jan 26, 2021 prepared by Hunsaker & Associates San Diego Inc.

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.1 – County of San Diego Drainage Design Criteria

2.3 SELECTION OF HYDROLOGIC METHOD AND DESIGN CRITERIA

Design Frequency – The flood frequency for determining the design storm discharge is 50 years for drainage that is upstream of any major roadway and 100 years frequency for all design storms at a major roadway, crossing the major roadway and thereafter. The 50-year storm flows shall be contained within the pipe and not encroach into the travel lane. For the 100-year storm this includes allowing one lane of a four-lane road (four or more lanes) to be used for conveyance without encroaching onto private property outside the dedicated street right-of-way. Natural channels that remain natural within private property are excluded from the right-of-way guideline.

Design Method – The choice of method to determine flows (discharge) shall be based on the size of the watershed area. For an area 0 to approximately 1 square mile the Rational Method or the Modified Rational Method shall be used. For watershed areas larger than 1 square mile the NRCS hydrologic method shall be used. Please check with the governing agency for any variations to these guidelines.

SECTION 3

RATIONAL METHOD AND MODIFIED RATIONAL METHOD

3.1 THE RATIONAL METHOD

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage, where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 1 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section 3.4), or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Section 4).

The RM can be applied using any design storm frequency (*e.g.*, 100-year, 50-year, 10-year, etc.). The local agency determines the design storm frequency that must be used based on the type of project and specific local requirements. A discussion of design storm frequency is provided in Section 2.3 of this manual. A procedure has been developed that converts the 6-hour and 24-hour precipitation isopleth map data to an Intensity-Duration curve that can be used for the rainfall intensity in the RM formula as shown in Figure 3-1. The RM is applicable to a 6-hour storm duration because the procedure uses Intensity-Duration Design Charts that are based on a 6-hour storm duration.

3.1.1 Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (TC), which is the time required for water to

flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C I A$$

Where: Q = peak discharge, in cubic feet per second (cfs)
 C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)
 I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)
 A = drainage area contributing to the design location, in acres

Combining the units for the expression CIA yields:

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

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

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

Unlike the MRM (discussed in Section 3.4) or the NRCS hydrologic method (discussed in Section 4), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

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

- The discharge flow rate resulting from any I is maximum when the I lasts as long as or longer than the T_c .

- 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 ($\Sigma[CA]$). 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.

3.1.3 Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration Design Chart (Figure 3-1). The 6-hour storm rainfall amount (P_6) and the 24-hour storm rainfall amount (P_{24}) for the selected storm frequency are also needed for calculation of I. P_6 and P_{24} can be read from the isopluvial maps provided in Appendix B. An Intensity-Duration Design Chart applicable to all areas within San Diego County is provided as Figure 3-1. Figure 3-2 provides an example of use of the Intensity-Duration Design Chart. Intensity can also be calculated using the following equation:

$$I = 7.44 P_6 D^{-0.645}$$

Where: P_6 = adjusted 6-hour storm rainfall amount (see discussion below)
 D = duration in minutes (use T_c)

Note: This equation applies only to the 6-hour storm rainfall amount (i.e., P_6 cannot be changed to P_{24} to calculate a 24-hour intensity using this equation).

The Intensity-Duration Design Chart and the equation are for the 6-hour storm rainfall amount. In general, P_6 for the selected frequency should be between 45% and 65% of P_{24} for the selected frequency. If P_6 is not within 45% to 65% of P_{24} , P_6 should be increased or decreased as necessary to meet this criteria. The isopluvial lines are based on precipitation gauge data. At the time that the isopluvial lines were created, the majority of precipitation gauges in San Diego County were read daily, and these readings yielded 24-hour precipitation data. Some 6-hour data were available from the few recording gauges distributed throughout the County at that time; however, some 6-hour data were extrapolated. Therefore, the 24-hour precipitation data for San Diego County are considered to be more reliable.

3.1.4 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c is composed of two components: initial time of concentration (T_i) and travel time (T_t). Methods of computation for T_i and T_t are discussed below. The T_i is the time required for runoff to travel across the surface of the most remote subarea in the study, or “initial subarea.” Guidelines for designating the initial subarea are provided within the discussion of computation of T_i . The T_t is the time required for the runoff to flow in a watercourse (e.g., swale, channel, gutter, pipe) or series of watercourses from the initial subarea to the point of interest. For the RM, the T_c at any point within the drainage area is given by:

$$T_c = T_i + T_t$$

Methods of calculation differ for natural watersheds (nonurbanized) and for urban drainage systems. When analyzing storm drain systems, the designer must consider the possibility that an existing natural watershed may become urbanized during the useful life of the storm drain system. Future land uses must be used for T_c and runoff calculations, and can be determined from the local Community General Plan.

3.1.4.1 Initial Time of Concentration

The initial time of concentration is typically based on sheet flow at the upstream end of a drainage basin. The Overland Time of Flow (Figure 3-3) is approximated by an equation developed by the Federal Aviation Agency (FAA) for analyzing flow on runways (FAA, 1970). The usual runway configuration consists of a crown, like most freeways, with sloping pavement that directs flow to either side of the runway. This type of flow is uniform in the direction perpendicular to the velocity and is very shallow. Since these depths are $\frac{1}{4}$ of an inch (more or less) in magnitude, the relative roughness is high. Some higher relative roughness values for overland flow are presented in Table 3.5 of the *HEC-1 Flood Hydrograph Package User's Manual* (USACE, 1990).

The sheet flow that is predicted by the FAA equation is limited to conditions that are similar to runway topography. Some considerations that limit the extent to which the FAA equation applies are identified below:

- Urban Areas – This “runway type” runoff includes:
 - 1) Flat roofs, sloping at $1\% \pm$
 - 2) Parking lots at the extreme upstream drainage basin boundary (at the “ridge” of a catchment area).

Even a parking lot is limited in the amounts of sheet flow. Parked or moving vehicles would “break-up” the sheet flow, concentrating runoff into streams that are not characteristic of sheet flow.
 - 3) Driveways are constructed at the upstream end of catchment areas in some developments. However, if flow from a roof is directed to a driveway through a downspout or other conveyance mechanism, flow would be concentrated.
 - 4) Flat slopes are prone to meandering flow that tends to be disrupted by minor irregularities and obstructions. Maximum Overland Flow lengths are shorter for the flatter slopes (see Table 3-2).
- Rural or Natural Areas - The FAA equation is applicable to these conditions since (.5% to 10%) slopes that are uniform in width of flow have slow velocities consistent with the equation. Irregularities in terrain limit the length of application.
 - 1) Most hills and ridge lines have a relatively flat area near the drainage divide. However, with flat slopes of $.5\% \pm$, minor irregularities would cause flow to concentrate into streams.
 - 2) Parks, lawns and other vegetated areas would have slow velocities that are consistent with the FAA Equation.

The concepts related to the initial time of concentration were evaluated in a report entitled *Initial Time of Concentration, Analysis of Parameters* (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.

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the “Regulating Agency” when submitted with a detailed study.

Table 3-2

**MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)**

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

3.1.4.1A Planning Considerations

The purpose of most hydrology studies is to develop flood flow values for areas that are not at the upstream end of the basin. Another example is the Master Plan, which is usually completed before the actual detailed design of lots, streets, etc. are accomplished. In these situations it is necessary that the initial time of concentration be determined without detailed information about flow patterns.

To provide guidance for the initial time of concentration design parameters, Table 3-2 includes the Land Use Elements and other variables related to the Time of Concentration. The table development included a review of the typical “layout” of the different Land Use Elements and related flow patterns and consideration of the extent of the sheet flow regimen, the effect of ponding, the significance to the drainage basin, downstream effects, etc.

3.1.4.1B Computation Criteria

- (a) Developed Drainage Areas With Overland Flow - T_i may be obtained directly from the chart, “Rational Formula – Overland Time of Flow Nomograph,” shown in Figure 3-3 or from Table 3-2. This chart is based on the Federal Aviation Agency (FAA) equation (FAA, 1970). For the short rain durations (<15 minutes) involved, intensities are high but the depth of flooding is limited and much of the runoff is stored temporarily in the overland flow and in shallow ponded areas. In developed areas, overland flow is limited to lengths given in Table 3-2. Beyond these distances, flow tends to become concentrated into streets, gutters, swales, ditches, etc.

- (b) Natural Or Rural Watersheds – These areas usually have an initial subarea at the upstream end with sheet flow. The sheet flow length is limited to 50 to 100 feet as specified in Table 3-2. The Overland Time of Flow Nomograph, Figure 3-3, can be used to obtain T_i . The initial time of concentration can excessively affect the magnitude of flow further downstream in the drainage basin. For instance, variations in the initial time of concentration for an initial subarea of one acre can change the flow further downstream where the area is 400 acres by 100%. Therefore, the initial time of concentration is limited (see Table 3-2).

The Rational Method procedure included in the original Hydrology Manual (1971) and Design and Procedure Manual (1968) included a 10 minute value to be added to the initial time of concentration developed through the Kirpich Formula (see Figure 3-4) for a natural watershed. That procedure is superceded by the procedure above to use Table 3-2 or Figure 3-3 to determine T_i for the appropriate sheet flow length of the initial subarea. The values for natural watersheds given in Table 3-2 vary from 13 to 7 minutes, depending on slope. If the total length of the initial subarea is greater than the maximum length allowable based on Table 3-2, add the travel time based on the Kirpich formula for the remaining length of the initial subarea.

3.1.4.2 Travel Time

The T_t is the time required for the runoff to flow in a watercourse (e.g., swale, channel, gutter, pipe) or series of watercourses from the initial subarea to the point of interest. The T_t is computed by dividing the length of the flow path by the computed flow velocity. Since the velocity normally changes as a result of each change in flow rate or slope, such as at an inlet or grade break, the total T_t must be computed as the sum of the T_t 's for each section of the flow path. Use Figure 3-6 to estimate time of travel for street gutter flow. Velocity in a channel can be estimated by using the nomograph shown in Figure 3-7 (Manning's Equation Nomograph).

- (a) Natural Watersheds – This includes rural, ranch, and agricultural areas with natural channels. Obtain T_t directly from the Kirpich nomograph in Figure 3-4 or from the equation. This nomograph requires values for length and change in elevation along the effective slope line for the subarea. See Figure 3-5 for a representation of the effective slope line.

This nomograph is based on the Kirpich formula, which was developed with data from agricultural watersheds ranging from 1.25 to 112 acres in area, 350 to 4,000 feet in length, and 2.7 to 8.8% slope (Kirpich, 1940). A maximum length of 4,000 feet should be used for the subarea length. Typically, as the flow length increases, the depth of flow will increase, and therefore it is considered a concentration of flow at points beyond lengths listed in Figure 3-2. However, because the Kirpich formula has been shown to be applicable for watersheds up to 4,000 feet in length (Kirpich, 1940), a subarea may be designated with a length up to 4,000 feet provided the topography and slope of the natural channel are generally uniform.

Justification needs to be included with this calculation showing that the watershed will remain natural forever. Examples include areas located in the Multiple Species Conservation Plan (MSCP), areas designated as open space or rural in a community's General Plan, and Cleveland National Forest.

- (b) Urban Watersheds - Flow through a closed conduit where no additional flow can enter the system during the travel, length, velocity and T_t are determined using the peak flow in the conduit. In cases where the conduit is not closed and additional flow from a contributing subarea is added to the total flow during travel (e.g., street flow in a gutter), calculation of velocity and T_t is performed using an assumed average flow based on the total area (including upstream subareas) contributing to the point of interest. The Manning equation is usually used to determine velocity. Discharges for small watersheds typically range from 2 to 3 cfs per acre, depending on land use, drainage area, and slope and rainfall intensity.

Note: The MRM should be used to calculate the peak discharge when there is a junction from independent subareas into the drainage system.

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

100-Year, 6-Hour Rainfall Isopluvial Map

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

100-Year, 24-Hour Rainfall Isopluvial Map

County of San Diego Hydrology Manual



Rainfall Isopleths

100 Year Rainfall Event - 24 Hours

..... Isopleth (inches)



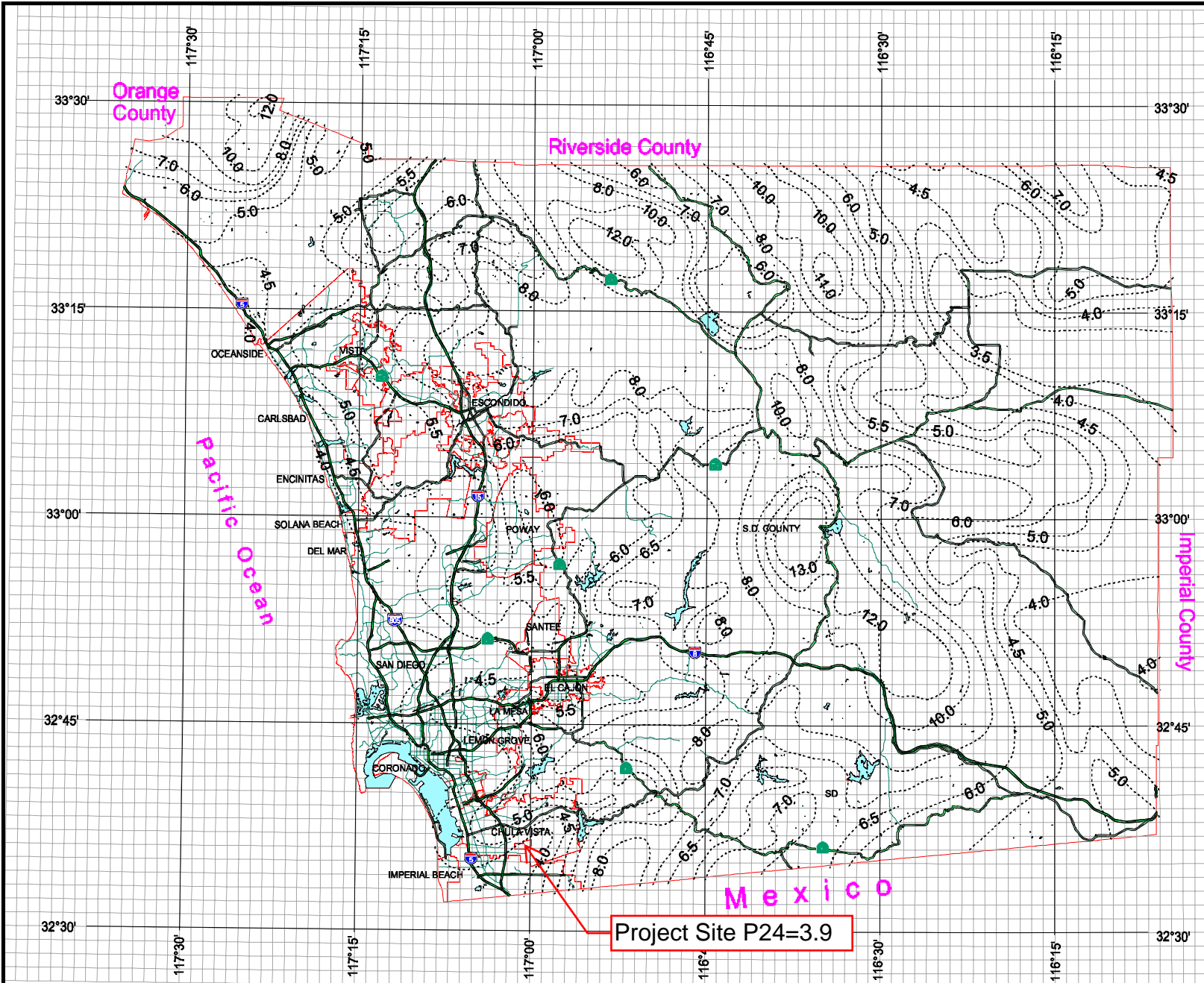
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3 0 3 Miles



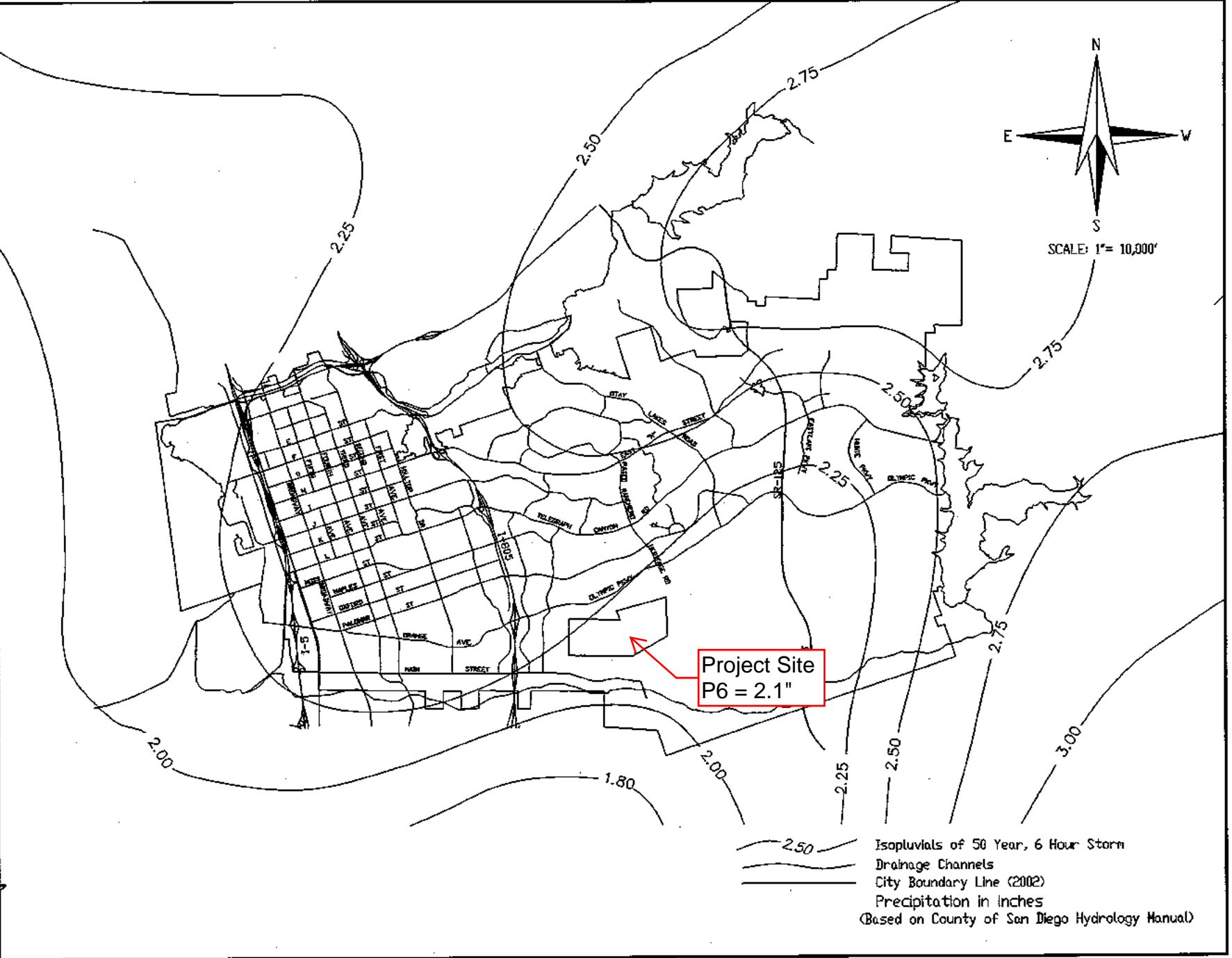
CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

50-Year, 6-Hour Rainfall Isopluvial Map

REVISION	BY	APPROVED	DATE	CITY OF CHULA VISTA ENGINEERING & CAPITAL PROJECTS STANDARD DRAWING
ORIGINAL			01/02	
REVISION	CWM	C. SWANSON	11/02	
REVISION	DPH	W. VALLÉ	11/17	
50-YEAR, 6-HOUR PRECIPITATION				DRN-03



CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

50-Year, 24-Hour Rainfall Isopluvial Map

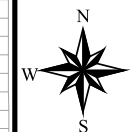
County of San Diego Hydrology Manual



Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

----- Isopluvial (inches)

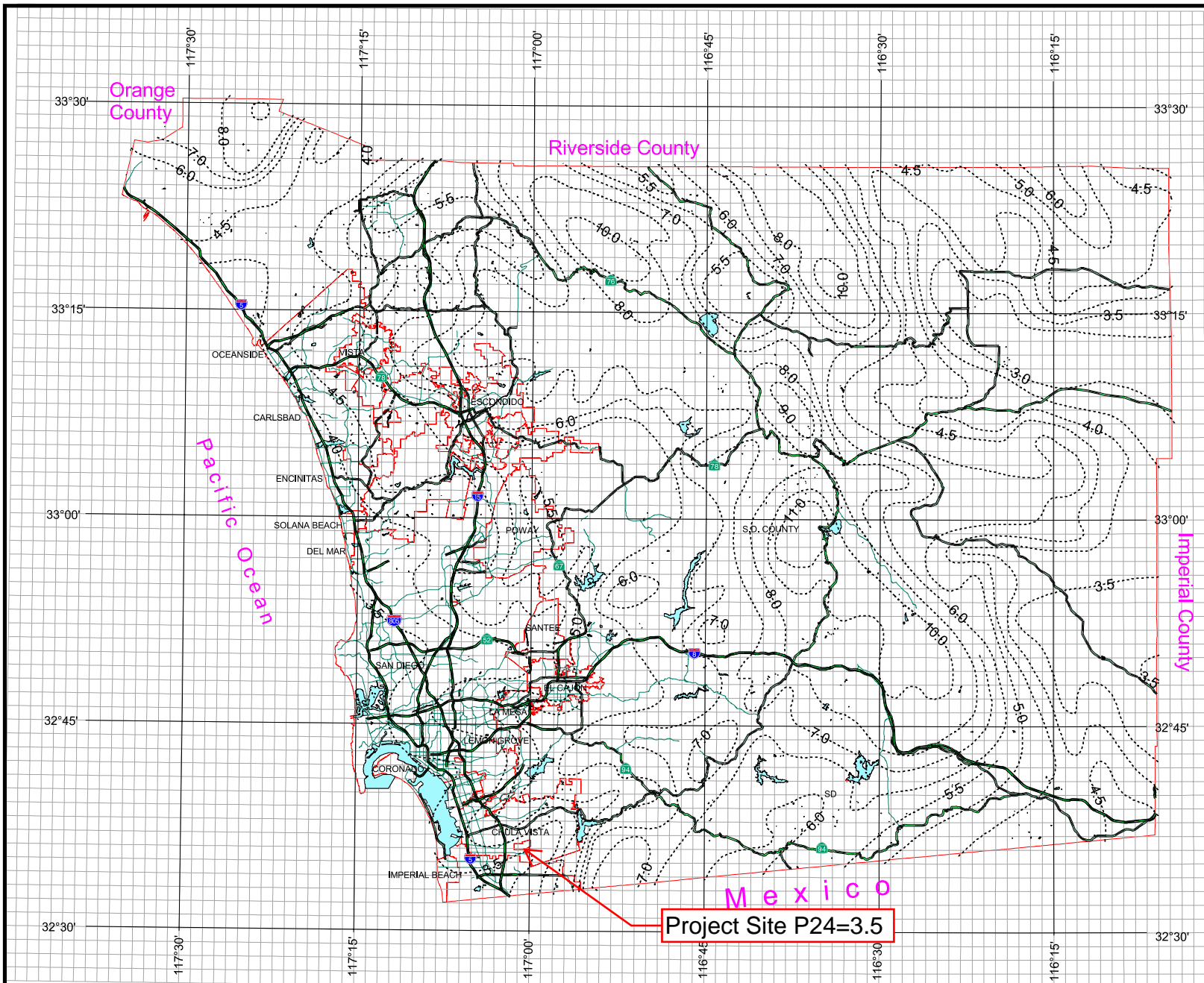


3 0 3 Miles

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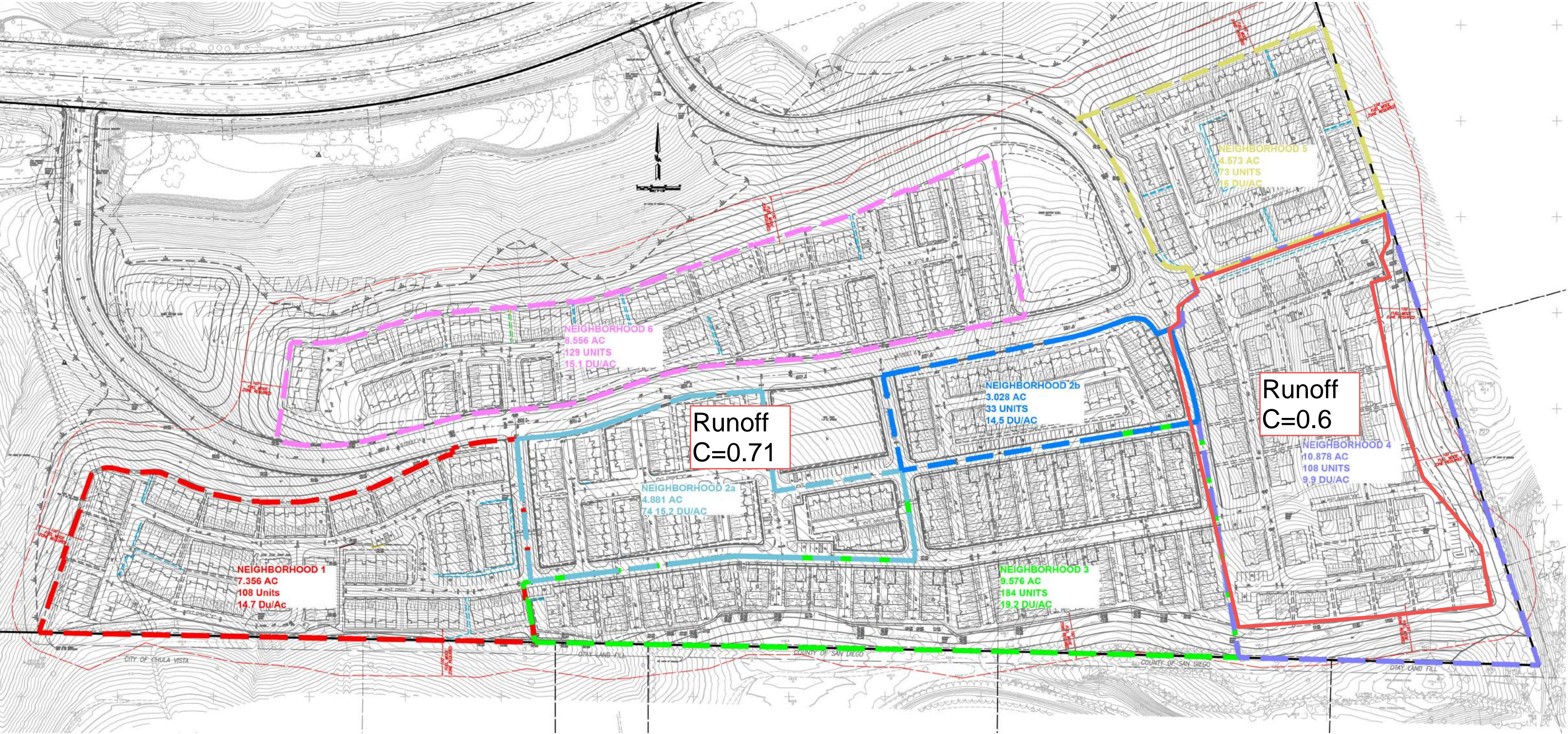


CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.3 – Rainfall Coefficient Determination

Development Density Map



**Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS**

Land Use		Runoff Coefficient "C"				
NRCS Elements	County Elements	% IMPER.	Soil Type			
			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, C_p , 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

For Graded Slopes

For R-3 Neighborhood

For the remainder

For the roads

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Maximum Overland Flow Length & Initial Time of Concentration Table

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the “Regulating Agency” when submitted with a detailed study.

Table 3-2

**MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)**

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

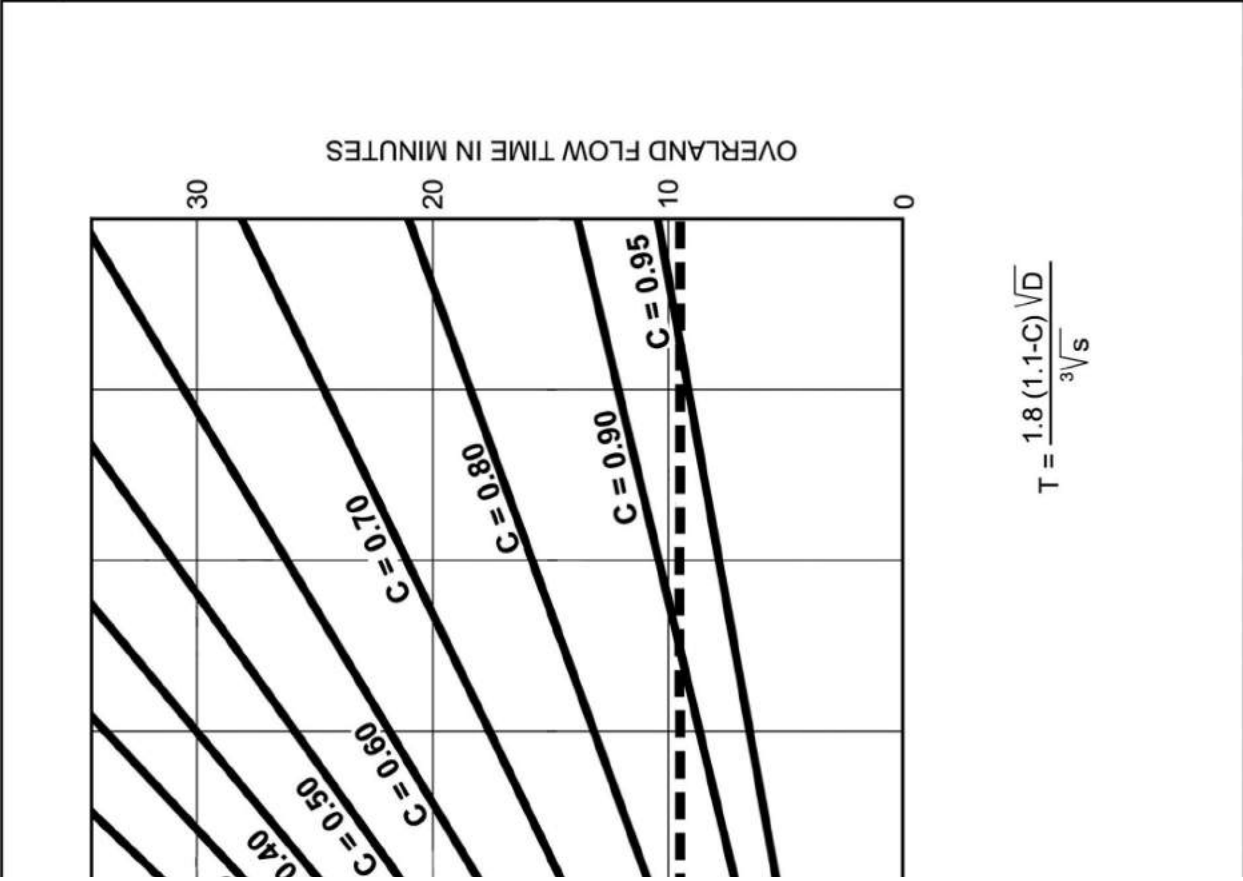
**Urban Watershed Overland Time of Flow
Nomograph**



FIGURE

3-3

Time of Flow Nomograph



FIGURE

3-5

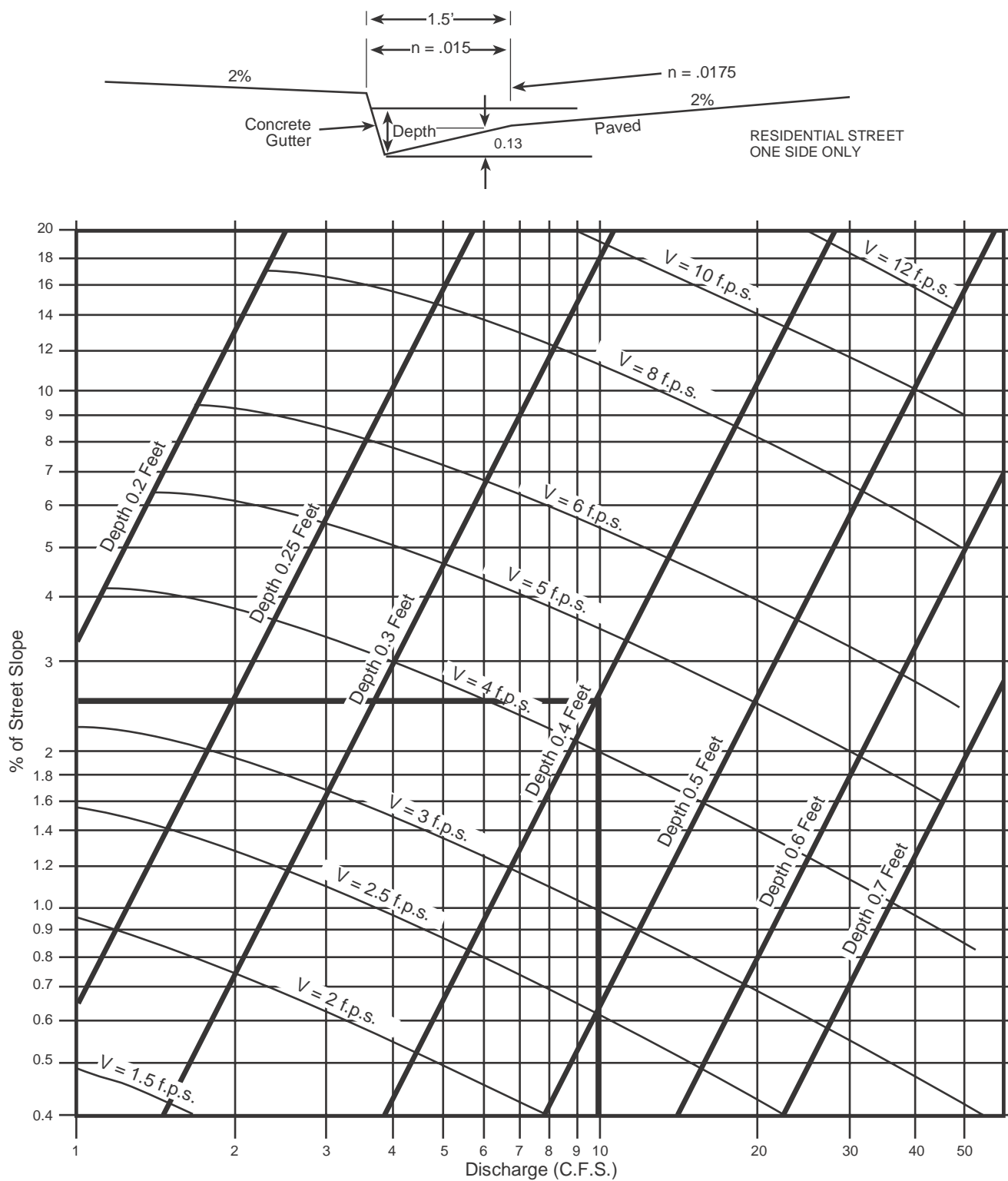
Time of Flow Nomograph

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Gutter & Roadway Discharge-Velocity Chart



EXAMPLE:
 Given: $Q = 10$ $S = 2.5\%$
 Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

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

Gutter and Roadway Discharge - Velocity Chart

FIGURE

3-6

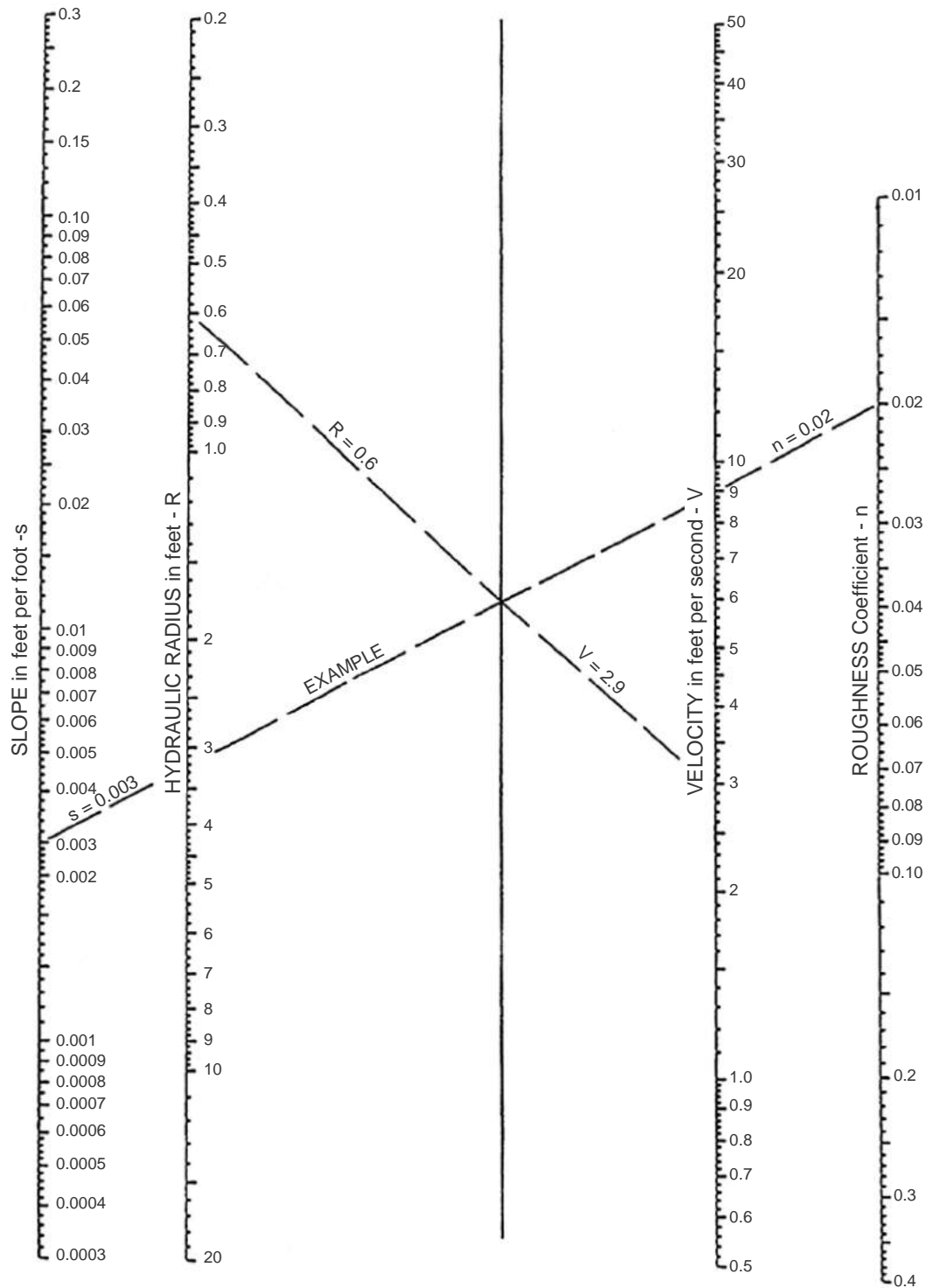
CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Manning's Equation Nomograph

$$\text{EQUATION: } V = \frac{1.49}{n} R^{2/3} s^{1/2}$$



GENERAL SOLUTION

SOURCE: USDOT, FHWA, HDS-3 (1961)

FIGURE

Manning's Equation Nomograph

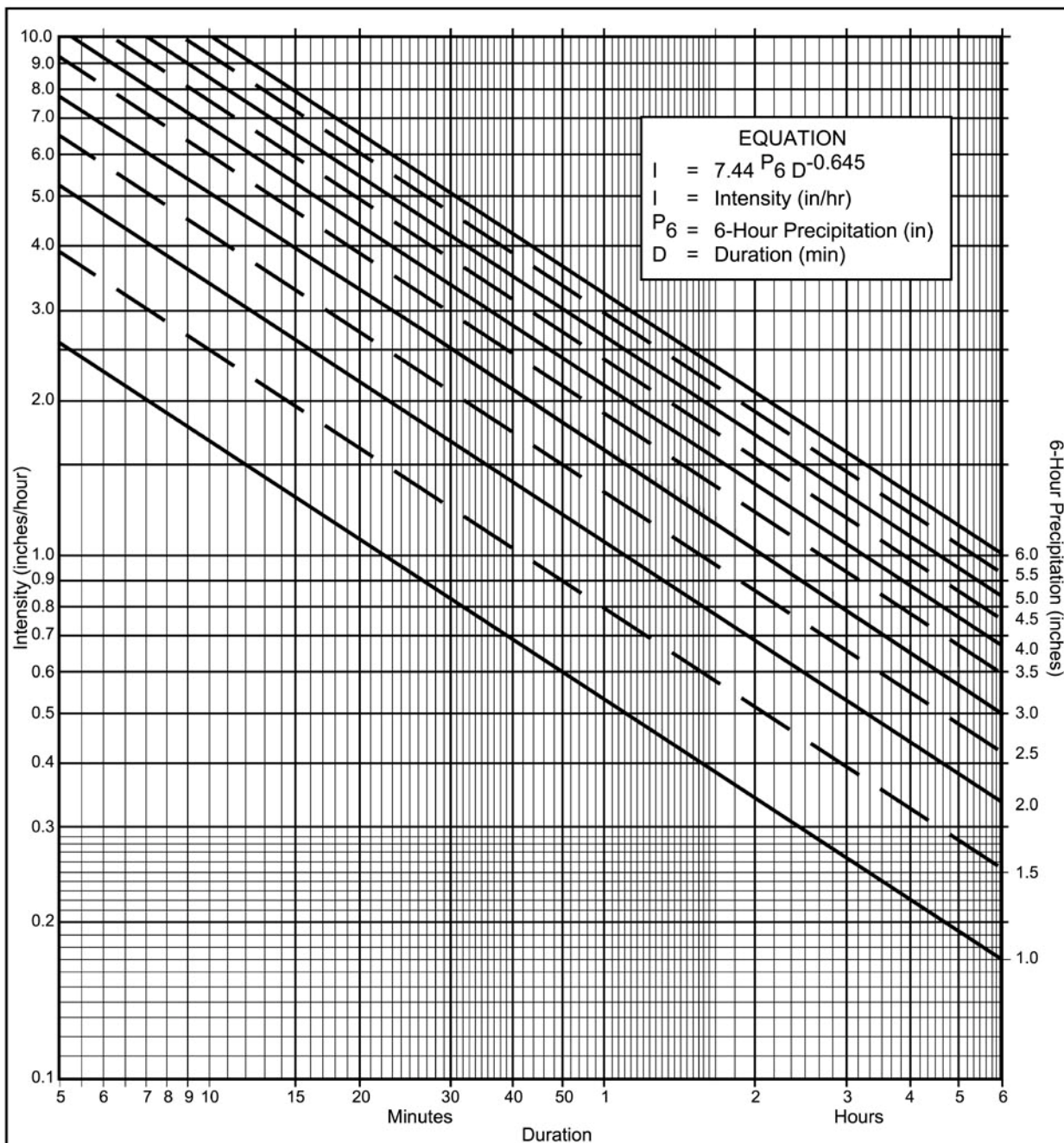
3-7

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Intensity-Duration Design Chart



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 applicable 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 **100** year
- (b) $P_6 =$ **2.4** in., $P_{24} =$ **3.9** in., $\frac{P_6}{P_{24}} =$ **61** %⁽²⁾
- (c) Adjusted $P_6^{(2)} =$ **2.4** in.
- (d) $t_x =$ _____ min.
- (e) $I =$ _____ in./hr.

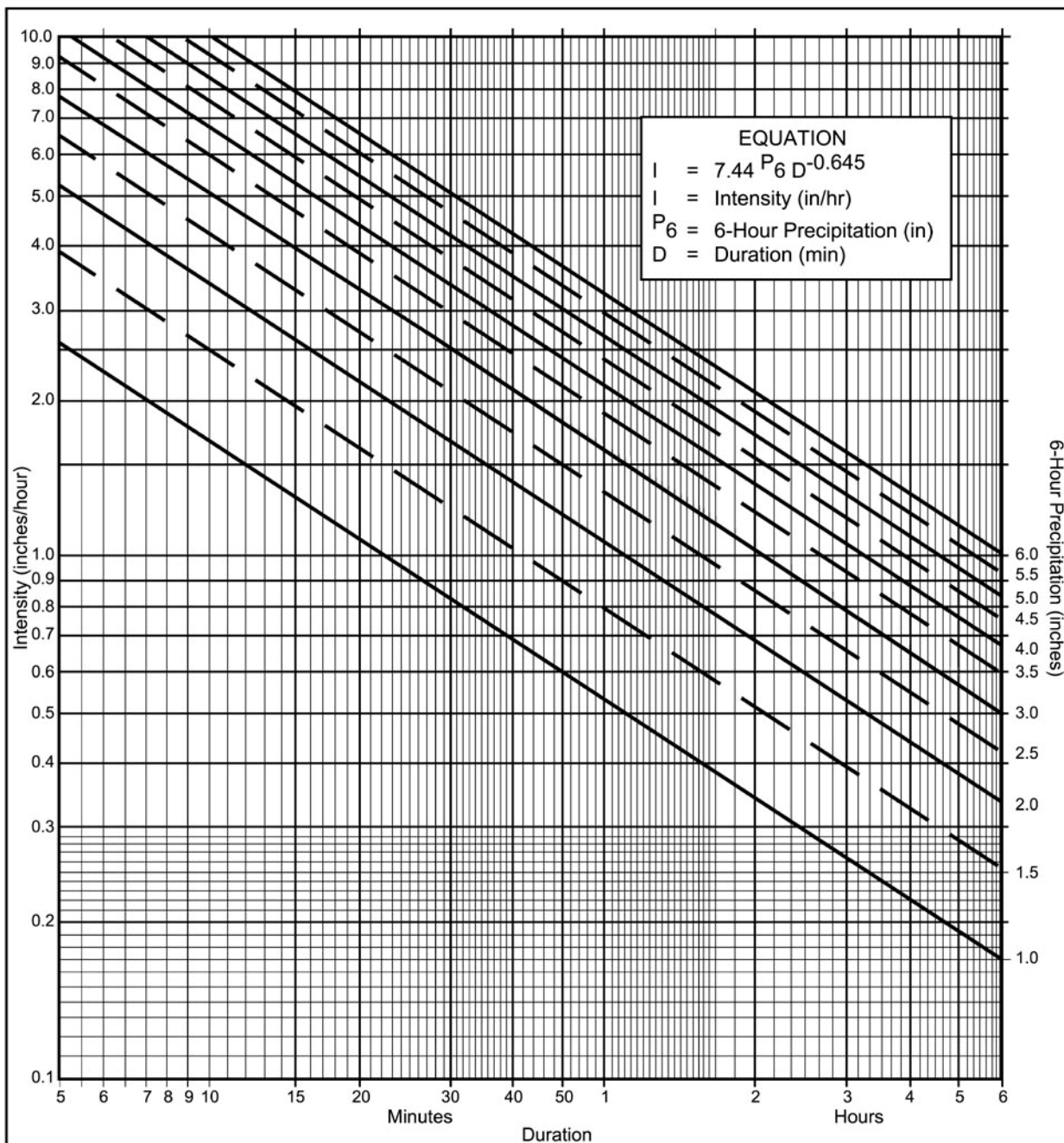
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

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



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 applicable 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 50 year
- (b) $P_6 =$ 2.1 in., $P_{24} =$ 3.5 in., $\frac{P_6}{P_{24}} =$ 60 %⁽²⁾
- (c) Adjusted $P_6^{(2)} =$ 2.1 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

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.5 - Rational Method Model Development Summary

Rational Method Hydrologic Analysis

Computer Software Package – AES-2015

Design Storm - 50-Year Return Interval for Storm Drain Hydraulics
100 - Year Return Interval for Inlet Sizing (Sump) and Detention

Land Use – High Density Residential (HDR) in Developed Areas

Soil Type – From the soil map, both group C and D are discovered from the site, however, to be conservative, Hydrologic soil group D was assumed for all areas. Group D soils have very slow infiltration rates when thoroughly wetted. Consisting chiefly of clay soils with a high swelling potential, soils with a high permanent water table, soils with clay pan or clay layer at or near the surface, and shallow soils over nearly impervious materials, Group D soils have a very slow rate of water transmission.

Runoff Coefficient – According to Development Density Map, the overall development density rated from 10DU/AC to 19.2 DU/AC, as a result, a set of runoff Cs then are determined based on County Hydrology Manual Table 3-1:

Onsite graded pervious slopes: 0.35

14.7 DU/A – 19.2DU/A: 0.71

9.9 DU/A: 0.6

Roads: 0.87

Method of Analysis – The Rational Method is the most widely used hydrologic model for estimating peak runoff rates. Applied to small urban and semi-urban areas with drainage areas less than 1.0 square mile, the Rational Method relates storm rainfall intensity, a runoff coefficient, and drainage area to peak runoff rate. This relationship is expressed by the equation:

$Q = CIA$, where:

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

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

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

A = The drainage basin area in acres.

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

The procedure for the subarea summation model is as follows:

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

- (2) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation.
- (3) Using the initial T_c , determine the corresponding values of I . Then $Q = C I A$.
- (4) Using Q , estimate the travel time between this node and the next by Manning's equation as applied to the particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows. The AES-2010 computer subarea menu is as follows:

SUBAREA HYDROLOGIC PROCESS

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

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

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

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

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

Drainage Study for
Sunbow II, Phase 3

- (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.

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

CHAPTER 3

EXISTING AND PROPOSED CONDITION RATIONAL METHOD HYDROLOGIC ANALYSIS

EXISTING CONDITION


```

100EX. OUT
SUBAREA AREA(ACRES) = 27.29 SUBAREA RUNOFF(CFS) = 30.79
TOTAL AREA(ACRES) = 27.5 TOTAL RUNOFF(CFS) = 31.02
TC(MIN.) = 14.21
*****
FLOW PROCESS FROM NODE 104.00 TO NODE 114.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 274.00 DOWNSTREAM(FEET) = 272.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 707.00 CHANNEL SLOPE = 0.0028
CHANNEL FLOW THRU SUBAREA(CFS) = 31.02
FLOW VELOCITY(FEET/SEC) = 1.80 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 6.55 Tc(MIN.) = 20.76
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 114.00 = 2941.00 FEET.
*****
FLOW PROCESS FROM NODE 104.00 TO NODE 114.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.524
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 5.75 SUBAREA RUNOFF(CFS) = 5.08
TOTAL AREA(ACRES) = 33.2 TOTAL RUNOFF(CFS) = 31.02
TC(MIN.) = 20.76
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.76
RAINFALL INTENSITY(INCH/HR) = 2.52
TOTAL STREAM AREA(ACRES) = 33.24
PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.02
*****
FLOW PROCESS FROM NODE 110.00 TO NODE 112.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```

```

100EX. OUT
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 149.00
UPSTREAM ELEVATION(FEET) = 452.00
DOWNSTREAM ELEVATION(FEET) = 445.00
ELEVATION DIFFERENCE(FEET) = 7.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 8.061
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 100.00
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.647
SUBAREA RUNOFF(CFS) = 0.36
TOTAL AREA(ACRES) = 0.22 TOTAL RUNOFF(CFS) = 0.36
*****
FLOW PROCESS FROM NODE 112.00 TO NODE 114.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 272.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1550.00 CHANNEL SLOPE = 0.1116
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.36
FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 5.45 Tc(MIN.) = 13.51
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1699.00 FEET.
*****
FLOW PROCESS FROM NODE 112.00 TO NODE 114.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.331
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 18.92 SUBAREA RUNOFF(CFS) = 22.06
TOTAL AREA(ACRES) = 19.1 TOTAL RUNOFF(CFS) = 22.31
TC(MIN.) = 13.51
*****
FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 1

```

100EX. OUT

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.51
RAINFALL INTENSITY(INCH/HR) = 3.33
TOTAL STREAM AREA(ACRES) = 19.14
PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.31

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	31.02	20.76	2.524	33.24
2	22.31	13.51	3.331	19.14

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	42.49	13.51	3.331
2	47.93	20.76	2.524

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 47.93 Tc(MIN.) = 20.76
TOTAL AREA(ACRES) = 52.4
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 114.00 = 2941.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 126.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 232.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1830.00 CHANNEL SLOPE = 0.0219
CHANNEL FLOW THRU SUBAREA(CFS) = 47.93
FLOW VELOCITY(FEET/SEC) = 5.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 5.40 Tc(MIN.) = 26.16
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 126.00 = 4771.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

100EX. OUT

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.175
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 21.40 SUBAREA RUNOFF(CFS) = 16.29
TOTAL AREA(ACRES) = 73.8 TOTAL RUNOFF(CFS) = 56.16
TC(MIN.) = 26.16

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 10

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

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

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 136.00
UPSTREAM ELEVATION(FEET) = 444.00
DOWNSTREAM ELEVATION(FEET) = 435.00
ELEVATION DIFFERENCE(FEET) = 9.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.191
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) = 5.002
SUBAREA RUNOFF(CFS) = 0.46
TOTAL AREA(ACRES) = 0.26 TOTAL RUNOFF(CFS) = 0.46

FLOW PROCESS FROM NODE 122.00 TO NODE 124.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 434.00 DOWNSTREAM(FEET) = 264.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1683.00 CHANNEL SLOPE = 0.1010
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.46

```

100EX. OUT
FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 5.91 Tc(MIN.) = 13.10
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 1819.00 FEET.
*****
FLOW PROCESS FROM NODE 122.00 TO NODE 124.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.397
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 32.18
TOTAL AREA(ACRES) = 27.3 TOTAL RUNOFF(CFS) = 32.49
TC(MIN.) = 13.10
*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.10
RAINFALL INTENSITY(INCH/HR) = 3.40
TOTAL STREAM AREA(ACRES) = 27.33
PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.49
*****
FLOW PROCESS FROM NODE 130.00 TO NODE 132.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 123.00
UPSTREAM ELEVATION(FEET) = 452.00
DOWNSTREAM ELEVATION(FEET) = 420.00
ELEVATION DIFFERENCE(FEET) = 32.00
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) = 5.466

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100EX. OUT
SUBAREA RUNOFF(CFS) = 0.63
TOTAL AREA(ACRES) = 0.33 TOTAL RUNOFF(CFS) = 0.63
*****
FLOW PROCESS FROM NODE 132.00 TO NODE 134.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 418.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 391.00 CHANNEL SLOPE = 0.0051
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.63
FLOW VELOCITY(FEET/SEC) = 1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 6.07 Tc(MIN.) = 12.34
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 514.00 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) = 3.531
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 89
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5973
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 5.56
TOTAL AREA(ACRES) = 2.8 TOTAL RUNOFF(CFS) = 5.97
TC(MIN.) = 12.34
*****
FLOW PROCESS FROM NODE 134.00 TO NODE 124.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 264.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1048.00 CHANNEL SLOPE = 0.1469
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 5.97
FLOW VELOCITY(FEET/SEC) = 6.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 14.85
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 1562.00 FEET.
*****
FLOW PROCESS FROM NODE 134.00 TO NODE 124.00 IS CODE = 81
-----

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100EX. OUT
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.133
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3999
SUBAREA AREA(ACRES) = 11.19 SUBAREA RUNOFF(CFS) = 12.27
TOTAL AREA(ACRES) = 14.0 TOTAL RUNOFF(CFS) = 17.57
TC(MIN.) = 14.85

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 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.) = 14.85
RAINFALL INTENSITY(INCH/HR) = 3.13
TOTAL STREAM AREA(ACRES) = 14.02
PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.57

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 32.49 13.10 3.397 27.33
2 17.57 14.85 3.133 14.02

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 47.99 13.10 3.397
2 47.54 14.85 3.133

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 47.99 Tc(MIN.) = 13.10
TOTAL AREA(ACRES) = 41.3
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 1819.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 126.00 IS CODE = 52
-----
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<

```

```

100EX. OUT
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 264.00 DOWNSTREAM(FEET) = 232.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 389.00 CHANNEL SLOPE = 0.0823
CHANNEL FLOW THRU SUBAREA(CFS) = 47.99
FLOW VELOCITY(FEET/SEC) = 10.97 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 13.70
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 2208.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 126.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.301
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3661
SUBAREA AREA(ACRES) = 2.17 SUBAREA RUNOFF(CFS) = 2.51
TOTAL AREA(ACRES) = 43.5 TOTAL RUNOFF(CFS) = 52.60
TC(MIN.) = 13.70

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 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 52.60 13.70 3.301 43.52
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 2208.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 56.16 26.16 2.175 73.78
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 126.00 = 4771.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 82.00 13.70 3.301
2 90.81 26.16 2.175

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

100EX. OUT
PEAK FLOW RATE(CFS) = 90.81 Tc(MIN.) = 26.16
TOTAL AREA(ACRES) = 117.3

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

=====

+-----+
| END EXISTING CONDITION HYD |
| SUNBOW PA-23 |
+-----+

=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 117.3 TC(MIN.) = 26.16
PEAK FLOW RATE(CFS) = 90.81

=====

=====

END OF RATIONAL METHOD ANALYSIS



PROPOSED CONDITION (UNATTENUATED)

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:\1561\HYD\DR\CALCS\TM\AES\PR.DAT
 TIME/DATE OF STUDY: 17:02 06/12/2020

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 6-HOUR DURATION PRECIPITATION (INCHES) = 2.400
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	12.0	6.0	0.020/0.020/0.020	0.50	1.50 0.0312 0.125	0.0160
2	15.0	7.5	0.020/0.020/0.020	0.33	1.50 0.0312 0.125	0.0130

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.50 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 5.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

-----+-----
 BEGIN PROPOSED CONDITION HYD
 SUNBOW PA-23
 -----+-----

 FLOW PROCESS FROM NODE 100.00 TO NODE 102.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(Feet) = 88.00
 UPSTREAM ELEVATION(Feet) = 474.00
 DOWNSTREAM ELEVATION(Feet) = 460.00
 ELEVATION DIFFERENCE(Feet) = 14.00

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.879
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.696
 SUBAREA RUNOFF(CFS) = 0.40
 TOTAL AREA(ACRES) = 0.20 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(Feet) = 460.00 DOWNSTREAM(Feet) = 438.00
 CHANNEL LENGTH THRU SUBAREA(Feet) = 317.00 CHANNEL SLOPE = 0.0694
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.40
 FLOW VELOCITY(Feet/Sec) = 3.95 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 7.22
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 405.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.991
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 3.02
 TOTAL AREA(ACRES) = 1.9 TOTAL RUNOFF(CFS) = 3.37
 Tc(MIN.) = 7.22

FLOW PROCESS FROM NODE 104.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(Feet) = 438.00 DOWNSTREAM(Feet) = 403.20
 FLOW LENGTH(Feet) = 594.00 MANNING'S N = 0.012
 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.) = 10.37
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.37
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 8.17
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 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<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"

100PR. OUT

S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 342.00
 UPSTREAM ELEVATION(FEET) = 464.00
 DOWNSTREAM ELEVATION(FEET) = 434.00
 ELEVATION DIFFERENCE(FEET) = 30.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.546
 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) = 5.315
 SUBAREA RUNOFF(CFS) = 0.35
 TOTAL AREA(ACRES) = 0.19 TOTAL RUNOFF(CFS) = 0.35

 FLOW PROCESS FROM NODE 112.00 TO NODE 114.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 434.00 DOWNSTREAM(FEET) = 408.60
 FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 0.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.54
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.35
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 6.64
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 402.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 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.) = 6.64
 RAINFALL INTENSITY(INCH/HR) = 5.27
 TOTAL STREAM AREA(ACRES) = 0.19
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.35

 FLOW PROCESS FROM NODE 116.00 TO NODE 114.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
 UPSTREAM ELEVATION(FEET) = 440.00
 DOWNSTREAM ELEVATION(FEET) = 412.00
 ELEVATION DIFFERENCE(FEET) = 28.00
 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) = 5.466
 SUBAREA RUNOFF(CFS) = 0.42
 TOTAL AREA(ACRES) = 0.22 TOTAL RUNOFF(CFS) = 0.42

Page 3

100PR. OUT

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 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) = 5.47
 TOTAL STREAM AREA(ACRES) = 0.22
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.42

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.35	6.64	5.265	0.19
2	0.42	6.27	5.466	0.22

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	0.75	6.27	5.466
2	0.76	6.64	5.265

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 0.76 Tc(MIN.) = 6.64
 TOTAL AREA(ACRES) = 0.4
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 402.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 408.00 DOWNSTREAM(FEET) = 402.70
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.33
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.76
 PIPE TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 9.89
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 124.00 = 1052.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.89
 RAINFALL INTENSITY(INCH/HR) = 4.07
 TOTAL STREAM AREA(ACRES) = 0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.76

 FLOW PROCESS FROM NODE 120.00 TO NODE 122.00 IS CODE = 21
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100PR. OUT

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(Feet) = 100.00
 UPSTREAM ELEVATION(Feet) = 460.00
 DOWNSTREAM ELEVATION(Feet) = 420.00
 ELEVATION DIFFERENCE(Feet) = 40.00
 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) = 5.466
 SUBAREA RUNOFF(CFS) = 0.27
 TOTAL AREA(ACRES) = 0.14 TOTAL RUNOFF(CFS) = 0.27

 FLOW PROCESS FROM NODE 122.00 TO NODE 124.00 IS CODE = 62

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(Feet) = 408.60 DOWNSTREAM ELEVATION(Feet) = 402.70
 STREET LENGTH(Feet) = 788.00 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 = 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) = 4.15
 STREET FLOW SPLITS OVER STREET-CROWN
 FULL DEPTH(Feet) = 0.37 FLOOD WIDTH(Feet) = 12.00
 FULL HALF-STREET VELOCITY(Feet/Sec.) = 2.01
 SPLIT DEPTH(Feet) = 0.27 SPLIT FLOOD WIDTH(Feet) = 7.27
 SPLIT FLOW(CFS) = 1.01 SPLIT VELOCITY(Feet/Sec.) = 1.57
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(Feet) = 0.37
 HALFSTREET FLOOD WIDTH(Feet) = 12.00
 AVERAGE FLOW VELOCITY(Feet/Sec.) = 2.01
 PRODUCT OF DEPTH&VELOCITY(Ft*Ft/Sec.) = 0.74
 STREET FLOW TRAVEL TIME(Min.) = 6.52 Tc(Min.) = 12.79
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.451
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.695
 SUBAREA AREA(ACRES) = 3.17 SUBAREA RUNOFF(CFS) = 7.77
 TOTAL AREA(ACRES) = 3.3 PEAK FLOW RATE(CFS) = 7.94

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(Feet) = 0.39 HALFSTREET FLOOD WIDTH(Feet) = 12.00
 FLOW VELOCITY(Feet/Sec.) = 2.20 DEPTH*VELOCITY(Ft*Ft/Sec.) = 0.85
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 888.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

100PR. OUT

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(Min.) = 12.79
 RAINFALL INTENSITY(INCH/HR) = 3.45
 TOTAL STREAM AREA(ACRES) = 3.31
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.94

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (Min.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.76	9.89	4.072	0.41
2	7.94	12.79	3.451	3.31

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (Min.)	INTENSITY (INCH/HOUR)
1	6.90	9.89	4.072
2	8.58	12.79	3.451

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 8.58 Tc(Min.) = 12.79
 TOTAL AREA(ACRES) = 3.7
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 124.00 = 1052.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 127.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(Feet) = 402.70 DOWNSTREAM(Feet) = 402.00
 FLOW LENGTH(Feet) = 60.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 7.36
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 8.58
 PIPE TRAVEL TIME(Min.) = 0.14 Tc(Min.) = 12.92
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 1112.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(Min.) = 12.92
 RAINFALL INTENSITY(INCH/HR) = 3.43
 TOTAL STREAM AREA(ACRES) = 3.72
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.58

 FLOW PROCESS FROM NODE 121.00 TO NODE 123.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
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SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(Feet) = 143.00
 UPSTREAM ELEVATION(Feet) = 474.00
 DOWNSTREAM ELEVATION(Feet) = 460.00
 ELEVATION DIFFERENCE(Feet) = 14.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.311
 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) = 5.441
 SUBAREA RUNOFF(CFS) = 0.34
 TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.34

 FLOW PROCESS FROM NODE 123.00 TO NODE 125.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

 ELEVATION DATA: UPSTREAM(Feet) = 460.00 DOWNSTREAM(Feet) = 440.00
 CHANNEL LENGTH THRU SUBAREA(Feet) = 229.00 CHANNEL SLOPE = 0.0873
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.34
 FLOW VELOCITY(Feet/Sec) = 4.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 7.17
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 125.00 = 372.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.011
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) = 1.39 SUBAREA RUNOFF(CFS) = 2.44
 TOTAL AREA(ACRES) = 1.6 TOTAL RUNOFF(CFS) = 2.75
 Tc(MIN.) = 7.17

 FLOW PROCESS FROM NODE 125.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(Feet) = 408.00 DOWNSTREAM(Feet) = 402.00
 FLOW LENGTH(Feet) = 290.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.1 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 6.76
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.75
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 7.89
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 127.00 = 662.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 7.89
 RAINFALL INTENSITY(INCH/HR) = 4.71
 TOTAL STREAM AREA(ACRES) = 1.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.75

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.58	12.92	3.428	3.72
2	2.75	7.89	4.713	1.57

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	8.99	7.89	4.713
2	10.58	12.92	3.428

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.58 Tc(MIN.) = 12.92
 TOTAL AREA(ACRES) = 5.3
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 1112.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(Feet) = 404.00 DOWNSTREAM(Feet) = 403.20
 FLOW LENGTH(Feet) = 80.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.1 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 7.14
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.58
 PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.11
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 128.00 = 1192.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.58	13.11	3.396	5.29

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 128.00 = 1192.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	3.37	8.17	4.607	1.93

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 999.00 FEET.

** PEAK FLOW RATE TABLE **

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STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	9.97	8.17	4.607
2	13.07	13.11	3.396

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 13.07 Tc(MIN.) = 13.11
 TOTAL AREA(ACRES) = 7.2

```
*****
FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 128.00 TO NODE 134.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
```

```
=====
ELEVATION DATA: UPSTREAM( FEET ) = 403.20 DOWNSTREAM( FEET ) = 402.45
FLOW LENGTH( FEET ) = 30.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.6 INCHES
PIPE-FLOW VELOCITY( FEET/SEC. ) = 10.87
ESTIMATED PIPE DIAMETER( INCH ) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS ) = 13.07
PIPE TRAVEL TIME( MIN. ) = 0.05 Tc( MIN. ) = 13.15
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 134.00 = 1222.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
```

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 13.15
 RAINFALL INTENSITY(INCH/HR) = 3.39
 TOTAL STREAM AREA(ACRES) = 7.22
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.07

```
*****
FLOW PROCESS FROM NODE 130.00 TO NODE 132.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH( FEET ) = 101.00
UPSTREAM ELEVATION( FEET ) = 450.00
DOWNSTREAM ELEVATION( FEET ) = 417.00
ELEVATION DIFFERENCE( FEET ) = 33.00
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 ) = 5.466
SUBAREA RUNOFF( CFS ) = 0.23
TOTAL AREA( ACRES ) = 0.12 TOTAL RUNOFF( CFS ) = 0.23
```

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```
*****
FLOW PROCESS FROM NODE 132.00 TO NODE 134.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
```

```
=====
UPSTREAM ELEVATION( FEET ) = 417.00 DOWNSTREAM ELEVATION( FEET ) = 402.45
STREET LENGTH( FEET ) = 673.30 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 = 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 ) = 3.49
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH( FEET ) = 0.33
HALFSTREET FLOOD WIDTH( FEET ) = 10.08
AVERAGE FLOW VELOCITY( FEET/SEC. ) = 3.08
PRODUCT OF DEPTH&VELOCITY( FT*FT/SEC. ) = 1.01
STREET FLOW TRAVEL TIME( MIN. ) = 3.65 Tc( MIN. ) = 9.91
100 YEAR RAINFALL INTENSITY( INCH/HOUR ) = 4.067
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.589
SUBAREA AREA( ACRES ) = 2.70 SUBAREA RUNOFF( CFS ) = 6.59
TOTAL AREA( ACRES ) = 2.8 PEAK FLOW RATE( CFS ) = 6.76
```

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
 FLOW VELOCITY(FEET/SEC.) = 3.42 DEPTH*VELOCITY(FT*FT/SEC.) = 1.25
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 774.30 FEET.

```
*****
FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.91
RAINFALL INTENSITY(INCH/HR) = 4.07
TOTAL STREAM AREA(ACRES) = 2.82
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.76
```

```
** CONFLUENCE DATA **
STREAM   RUNOFF   Tc   INTENSITY   AREA
NUMBER   (CFS)    (MIN.) (INCH/HOUR) (ACRE)
1        13.07   13.15   3.388      7.22
2         6.76   9.91    4.067      2.82
```

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

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

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NUMBER	(CFS)	(MIN.)	(INCH/HOUR)
1	16.61	9.91	4.067
2	18.70	13.15	3.388

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.70 Tc(MIN.) = 13.15

TOTAL AREA(ACRES) = 10.0

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 134.00 = 1222.00 FEET.

```
*****
FLOW PROCESS FROM NODE 134.00 TO NODE 146.00 IS CODE = 31
-----
```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```
*****
ELEVATION DATA: UPSTREAM(FEET) = 402.45 DOWNSTREAM(FEET) = 392.90
FLOW LENGTH(FEET) = 352.60 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.30
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.70
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 13.63
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 146.00 = 1574.60 FEET.
```

```
*****
FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 10
-----
```

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

```
*****
FLOW PROCESS FROM NODE 140.00 TO NODE 142.00 IS CODE = 21
-----
```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```
*****
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 106.00
UPSTREAM ELEVATION(FEET) = 435.00
DOWNSTREAM ELEVATION(FEET) = 415.00
ELEVATION DIFFERENCE(FEET) = 20.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.178
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) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.46
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.46
```

```
*****
FLOW PROCESS FROM NODE 142.00 TO NODE 144.00 IS CODE = 62
-----
```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

```
*****
UPSTREAM ELEVATION(FEET) = 415.60 DOWNSTREAM ELEVATION(FEET) = 398.00
STREET LENGTH(FEET) = 643.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 12.00
```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 6.00

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INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0160

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.10
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 10.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.49
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
STREET FLOW TRAVEL TIME(MIN.) = 3.07 Tc(MIN.) = 7.24
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.978
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.17
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 7.53
```

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00

FLOW VELOCITY(FEET/SEC.) = 3.85 DEPTH*VELOCITY(FT*FT/SEC.) = 1.41

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 749.00 FEET.

```
*****
FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31
-----
```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```
*****
ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 393.00
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.012
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.) = 9.82
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.53
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 7.56
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 934.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 7.56
RAINFALL INTENSITY(INCH/HR) = 4.84
TOTAL STREAM AREA(ACRES) = 2.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.53
```

```
*****
FLOW PROCESS FROM NODE 141.00 TO NODE 143.00 IS CODE = 21
-----
```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```
*****
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
```

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100PR. OUT

S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 150.00
 UPSTREAM ELEVATION(FEET) = 407.00
 DOWNSTREAM ELEVATION(FEET) = 406.00
 ELEVATION DIFFERENCE(FEET) = 1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.640
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 55.00
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.810
 SUBAREA RUNOFF(CFS) = 0.52
 TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.52

 FLOW PROCESS FROM NODE 143.00 TO NODE 145.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 406.00 DOWNSTREAM ELEVATION(FEET) = 393.00
 STREET LENGTH(FEET) = 478.00 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 = 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) = 2.31
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.28
 HALFSTREET FLOOD WIDTH(FEET) = 7.92
 AVERAGE FLOW VELOCITY(FT/SEC.) = 3.10
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.88
 STREET FLOW TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 10.21
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.990
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
 SUBAREA AREA(ACRES) = 1.49 SUBAREA RUNOFF(CFS) = 3.57
 TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 4.00

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.17
 FLOW VELOCITY(FT/SEC.) = 3.47 DEPTH*VELOCITY(FT*FT/SEC.) = 1.14
 LONGEST FLOWPATH FROM NODE 141.00 TO NODE 145.00 = 628.00 FEET.

 FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 10.21
 RAINFALL INTENSITY(INCH/HR) = 3.99

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100PR. OUT

TOTAL STREAM AREA(ACRES) = 1.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.00

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	7.53	7.56	4.844	2.52
2	4.00	10.21	3.990	1.67

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	10.49	7.56	4.844
2	10.20	10.21	3.990

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 10.49 Tc(MIN.) = 7.56
 TOTAL AREA(ACRES) = 4.2
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 934.00 FEET.

 FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 393.00
 FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
 PIPE-FLOW VELOCITY(FT/SEC.) = 9.90
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.49
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 7.63
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 979.00 FEET.

 FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.49	7.63	4.813	4.19

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 979.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	18.70	13.63	3.311	10.04

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 146.00 = 1574.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	20.96	7.63	4.813
2	25.91	13.63	3.311

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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                                100PR. OUT
PEAK FLOW RATE(CFS) =      25.91   Tc(MIN.) =   13.63
TOTAL AREA(ACRES) =      14.2

*****
FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 IS CODE =   12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE    146.00 TO NODE    154.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   392.90   DOWNSTREAM(FEET) =   391.00
FLOW LENGTH(FEET) =    84.00   MANNING'S N =   0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   12.44
ESTIMATED PIPE DIAMETER(INCH) =   24.00   NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      25.91
PIPE TRAVEL TIME(MIN.) =    0.11   Tc(MIN.) =   13.74
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    154.00 =   1658.60 FEET.

*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =   13.74
RAINFALL INTENSITY(INCH/HR) =    3.29
TOTAL STREAM AREA(ACRES) =    14.23
PEAK FLOW RATE(CFS) AT CONFLUENCE =    25.91

*****
FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   88
INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
UPSTREAM ELEVATION(FEET) =   401.00
DOWNSTREAM ELEVATION(FEET) =   400.00
ELEVATION DIFFERENCE(FEET) =    1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.563
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    56.43
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
         100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.842
SUBAREA RUNOFF(CFS) =    0.52
TOTAL AREA(ACRES) =    0.18   TOTAL RUNOFF(CFS) =    0.52

*****
FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =   62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

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                                100PR. OUT
UPSTREAM ELEVATION(FEET) = 400.00   DOWNSTREAM ELEVATION(FEET) = 391.00
STREET LENGTH(FEET) =   358.00   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 =    1
STREET PARKWAY CROSSFALL(DECIMAL) =    0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) =   0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    2.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =    0.29
HALFSTREET FLOOD WIDTH(FEET) =    8.02
AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
STREET FLOW TRAVEL TIME(MIN.) =    1.99   Tc(MIN.) =    9.56
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =    4.164
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   88
AREA-AVERAGE RUNOFF COEFFICIENT =    0.600
SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    3.50
TOTAL AREA(ACRES) =    1.6   PEAK FLOW RATE(CFS) =    3.95

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) =    0.33   HALFSTREET FLOOD WIDTH(FEET) =   10.27
FLOW VELOCITY(FEET/SEC.) =    3.37   DEPTH*VELOCITY(FT*FT/SEC.) =    1.12
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =   498.00 FEET.

*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =    9.56
RAINFALL INTENSITY(INCH/HR) =    4.16
TOTAL STREAM AREA(ACRES) =    1.58
PEAK FLOW RATE(CFS) AT CONFLUENCE =    3.95

*****
FLOW PROCESS FROM NODE    151.00 TO NODE    153.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   88
INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
UPSTREAM ELEVATION(FEET) =   401.00
DOWNSTREAM ELEVATION(FEET) =   400.00
ELEVATION DIFFERENCE(FEET) =    1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.563
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    56.43
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
         100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.842

500 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.842

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100PR. OUT

SUBAREA RUNOFF(CFS) = 0.52
TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.52

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 391.40
STREET LENGTH(FEET) = 358.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.22
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.25
HALFSTREET FLOOD WIDTH(FEET) = 5.96
AVERAGE FLOW VELOCITY(FT/SEC.) = 2.58
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 9.88
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.076
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
SUBAREA AREA(ACRES) = 0.57 SUBAREA RUNOFF(CFS) = 1.39
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 7.36
FLOW VELOCITY(FT/SEC.) = 2.78 DEPTH*VELOCITY(FT*FT/SEC.) = 0.76
LONGEST FLOWPATH FROM NODE 151.00 TO NODE 154.00 = 498.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 9.88
RAINFALL INTENSITY(INCH/HR) = 4.08
TOTAL STREAM AREA(ACRES) = 0.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.83

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	25.91	13.74	3.294	14.23
2	3.95	9.56	4.164	1.58
3	1.83	9.88	4.076	0.75

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	23.74	9.56	4.164
2	24.32	9.88	4.076
3	30.52	13.74	3.294

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 30.52 Tc(MIN.) = 13.74
TOTAL AREA(ACRES) = 16.6
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 154.00 = 1658.60 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 169.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 391.40 DOWNSTREAM(FEET) = 390.10
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 16.32
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.52
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 13.77
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 169.00 = 1688.60 FEET.

FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 160.00 TO NODE 162.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 108.00
UPSTREAM ELEVATION(FEET) = 396.00
DOWNSTREAM ELEVATION(FEET) = 395.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.707
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 62.78
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.807
SUBAREA RUNOFF(CFS) = 0.54
TOTAL AREA(ACRES) = 0.13 TOTAL RUNOFF(CFS) = 0.54

FLOW PROCESS FROM NODE 162.00 TO NODE 164.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 396.00 DOWNSTREAM ELEVATION(FEET) = 392.30
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                                100PR. OUT
STREET LENGTH(FEET) = 340.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.67
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 10.36
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.24
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.75
STREET FLOW TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 8.24
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.583
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 4.23
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 4.65

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 164.00 = 448.00 FEET.

*****
FLOW PROCESS FROM NODE 164.00 TO NODE 168.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 392.30 DOWNSTREAM(FEET) = 390.00
FLOW LENGTH(FEET) = 233.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.97
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.65
PIPE TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 8.89
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 168.00 = 681.00 FEET.

*****
FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.89
RAINFALL INTENSITY(INCH/HR) = 4.36
TOTAL STREAM AREA(ACRES) = 1.43
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.65

*****
FLOW PROCESS FROM NODE 161.00 TO NODE 163.00 IS CODE = 21
-----

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                                100PR. OUT
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 118.00
UPSTREAM ELEVATION(FEET) = 396.00
DOWNSTREAM ELEVATION(FEET) = 395.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.766
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 60.42
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.768
SUBAREA RUNOFF(CFS) = 0.53
TOTAL AREA(ACRES) = 0.13 TOTAL RUNOFF(CFS) = 0.53

*****
FLOW PROCESS FROM NODE 163.00 TO NODE 168.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 395.00 DOWNSTREAM ELEVATION(FEET) = 390.00
STREET LENGTH(FEET) = 580.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.16
SPLIT DEPTH(FEET) = 0.16 SPLIT FLOOD WIDTH(FEET) = 1.54
SPLIT FLOW(CFS) = 0.13 SPLIT VELOCITY(FEET/SEC.) = 0.94
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79
STREET FLOW TRAVEL TIME(MIN.) = 4.47 Tc(MIN.) = 10.24
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.983
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.94
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.31

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.16 DEPTH*VELOCITY(FT*FT/SEC.) = 0.79
LONGEST FLOWPATH FROM NODE 161.00 TO NODE 168.00 = 698.00 FEET.

*****

```

```

100PR. OUT
FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.24
RAINFALL INTENSITY(INCH/HR) = 3.98
TOTAL STREAM AREA(ACRES) = 2.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.31
=====
FLOW PROCESS FROM NODE 165.00 TO NODE 167.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 121.00
UPSTREAM ELEVATION(FEET) = 394.20
DOWNSTREAM ELEVATION(FEET) = 392.80
ELEVATION DIFFERENCE(FEET) = 1.40
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.456
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 66.57
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.977
SUBAREA RUNOFF(CFS) = 0.64
TOTAL AREA(ACRES) = 0.15 TOTAL RUNOFF(CFS) = 0.64
=====
FLOW PROCESS FROM NODE 167.00 TO NODE 168.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 392.80 DOWNSTREAM ELEVATION(FEET) = 390.00
STREET LENGTH(FEET) = 284.00 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 = 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) = 1.58
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 8.39
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.92
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 7.92
100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.699
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710

```

```

100PR. OUT
SUBAREA AREA(ACRES) = 0.56 SUBAREA RUNOFF(CFS) = 1.87
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 2.37

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.08
FLOW VELOCITY(FEET/SEC.) = 2.09 DEPTH*VELOCITY(FT*FT/SEC.) = 0.68
LONGEST FLOWPATH FROM NODE 165.00 TO NODE 168.00 = 405.00 FEET.
=====
FLOW PROCESS FROM NODE 168.00 TO NODE 169.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 391.00 DOWNSTREAM(FEET) = 390.50
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.99
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.37
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 8.09
LONGEST FLOWPATH FROM NODE 165.00 TO NODE 169.00 = 455.00 FEET.
=====
FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 8.09
RAINFALL INTENSITY(INCH/HR) = 4.64
TOTAL STREAM AREA(ACRES) = 0.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.37

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HR) (ACRE)
1 4.65 8.89 4.364 1.43
2 6.31 10.24 3.983 2.23
3 2.37 8.09 4.636 0.71

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/HR)
1 11.59 8.09 4.636
2 12.36 8.89 4.364
3 12.59 10.24 3.983

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 12.59 Tc(MIN.) = 10.24
TOTAL AREA(ACRES) = 4.4
LONGEST FLOWPATH FROM NODE 161.00 TO NODE 169.00 = 698.00 FEET.
=====
FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

```

100PR. OUT

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	12.59	10.24	3.983	4.37

LONGEST FLOWPATH FROM NODE 161.00 TO NODE 169.00 = 698.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	30.52	13.77	3.289	16.56

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 169.00 = 1688.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	35.27	10.24	3.983
2	40.91	13.77	3.289

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 40.91 Tc(MIN.) = 13.77
 TOTAL AREA(ACRES) = 20.9

 FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 169.00 TO NODE 198.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.10 DOWNSTREAM(FEET) = 388.90
 FLOW LENGTH(FEET) = 113.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.30
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 40.91
 PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 13.96
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 198.00 = 1801.60 FEET.

 FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 170.00 TO NODE 172.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 120.00
 UPSTREAM ELEVATION(FEET) = 440.00
 DOWNSTREAM ELEVATION(FEET) = 410.00
 ELEVATION DIFFERENCE(FEET) = 30.00

100PR. OUT

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) = 5.466
 SUBAREA RUNOFF(CFS) = 0.33
 TOTAL AREA(ACRES) = 0.17 TOTAL RUNOFF(CFS) = 0.33

 FLOW PROCESS FROM NODE 172.00 TO NODE 176.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 408.00 DOWNSTREAM ELEVATION(FEET) = 388.50
 STREET LENGTH(FEET) = 671.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.12
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.28
 HALFSTREET FLOOD WIDTH(FEET) = 7.55
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.08
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.85
 STREET FLOW TRAVEL TIME(MIN.) = 3.63 Tc(MIN.) = 9.90
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.070
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.667
 SUBAREA AREA(ACRES) = 1.26 SUBAREA RUNOFF(CFS) = 3.64
 TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.88

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.89
 FLOW VELOCITY(FEET/SEC.) = 3.54 DEPTH*VELOCITY(FT*FT/SEC.) = 1.15
 LONGEST FLOWPATH FROM NODE 170.00 TO NODE 176.00 = 791.00 FEET.

 FLOW PROCESS FROM NODE 176.00 TO NODE 176.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.90
 RAINFALL INTENSITY(INCH/HR) = 4.07
 TOTAL STREAM AREA(ACRES) = 1.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.88

 FLOW PROCESS FROM NODE 171.00 TO NODE 173.00 IS CODE = 21

100PR. OUT

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 60.00
UPSTREAM ELEVATION(FEET) = 394.50
DOWNSTREAM ELEVATION(FEET) = 394.00
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.778
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.760
SUBAREA RUNOFF(CFS) = 0.29
TOTAL AREA(ACRES) = 0.07 TOTAL RUNOFF(CFS) = 0.29
```

```
*****
FLOW PROCESS FROM NODE 173.00 TO NODE 176.00 IS CODE = 62
-----
```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```
=====
UPSTREAM ELEVATION(FEET) = 394.00 DOWNSTREAM ELEVATION(FEET) = 388.50
STREET LENGTH(FEET) = 460.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.67
AVERAGE FLOW VELOCITY(FT/SEC.) = 2.11
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 3.63 Tc(MIN.) = 9.41
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.206
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 1.02 SUBAREA RUNOFF(CFS) = 3.05
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.25
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.02
FLOW VELOCITY(FT/SEC.) = 2.44 DEPTH*VELOCITY(FT*FT/SEC.) = 0.85
LONGEST FLOWPATH FROM NODE 171.00 TO NODE 176.00 = 520.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 176.00 TO NODE 176.00 IS CODE = 1
-----
```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

```
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.41
RAINFALL INTENSITY(INCH/HR) = 4.21
```

100PR. OUT

TOTAL STREAM AREA(ACRES) = 1.09
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.25

```
** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 3.88 9.90 4.070 1.43
2 3.25 9.41 4.206 1.09
```

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

```
** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 6.95 9.41 4.206
2 7.03 9.90 4.070
```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 7.03 Tc(MIN.) = 9.90
TOTAL AREA(ACRES) = 2.5
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 176.00 = 791.00 FEET.

```
*****
FLOW PROCESS FROM NODE 176.00 TO NODE 198.00 IS CODE = 31
-----
```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 388.50 DOWNSTREAM(FEET) = 388.25
FLOW LENGTH(FEET) = 25.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 6.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.03
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.96
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 198.00 = 816.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 11
-----
```

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

```
** MAIN STREAM CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 7.03 9.96 4.054 2.52
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 198.00 = 816.00 FEET.
```

```
** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 40.91 13.96 3.261 20.93
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 198.00 = 1801.60 FEET.
```

```
** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 36.23 9.96 4.054
2 46.57 13.96 3.261
```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:


```

                                100PR. OUT
PEAK FLOW RATE(CFS) =      46.57   Tc(MIN.) =   13.96
TOTAL AREA(ACRES) =      23.5

*****
FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE    180.00 TO NODE    182.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   92
INITIAL SUBAREA FLOW-LENGTH(FEET) =   80.00
UPSTREAM ELEVATION(FEET) =   409.50
DOWNSTREAM ELEVATION(FEET) =   408.50
ELEVATION DIFFERENCE(FEET) =     1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =   5.354
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   67.50
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
          100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   6.050
SUBAREA RUNOFF(CFS) =     0.52
TOTAL AREA(ACRES) =     0.12   TOTAL RUNOFF(CFS) =     0.52

*****
FLOW PROCESS FROM NODE    182.00 TO NODE    184.00 IS CODE =   62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 406.00   DOWNSTREAM ELEVATION(FEET) = 394.40
STREET LENGTH(FEET) = 529.30   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 =   1
STREET PARKWAY CROSSFALL(DECIMAL) =   0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) =   0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     4.50
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =   0.35
HALFSTREET FLOOD WIDTH(FEET) =   11.11
AVERAGE FLOW VELOCITY(FEET/SEC.) =   3.33
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =   1.16
STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =   8.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.668

```

```

                                100PR. OUT
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   94
AREA-AVERAGE RUNOFF COEFFICIENT =   0.786
SUBAREA AREA(ACRES) =     2.15   SUBAREA RUNOFF(CFS) =     7.93
TOTAL AREA(ACRES) =     2.3     PEAK FLOW RATE(CFS) =     8.33

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =   609.30 FEET.

*****
FLOW PROCESS FROM NODE    184.00 TO NODE    196.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   394.50   DOWNSTREAM(FEET) =   390.50
FLOW LENGTH(FEET) =   421.00   MANNING'S N =   0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.74
ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     8.33
PIPE TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =   9.04
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    196.00 = 1030.30 FEET.

*****
FLOW PROCESS FROM NODE    196.00 TO NODE    196.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =   2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) =   9.04
RAINFALL INTENSITY(INCH/HR) =   4.31
TOTAL STREAM AREA(ACRES) =     2.27
PEAK FLOW RATE(CFS) AT CONFLUENCE =     8.33

*****
FLOW PROCESS FROM NODE    190.00 TO NODE    192.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   92
INITIAL SUBAREA FLOW-LENGTH(FEET) =   96.00
UPSTREAM ELEVATION(FEET) =   404.00
DOWNSTREAM ELEVATION(FEET) =   403.00
ELEVATION DIFFERENCE(FEET) =     1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =   5.601
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   65.42
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
          100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   5.877
SUBAREA RUNOFF(CFS) =     0.42
TOTAL AREA(ACRES) =     0.10   TOTAL RUNOFF(CFS) =     0.42

*****
FLOW PROCESS FROM NODE    192.00 TO NODE    194.00 IS CODE =   62
-----

```

100PR. OUT

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 403.00 DOWNSTREAM ELEVATION(FEET) = 395.30
STREET LENGTH(FEET) = 704.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.75
STREET FLOW SPLITS OVER STREET-CROWN
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.43
SPLIT DEPTH(FEET) = 0.34 SPLIT FLOOD WIDTH(FEET) = 10.83
SPLIT FLOW(CFS) = 2.96 SPLIT VELOCITY(FEET/SEC.) = 2.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.89
STREET FLOW TRAVEL TIME(MIN.) = 4.82 Tc(MIN.) = 10.42
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.938
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 4.41 SUBAREA RUNOFF(CFS) = 12.33
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 12.61

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.97 DEPTH*VELOCITY(FT*FT/SEC.) = 1.23
LONGEST FLOWPATH FROM NODE 190.00 TO NODE 194.00 = 800.00 FEET.

FLOW PROCESS FROM NODE 194.00 TO NODE 196.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.30 DOWNSTREAM(FEET) = 390.00
FLOW LENGTH(FEET) = 42.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.83
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.61
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 190.00 TO NODE 196.00 = 842.00 FEET.

FLOW PROCESS FROM NODE 196.00 TO NODE 196.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.46
RAINFALL INTENSITY(INCH/HR) = 3.93
TOTAL STREAM AREA(ACRES) = 4.51
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.61

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.33	9.04	4.314	2.27
2	12.61	10.46	3.929	4.51

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	19.24	9.04	4.314
2	20.19	10.46	3.929

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 20.19 Tc(MIN.) = 10.46
TOTAL AREA(ACRES) = 6.8
LONGEST FLOWPATH FROM NODE 180.00 TO NODE 196.00 = 1030.30 FEET.

FLOW PROCESS FROM NODE 196.00 TO NODE 198.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 388.90
FLOW LENGTH(FEET) = 115.30 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.36
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.19
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 10.69
LONGEST FLOWPATH FROM NODE 180.00 TO NODE 198.00 = 1145.60 FEET.

FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 11

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

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	20.19	10.69	3.875	6.78

LONGEST FLOWPATH FROM NODE 180.00 TO NODE 198.00 = 1145.60 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	46.57	13.96	3.261	23.45

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 198.00 = 1801.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
------------------	-----------------	--------------	--------------------------

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1	55.85	10.69	3.875
2	63.57	13.96	3.261

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 63.57 Tc(MIN.) = 13.96

TOTAL AREA(ACRES) = 30.2

```
*****
FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 198.00 TO NODE 204.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 388.90 DOWNSTREAM(FEET) = 379.20
FLOW LENGTH(FEET) = 262.50 MANNING'S N = 0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.67
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.57
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 14.19
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 204.00 = 2064.10 FEET.
```

```
*****
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 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.) = 14.19
RAINFALL INTENSITY(INCH/HR) = 3.23
TOTAL STREAM AREA(ACRES) = 30.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.57
```

```
*****
FLOW PROCESS FROM NODE 200.00 TO NODE 202.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
```

```
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 90.00
UPSTREAM ELEVATION(FEET) = 392.80
DOWNSTREAM ELEVATION(FEET) = 391.80
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.511
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 66.11
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.939
SUBAREA RUNOFF(CFS) = 0.25
TOTAL AREA(ACRES) = 0.06 TOTAL RUNOFF(CFS) = 0.25
```

```
*****
FLOW PROCESS FROM NODE 202.00 TO NODE 204.00 IS CODE = 62
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```

100PR. OUT

```
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 391.80 DOWNSTREAM ELEVATION(FEET) = 379.20
STREET LENGTH(FEET) = 481.00 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 = 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) = 1.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.25
HALFSTREET FLOOD WIDTH(FEET) = 6.23
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.70
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 8.48
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.499
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 0.69 SUBAREA RUNOFF(CFS) = 2.20
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.40
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.11
FLOW VELOCITY(FEET/SEC.) = 3.09 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 571.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 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.) = 8.48
RAINFALL INTENSITY(INCH/HR) = 4.50
TOTAL STREAM AREA(ACRES) = 0.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.40
```

```
** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 63.57 14.19 3.226 30.23
2 2.40 8.48 4.499 0.75
```

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

```
** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 40.36 8.48 4.499
```

```

                100PR. OUT
2      65.29   14.19   3.226

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 65.29 Tc(MIN.) = 14.19
TOTAL AREA(ACRES) = 31.0
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 204.00 = 2064.10 FEET.

*****
FLOW PROCESS FROM NODE 204.00 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) = 375.00 DOWNSTREAM( FEET) = 374.00
FLOW LENGTH( FEET) = 51.50 MANNING'S N = 0.012
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY( FEET/SEC. ) = 14.67
ESTIMATED PIPE DIAMETER( INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 65.29
PIPE TRAVEL TIME( MIN. ) = 0.06 Tc( MIN. ) = 14.25
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 2.00 = 2115.60 FEET.

*****
FLOW PROCESS FROM NODE 204.00 TO NODE 2.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY( INCH/HOUR) = 3.218
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6174
SUBAREA AREA( ACRES) = 1.74 SUBAREA RUNOFF( CFS) = 1.96
TOTAL AREA( ACRES) = 32.7 TOTAL RUNOFF( CFS) = 65.29
Tc( MIN. ) = 14.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
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 210.00 TO NODE 212.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH( FEET) = 138.00
UPSTREAM ELEVATION( FEET) = 392.60
DOWNSTREAM ELEVATION( FEET) = 390.00
ELEVATION DIFFERENCE( FEET) = 2.60
SUBAREA OVERLAND TIME OF FLOW( MIN. ) = 4.884
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 73.84
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY( INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF( CFS) = 0.49

```

```

                100PR. OUT
TOTAL AREA( ACRES) = 0.11 TOTAL RUNOFF( CFS) = 0.49

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 214.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION( FEET) = 390.00 DOWNSTREAM ELEVATION( FEET) = 384.20
STREET LENGTH( FEET) = 474.00 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 = 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) = 5.32
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH( FEET) = 0.37 FLOOD WIDTH( FEET) = 12.00
FULL HALF-STREET VELOCITY( FEET/SEC. ) = 2.58
SPLIT DEPTH( FEET) = 0.27 SPLIT FLOOD WIDTH( FEET) = 7.36
SPLIT FLOW( CFS) = 1.31 SPLIT VELOCITY( FEET/SEC. ) = 1.98
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH( FEET) = 0.37
HALFSTREET FLOOD WIDTH( FEET) = 12.00
AVERAGE FLOW VELOCITY( FEET/SEC. ) = 2.58
PRODUCT OF DEPTH&VELOCITY( FT*FT/SEC. ) = 0.94
STREET FLOW TRAVEL TIME( MIN. ) = 3.07 Tc( MIN. ) = 7.95
100 YEAR RAINFALL INTENSITY( INCH/HOUR) = 4.688
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA( ACRES) = 2.90 SUBAREA RUNOFF( CFS) = 9.65
TOTAL AREA( ACRES) = 3.0 PEAK FLOW RATE( CFS) = 10.02

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH( FEET) = 0.39 HALFSTREET FLOOD WIDTH( FEET) = 12.00
FLOW VELOCITY( FEET/SEC. ) = 2.81 DEPTH*VELOCITY( FT*FT/SEC. ) = 1.08
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 612.00 FEET.

*****
FLOW PROCESS FROM NODE 214.00 TO NODE 224.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 384.20 DOWNSTREAM( FEET) = 379.20
FLOW LENGTH( FEET) = 526.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC. ) = 6.94
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 10.02
PIPE TRAVEL TIME( MIN. ) = 1.26 Tc( MIN. ) = 9.21
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 224.00 = 1138.00 FEET.

*****
FLOW PROCESS FROM NODE 221.00 TO NODE 224.00 IS CODE = 1

```

100PR. OUT

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.21
RAINFALL INTENSITY(INCH/HR) = 4.26
TOTAL STREAM AREA(ACRES) = 3.01
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.02

FLOW PROCESS FROM NODE 220.00 TO NODE 222.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 92.00
UPSTREAM ELEVATION(Feet) = 396.70
DOWNSTREAM ELEVATION(Feet) = 396.00
ELEVATION DIFFERENCE(Feet) = 0.70
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.847
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 57.83
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.716
SUBAREA RUNOFF(CFS) = 0.32
TOTAL AREA(ACRES) = 0.08 TOTAL RUNOFF(CFS) = 0.32

FLOW PROCESS FROM NODE 222.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(Feet) = 396.00 DOWNSTREAM ELEVATION(Feet) = 390.60
STREET LENGTH(Feet) = 458.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.12
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.31
HALFSTREET FLOOD WIDTH(Feet) = 9.23
AVERAGE FLOW VELOCITY(Feet/Sec.) = 2.18
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 9.34
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.225
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 1.18 SUBAREA RUNOFF(CFS) = 3.54

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TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 3.78

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.36 HALFSTREET FLOOD WIDTH(Feet) = 11.77
FLOW VELOCITY(Feet/Sec.) = 2.52 DEPTH*VELOCITY(FT*FT/SEC.) = 0.91
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 224.00 = 550.00 FEET.

FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.34
RAINFALL INTENSITY(INCH/HR) = 4.22
TOTAL STREAM AREA(ACRES) = 1.26
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.78

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.02	9.21	4.263	3.01
2	3.78	9.34	4.225	1.26

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

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	13.75	9.21	4.263
2	13.71	9.34	4.225

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 13.75 Tc(MIN.) = 9.21
TOTAL AREA(ACRES) = 4.3
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 224.00 = 1138.00 FEET.

FLOW PROCESS FROM NODE 224.00 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) = 375.40 DOWNSTREAM(Feet) = 374.00
FLOW LENGTH(Feet) = 140.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 7.76
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.75
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.52
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 2.00 = 1278.00 FEET.

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

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

STREAM	RUNOFF	Tc	INTENSITY	AREA
				Page 36

```

100PR. OUT
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
1           13.75      9.52         4.175           4.27
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 2.00 = 1278.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
1           65.29      14.25      3.218           32.72
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 2.00 = 2115.60 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
1           57.34      9.52         4.175
2           75.88      14.25      3.218

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 75.88 Tc(MIN.) = 14.25
TOTAL AREA(ACRES) = 37.0

*****
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 10.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
FLOW LENGTH(FEET) = 503.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.63
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 75.88
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.52
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 10.00 = 2618.60 FEET.

*****
FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.52
RAINFALL INTENSITY(INCH/HR) = 3.18
TOTAL STREAM AREA(ACRES) = 36.99
PEAK FLOW RATE(CFS) AT CONFLUENCE = 75.88

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 232.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 379.20

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100PR. OUT
DOWNSTREAM ELEVATION(FEET) = 374.00
ELEVATION DIFFERENCE(FEET) = 5.20
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.272
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 90.40
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.61
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.61

*****
FLOW PROCESS FROM NODE 232.00 TO NODE 10.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 374.00 DOWNSTREAM ELEVATION(FEET) = 320.00
STREET LENGTH(FEET) = 480.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.61
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 5.89
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.37
STREET FLOW TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 3.70
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 4.02
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 4.62

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 7.92
FLOW VELOCITY(FEET/SEC.) = 6.20 DEPTH*VELOCITY(FT*FT/SEC.) = 1.76
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 10.00 = 580.00 FEET.

*****
FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 3.70
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 0.84

```

100PR. OUT
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.62

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	75.88	14.52	3.179	36.99
2	4.62	3.70	6.323	0.84

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	23.94	3.70	6.323
2	78.20	14.52	3.179

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 78.20 Tc(MIN.) = 14.52
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 10.00 = 2618.60 FEET.

FLOW PROCESS FROM NODE 10.00 TO NODE 14.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 276.20
FLOW LENGTH(FEET) = 535.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.33
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 78.20
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.86
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 14.00 = 3153.60 FEET.

FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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.) = 14.86
RAINFALL INTENSITY(INCH/HR) = 3.13
TOTAL STREAM AREA(ACRES) = 37.83
PEAK FLOW RATE(CFS) AT CONFLUENCE = 78.20

FLOW PROCESS FROM NODE 231.00 TO NODE 233.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 60.00
UPSTREAM ELEVATION(FEET) = 323.00
DOWNSTREAM ELEVATION(FEET) = 315.00
ELEVATION DIFFERENCE(FEET) = 8.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.489
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!

100PR. OUT
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
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 233.00 TO NODE 14.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 315.00 DOWNSTREAM ELEVATION(FEET) = 274.00
STREET LENGTH(FEET) = 449.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.48
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.25
HALFSTREET FLOOD WIDTH(FEET) = 6.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 2.95
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 3.85
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 4.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.11
FLOW VELOCITY(FEET/SEC.) = 5.67 DEPTH*VELOCITY(FT*FT/SEC.) = 1.64
LONGEST FLOWPATH FROM NODE 231.00 TO NODE 14.00 = 509.00 FEET.

FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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.) = 2.95
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.40

+-----+
| OFFSET FLOW FROM NORTHEAST |
| |
+-----+

```

*****
100PR. OUT
*****
FLOW PROCESS FROM NODE      12.00 TO NODE      13.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
INITIAL SUBAREA FLOW-LENGTH(FEET) =  134.00
UPSTREAM ELEVATION(FEET) =  400.00
DOWNSTREAM ELEVATION(FEET) =  350.00
ELEVATION DIFFERENCE(FEET) =  50.00
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) =  5.466
SUBAREA RUNOFF(CFS) =  0.38
TOTAL AREA(ACRES) =  0.20  TOTAL RUNOFF(CFS) =  0.38
*****
FLOW PROCESS FROM NODE      13.00 TO NODE      14.00 IS CODE =  52
-----
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  350.00  DOWNSTREAM(FEET) =  260.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1386.00  CHANNEL SLOPE =  0.0649
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) =  0.38
FLOW VELOCITY(FEET/SEC) =  3.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =  6.04  Tc(MIN.) =  12.31
LONGEST FLOWPATH FROM NODE      12.00 TO NODE      14.00 =  1520.00 FEET.
*****
FLOW PROCESS FROM NODE      13.00 TO NODE      14.00 IS CODE =  81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.536
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
AREA-AVERAGE RUNOFF COEFFICIENT =  0.3500
SUBAREA AREA(ACRES) =  10.10  SUBAREA RUNOFF(CFS) =  12.50
TOTAL AREA(ACRES) =  10.3  TOTAL RUNOFF(CFS) =  12.75
Tc(MIN.) =  12.31
*****
FLOW PROCESS FROM NODE      14.00 TO NODE      14.00 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.) =  12.31
RAINFALL INTENSITY(INCH/HR) =  3.54
TOTAL STREAM AREA(ACRES) =  10.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =  12.75
*****
** CONFLUENCE DATA **

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*****
100PR. OUT
*****
STREAM  RUNOFF      Tc      INTENSITY      100PR. OUT
NUMBER  (CFS)      (MIN.)  (INCH/HOUR)  AREA
1       78.20     14.86     3.132        37.83
2       4.40      2.95     6.323         0.80
3       12.75     12.31     3.536        10.30
*****
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       46.19     2.95     6.323
2       84.46     12.31     3.536
3       91.67     14.86     3.132
*****
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  91.67  Tc(MIN.) =  14.86
TOTAL AREA(ACRES) =  48.9
LONGEST FLOWPATH FROM NODE      110.00 TO NODE      14.00 =  3153.60 FEET.
*****
FLOW PROCESS FROM NODE      14.00 TO NODE      28.00 IS CODE =  52
-----
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  260.00  DOWNSTREAM(FEET) =  248.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1259.00  CHANNEL SLOPE =  0.0095
CHANNEL FLOW THRU SUBAREA(CFS) =  91.67
FLOW VELOCITY(FEET/SEC) =  4.51 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =  4.65  Tc(MIN.) =  19.51
LONGEST FLOWPATH FROM NODE      110.00 TO NODE      28.00 =  4412.60 FEET.
*****
FLOW PROCESS FROM NODE      14.00 TO NODE      28.00 IS CODE =  81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.628
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
AREA-AVERAGE RUNOFF COEFFICIENT =  0.5244
SUBAREA AREA(ACRES) =  14.95  SUBAREA RUNOFF(CFS) =  13.75
TOTAL AREA(ACRES) =  63.9  TOTAL RUNOFF(CFS) =  91.67
Tc(MIN.) =  19.51
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE      28.00 TO NODE      28.00 IS CODE =  10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====
+-----+
| BEGIN WEST BASIN HYD |
+-----+
*****
FLOW PROCESS FROM NODE      500.00 TO NODE      504.00 IS CODE =  21
*****

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100PR. OUT

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 218.00
 UPSTREAM ELEVATION(FEET) = 402.60
 DOWNSTREAM ELEVATION(FEET) = 400.80
 ELEVATION DIFFERENCE(FEET) = 1.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.785
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 59.77
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.756
 SUBAREA RUNOFF(CFS) = 1.76
 TOTAL AREA(ACRES) = 0.43 TOTAL RUNOFF(CFS) = 1.76

 FLOW PROCESS FROM NODE 504.00 TO NODE 506.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 400.80 DOWNSTREAM(FEET) = 400.00
 FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.59
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.76
 PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.08
 LONGEST FLOWPATH FROM NODE 500.00 TO NODE 506.00 = 298.00 FEET.

 FLOW PROCESS FROM NODE 506.00 TO NODE 506.00 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.) = 6.08
 RAINFALL INTENSITY(INCH/HR) = 5.58
 TOTAL STREAM AREA(ACRES) = 0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.76

 FLOW PROCESS FROM NODE 501.00 TO NODE 503.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 97.00
 UPSTREAM ELEVATION(FEET) = 445.00
 DOWNSTREAM ELEVATION(FEET) = 412.00
 ELEVATION DIFFERENCE(FEET) = 33.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.172
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.520
 SUBAREA RUNOFF(CFS) = 0.35

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100PR. OUT

TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.35

 FLOW PROCESS FROM NODE 503.00 TO NODE 506.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 406.00 DOWNSTREAM ELEVATION(FEET) = 403.50
 STREET LENGTH(FEET) = 264.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.54
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.29
 HALFSTREET FLOOD WIDTH(FEET) = 8.39
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.88
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.55
 STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 8.52
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.485
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.641
 SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 2.42
 TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.70

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.73
 FLOW VELOCITY(FEET/SEC.) = 2.13 DEPTH*VELOCITY(FT*FT/SEC.) = 0.73
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 506.00 = 361.00 FEET.

 FLOW PROCESS FROM NODE 506.00 TO NODE 506.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 8.52
 RAINFALL INTENSITY(INCH/HR) = 4.48
 TOTAL STREAM AREA(ACRES) = 0.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.70

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	1.76	6.08	5.577	0.43
2	2.70	8.52	4.485	0.94

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

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** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	3.68	6.08	5.577
2	4.12	8.52	4.485

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 4.12 Tc(MIN.) = 8.52
 TOTAL AREA(ACRES) = 1.4
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 506.00 = 361.00 FEET.

 FLOW PROCESS FROM NODE 506.00 TO NODE 514.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 403.50 DOWNSTREAM(FEET) = 391.50
 FLOW LENGTH(FEET) = 379.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.82
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.12
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 9.23
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 514.00 = 740.00 FEET.

 FLOW PROCESS FROM NODE 506.00 TO NODE 514.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.257
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6890
 SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 5.20
 TOTAL AREA(ACRES) = 3.1 TOTAL RUNOFF(CFS) = 9.06
 TC(MIN.) = 9.23

 FLOW PROCESS FROM NODE 514.00 TO NODE 22.50 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 391.50 DOWNSTREAM(FEET) = 387.90
 FLOW LENGTH(FEET) = 154.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.76
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.06
 PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 9.50
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 22.50 = 894.00 FEET.

 FLOW PROCESS FROM NODE 22.50 TO NODE 22.50 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 3

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CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 9.50
 RAINFALL INTENSITY(INCH/HR) = 4.18
 TOTAL STREAM AREA(ACRES) = 3.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.06

 FLOW PROCESS FROM NODE 20.00 TO NODE 21.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 139.00
 UPSTREAM ELEVATION(FEET) = 468.00
 DOWNSTREAM ELEVATION(FEET) = 448.00
 ELEVATION DIFFERENCE(FEET) = 20.00
 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) = 5.466
 SUBAREA RUNOFF(CFS) = 0.25
 TOTAL AREA(ACRES) = 0.13 TOTAL RUNOFF(CFS) = 0.25

 FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 448.00 DOWNSTREAM(FEET) = 364.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 482.00 CHANNEL SLOPE = 0.1743
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.25
 FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 7.96
 LONGEST FLOWPATH FROM NODE 20.00 TO NODE 22.00 = 621.00 FEET.

 FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.685
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) = 5.56 SUBAREA RUNOFF(CFS) = 9.12
 TOTAL AREA(ACRES) = 5.7 TOTAL RUNOFF(CFS) = 9.33
 TC(MIN.) = 7.96

 FLOW PROCESS FROM NODE 22.00 TO NODE 22.50 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 364.00 DOWNSTREAM(FEET) = 363.15

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                                100PR. OUT
FLOW LENGTH(FEET) =      85.00  MANNING'S N =  0.012
DEPTH OF FLOW IN  18.0 INCH PIPE IS 12.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  7.03
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =      9.33
PIPE TRAVEL TIME(MIN.) =  0.20  Tc(MIN.) =  8.16
LONGEST FLOWPATH FROM NODE      20.00 TO NODE      22.50 =      706.00 FEET.

*****
FLOW PROCESS FROM NODE      22.50 TO NODE      22.50 IS CODE =  1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  8.16
RAINFALL INTENSITY(INCH/HR) =  4.61
TOTAL STREAM AREA(ACRES) =  5.69
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33

*****
FLOW PROCESS FROM NODE      20.00 TO NODE      20.50 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) =  468.00
DOWNSTREAM ELEVATION(FEET) =  450.00
ELEVATION DIFFERENCE(FEET) =  18.00
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) =  5.466
SUBAREA RUNOFF(CFS) =  0.21
TOTAL AREA(ACRES) =  0.11  TOTAL RUNOFF(CFS) =  0.21

*****
FLOW PROCESS FROM NODE      20.50 TO NODE      21.50 IS CODE =  52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  450.00  DOWNSTREAM(FEET) =  380.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  354.00  CHANNEL SLOPE = 0.1977
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) =  0.21
FLOW VELOCITY(FEET/SEC) =  4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =  1.24  Tc(MIN.) =  7.51
LONGEST FLOWPATH FROM NODE      20.00 TO NODE      21.50 =  454.00 FEET.

*****
FLOW PROCESS FROM NODE      20.50 TO NODE      21.50 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.864
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500

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                                100PR. OUT
SUBAREA AREA(ACRES) =  1.10  SUBAREA RUNOFF(CFS) =  1.87
TOTAL AREA(ACRES) =  1.2  TOTAL RUNOFF(CFS) =  2.06
TC(MIN.) =  7.51

*****
FLOW PROCESS FROM NODE      21.50 TO NODE      22.50 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  380.00  DOWNSTREAM(FEET) =  378.00
FLOW LENGTH(FEET) =  195.00  MANNING'S N =  0.012
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.) =  4.84
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  2.06
PIPE TRAVEL TIME(MIN.) =  0.67  Tc(MIN.) =  8.18
LONGEST FLOWPATH FROM NODE      20.00 TO NODE      22.50 =  649.00 FEET.

*****
FLOW PROCESS FROM NODE      22.50 TO NODE      22.50 IS CODE =  1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =  8.18
RAINFALL INTENSITY(INCH/HR) =  4.60
TOTAL STREAM AREA(ACRES) =  1.21
PEAK FLOW RATE(CFS) AT CONFLUENCE =  2.06

** CONFLUENCE DATA **
STREAM  RUNOFF      Tc      INTENSITY      AREA
NUMBER  (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
  1      9.06      9.50      4.181      3.09
  2      9.33      8.16      4.610      5.69
  3      2.06      8.18      4.602      1.21

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

** PEAK FLOW RATE TABLE **
STREAM  RUNOFF      Tc      INTENSITY
NUMBER  (CFS)      (MIN.)  (INCH/HOUR)
  1      19.60      8.16      4.610
  2      19.61      8.18      4.602
  3      19.40      9.50      4.181

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  19.61  Tc(MIN.) =  8.18
TOTAL AREA(ACRES) =  10.0
LONGEST FLOWPATH FROM NODE      501.00 TO NODE      22.50 =  894.00 FEET.

*****
FLOW PROCESS FROM NODE      22.50 TO NODE      524.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  386.52  DOWNSTREAM(FEET) =  381.20
FLOW LENGTH(FEET) =  266.00  MANNING'S N =  0.012

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100PR. OUT
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.99
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.61
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 8.59
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 524.00 = 1160.00 FEET.

*****
FLOW PROCESS FROM NODE 524.00 TO NODE 524.00 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.) = 8.59
RAINFALL INTENSITY(INCH/HR) = 4.46
TOTAL STREAM AREA(ACRES) = 9.99
PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.61

*****
FLOW PROCESS FROM NODE 520.00 TO NODE 522.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 103.00
UPSTREAM ELEVATION(FEET) = 391.60
DOWNSTREAM ELEVATION(FEET) = 390.70
ELEVATION DIFFERENCE(FEET) = 0.90
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.745
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 61.21
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.782
SUBAREA RUNOFF(CFS) = 0.49
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.49

*****
FLOW PROCESS FROM NODE 522.00 TO NODE 524.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.20
STREET LENGTH(FEET) = 353.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.57
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 6.70

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100PR. OUT
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72
STREET FLOW TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 7.87
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.719
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 0.64 SUBAREA RUNOFF(CFS) = 2.14
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.55

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 8.48
FLOW VELOCITY(FEET/SEC.) = 3.04 DEPTH*VELOCITY(FT*FT/SEC.) = 0.90
LONGEST FLOWPATH FROM NODE 520.00 TO NODE 524.00 = 456.00 FEET.

*****
FLOW PROCESS FROM NODE 524.00 TO NODE 524.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.87
RAINFALL INTENSITY(INCH/HR) = 4.72
TOTAL STREAM AREA(ACRES) = 0.76
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.55

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 19.61 8.59 4.462 9.99
2 2.55 7.87 4.719 0.76

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 21.09 7.87 4.719
2 22.02 8.59 4.462

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 22.02 Tc(MIN.) = 8.59
TOTAL AREA(ACRES) = 10.8
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 524.00 = 1160.00 FEET.

*****
FLOW PROCESS FROM NODE 524.00 TO NODE 556.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 380.40
FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.62
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.02
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 8.70
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 556.00 = 1220.00 FEET.

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FLOW PROCESS FROM NODE 556.00 TO NODE 556.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 530.00 TO NODE 532.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 100.00
UPSTREAM ELEVATION(Feet) = 403.40
DOWNSTREAM ELEVATION(Feet) = 401.80
ELEVATION DIFFERENCE(Feet) = 1.60
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.057
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) = 6.277
SUBAREA RUNOFF(CFS) = 0.49
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.49

FLOW PROCESS FROM NODE 532.00 TO NODE 534.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(Feet) = 401.50 DOWNSTREAM ELEVATION(Feet) = 395.80
STREET LENGTH(Feet) = 246.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.25
HALFSTREET FLOOD WIDTH(Feet) = 6.23
AVERAGE FLOW VELOCITY(Feet/SEC.) = 2.56
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.64
STREET FLOW TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 6.66
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.255
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 0.43 SUBAREA RUNOFF(CFS) = 1.60
TOTAL AREA(ACRES) = 0.5 PEAK FLOW RATE(CFS) = 2.01

END OF SUBAREA STREET FLOW HYDRAULICS:

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DEPTH(Feet) = 0.28 HALFSTREET FLOOD WIDTH(Feet) = 7.73
FLOW VELOCITY(Feet/SEC.) = 2.81 DEPTH*VELOCITY(FT*FT/SEC.) = 0.79
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 534.00 = 346.00 FEET.

FLOW PROCESS FROM NODE 534.00 TO NODE 544.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(Feet) = 395.50 DOWNSTREAM(Feet) = 392.00
FLOW LENGTH(Feet) = 153.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES
PIPE-FLOW VELOCITY(Feet/SEC.) = 6.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.01
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 7.06
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 544.00 = 499.00 FEET.

FLOW PROCESS FROM NODE 544.00 TO NODE 544.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 7.06
RAINFALL INTENSITY(INCH/HR) = 5.06
TOTAL STREAM AREA(ACRES) = 0.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.01

FLOW PROCESS FROM NODE 540.00 TO NODE 542.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 89.00
UPSTREAM ELEVATION(Feet) = 397.60
DOWNSTREAM ELEVATION(Feet) = 396.50
ELEVATION DIFFERENCE(Feet) = 1.10
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.369
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 67.36
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.040
SUBAREA RUNOFF(CFS) = 0.43
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.43

FLOW PROCESS FROM NODE 542.00 TO NODE 544.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(Feet) = 396.50 DOWNSTREAM ELEVATION(Feet) = 393.40
STREET LENGTH(Feet) = 258.60 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(Feet) = 12.00

```

100PR. OUT
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 = 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) = 1.90
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH( FEET) = 0.30
HALFSTREET FLOOD WIDTH( FEET) = 8.77
AVERAGE FLOW VELOCITY( FEET/SEC.) = 2.15
PRODUCT OF DEPTH&VELOCITY( FT*FT/SEC.) = 0.65
STREET FLOW TRAVEL TIME( MIN.) = 2.01 Tc( MIN.) = 7.38
100 YEAR RAINFALL INTENSITY( INCH/HOUR) = 4.921
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA( ACRES) = 0.84 SUBAREA RUNOFF( CFS) = 2.94
TOTAL AREA( ACRES) = 0.9 PEAK FLOW RATE( CFS) = 3.28

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH( FEET) = 0.35 HALFSTREET FLOOD WIDTH( FEET) = 11.11
FLOW VELOCITY( FEET/SEC.) = 2.43 DEPTH*VELOCITY( FT*FT/SEC.) = 0.85
LONGEST FLOWPATH FROM NODE 540.00 TO NODE 544.00 = 347.60 FEET.

*****
FLOW PROCESS FROM NODE 544.00 TO NODE 544.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION( MIN.) = 7.38
RAINFALL INTENSITY( INCH/HR) = 4.92
TOTAL STREAM AREA( ACRES) = 0.94
PEAK FLOW RATE( CFS) AT CONFLUENCE = 3.28

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 2.01 7.06 5.061 0.54
2 3.28 7.38 4.921 0.94

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 5.16 7.06 5.061
2 5.24 7.38 4.921

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE( CFS) = 5.24 Tc( MIN.) = 7.38
TOTAL AREA( ACRES) = 1.5
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 544.00 = 499.00 FEET.

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100PR. OUT
FLOW PROCESS FROM NODE 544.00 TO NODE 545.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 392.00 DOWNSTREAM( FEET) = 388.00
FLOW LENGTH( FEET) = 160.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER( INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 8.67
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 5.24
PIPE TRAVEL TIME( MIN.) = 0.31 Tc( MIN.) = 7.68
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 545.00 = 659.00 FEET.

*****
FLOW PROCESS FROM NODE 545.00 TO NODE 545.00 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.) = 7.68
RAINFALL INTENSITY( INCH/HR) = 4.79
TOTAL STREAM AREA( ACRES) = 1.48
PEAK FLOW RATE( CFS) AT CONFLUENCE = 5.24

*****
FLOW PROCESS FROM NODE 541.00 TO NODE 543.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH( FEET) = 80.00
UPSTREAM ELEVATION( FEET) = 397.60
DOWNSTREAM ELEVATION( FEET) = 396.00
ELEVATION DIFFERENCE( FEET) = 1.60
SUBAREA OVERLAND TIME OF FLOW( MIN.) = 4.825
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 75.00
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY( INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF( CFS) = 0.40
TOTAL AREA( ACRES) = 0.09 TOTAL RUNOFF( CFS) = 0.40

*****
FLOW PROCESS FROM NODE 543.00 TO NODE 545.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION( FEET) = 396.00 DOWNSTREAM ELEVATION( FEET) = 389.70
STREET LENGTH( FEET) = 278.00 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

```

100PR. OUT
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.29
HALFSTREET FLOOD WIDTH(Feet) = 8.11
AVERAGE FLOW VELOCITY(Feet/Sec.) = 2.81
PRODUCT OF DEPTH&VELOCITY(Ft*Ft/Sec.) = 0.81
STREET FLOW TRAVEL TIME(Min.) = 1.65 Tc(Min.) = 6.47
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.353
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 0.93 SUBAREA RUNOFF(CFS) = 3.53
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.88

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.33 HALFSTREET FLOOD WIDTH(Feet) = 10.36
FLOW VELOCITY(Feet/Sec.) = 3.25 DEPTH*VELOCITY(Ft*Ft/Sec.) = 1.09
LONGEST FLOWPATH FROM NODE 541.00 TO NODE 545.00 = 358.00 FEET.

FLOW PROCESS FROM NODE 545.00 TO NODE 545.00 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.) = 6.47
RAINFALL INTENSITY(INCH/HR) = 5.35
TOTAL STREAM AREA(ACRES) = 1.02
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.88

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (Min.) (INCH/HOUR) (ACRE)
1 5.24 7.68 4.793 1.48
2 3.88 6.47 5.353 1.02

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (Min.) (INCH/HOUR)
1 8.57 6.47 5.353
2 8.71 7.68 4.793

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 8.71 Tc(Min.) = 7.68
TOTAL AREA(ACRES) = 2.5
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 545.00 = 659.00 FEET.

FLOW PROCESS FROM NODE 545.00 TO NODE 548.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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100PR. OUT
=====

ELEVATION DATA: UPSTREAM(Feet) = 388.00 DOWNSTREAM(Feet) = 385.00
FLOW LENGTH(Feet) = 145.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 9.22
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.71
PIPE TRAVEL TIME(Min.) = 0.26 Tc(Min.) = 7.94
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 548.00 = 804.00 FEET.

FLOW PROCESS FROM NODE 548.00 TO NODE 548.00 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.) = 7.94
RAINFALL INTENSITY(INCH/HR) = 4.69
TOTAL STREAM AREA(ACRES) = 2.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.71

FLOW PROCESS FROM NODE 546.00 TO NODE 547.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 80.00
UPSTREAM ELEVATION(Feet) = 393.90
DOWNSTREAM ELEVATION(Feet) = 392.50
ELEVATION DIFFERENCE(Feet) = 1.40
SUBAREA OVERLAND TIME OF FLOW(Min.) = 4.960
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 72.50
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.09 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 547.00 TO NODE 548.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(Feet) = 392.50 DOWNSTREAM ELEVATION(Feet) = 386.80
STREET LENGTH(Feet) = 280.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
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100PR. OUT

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.28
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.29
 HALFSTREET FLOOD WIDTH(FEET) = 8.39
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.82
 STREET FLOW TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 6.64
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.264
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 3.74
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 4.07

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.83
 FLOW VELOCITY(FEET/SEC.) = 3.16 DEPTH*VELOCITY(FT*FT/SEC.) = 1.08
 LONGEST FLOWPATH FROM NODE 546.00 TO NODE 548.00 = 360.00 FEET.

 FLOW PROCESS FROM NODE 548.00 TO NODE 548.00 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.) = 6.64
 RAINFALL INTENSITY(INCH/HR) = 5.26
 TOTAL STREAM AREA(ACRES) = 1.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.07

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.71	7.94	4.691	2.50
2	4.07	6.64	5.264	1.09

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	11.84	6.64	5.264
2	12.34	7.94	4.691

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 12.34 Tc(MIN.) = 7.94
 TOTAL AREA(ACRES) = 3.6
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 548.00 = 804.00 FEET.

 FLOW PROCESS FROM NODE 548.00 TO NODE 554.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 384.50 DOWNSTREAM(FEET) = 383.00
 FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.1 INCHES

100PR. OUT

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.75
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 12.34
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 8.04
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 554.00 = 864.00 FEET.

 FLOW PROCESS FROM NODE 554.00 TO NODE 554.00 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.) = 8.04
 RAINFALL INTENSITY(INCH/HR) = 4.66
 TOTAL STREAM AREA(ACRES) = 3.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.34

 FLOW PROCESS FROM NODE 550.00 TO NODE 552.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 =====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 98
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 144.00
 UPSTREAM ELEVATION(FEET) = 403.00
 DOWNSTREAM ELEVATION(FEET) = 399.00
 ELEVATION DIFFERENCE(FEET) = 4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.597
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 77.78
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
 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 552.00 TO NODE 554.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<
 =====

UPSTREAM ELEVATION(FEET) = 398.80 DOWNSTREAM ELEVATION(FEET) = 383.00
 STREET LENGTH(FEET) = 675.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.08
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.31
 HALFSTREET FLOOD WIDTH(FEET) = 9.33


```

100PR. OUT
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 3.60 Tc(MIN.) = 6.20
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.503
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 5.03
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 5.51

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 11.95
FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH*VELOCITY(FT*FT/SEC.) = 1.30
LONGEST FLOWPATH FROM NODE 550.00 TO NODE 554.00 = 819.00 FEET.

*****
FLOW PROCESS FROM NODE 554.00 TO NODE 554.00 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.) = 6.20
RAINFALL INTENSITY(INCH/HR) = 5.50
TOTAL STREAM AREA(ACRES) = 1.15
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.51

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 12.34 8.04 4.656 3.59
2 5.51 6.20 5.503 1.15

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 15.95 6.20 5.503
2 17.00 8.04 4.656

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 17.00 Tc(MIN.) = 8.04
TOTAL AREA(ACRES) = 4.7
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 554.00 = 864.00 FEET.

*****
FLOW PROCESS FROM NODE 554.00 TO NODE 556.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 382.20
FLOW LENGTH(FEET) = 36.70 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.07
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.00
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 8.09
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 556.00 = 900.70 FEET.
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100PR. OUT
*****
FLOW PROCESS FROM NODE 556.00 TO NODE 556.00 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 17.00 8.09 4.635 4.74
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 556.00 = 900.70 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 22.02 8.70 4.423 10.75
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 556.00 = 1220.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 37.48 8.09 4.635
2 38.24 8.70 4.423

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 38.24 Tc(MIN.) = 8.70
TOTAL AREA(ACRES) = 15.5

*****
FLOW PROCESS FROM NODE 556.00 TO NODE 556.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====

*****
FLOW PROCESS FROM NODE 556.00 TO NODE 568.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 382.20 DOWNSTREAM(FEET) = 352.00
FLOW LENGTH(FEET) = 388.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.64
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.24
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.00
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 568.00 = 1608.00 FEET.

*****
FLOW PROCESS FROM NODE 568.00 TO NODE 568.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.00
RAINFALL INTENSITY(INCH/HR) = 4.33
TOTAL STREAM AREA(ACRES) = 15.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.24

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                                100PR. OUT
FLOW PROCESS FROM NODE      560.00 TO NODE      562.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 90.00
UPSTREAM ELEVATION(FEET) = 394.00
DOWNSTREAM ELEVATION(FEET) = 384.50
ELEVATION DIFFERENCE(FEET) = 9.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 3.091
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.45
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.45

*****
FLOW PROCESS FROM NODE      562.00 TO NODE      564.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 384.00 DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 564.00 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 = 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) = 4.60
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.40
SPLIT DEPTH(FEET) = 0.25 SPLIT FLOOD WIDTH(FEET) = 6.14
SPLIT FLOW(CFS) = 0.86 SPLIT VELOCITY(FEET/SEC.) = 1.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.40
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.88
STREET FLOW TRAVEL TIME(MIN.) = 3.91 Tc(MIN.) = 7.01
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.087
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 8.31
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 8.67

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.55 DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 560.00 TO NODE 564.00 = 654.00 FEET.

*****

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                                100PR. OUT
FLOW PROCESS FROM NODE      564.00 TO NODE      566.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 374.20
FLOW LENGTH(FEET) = 322.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.42
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.67
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 7.73
LONGEST FLOWPATH FROM NODE 560.00 TO NODE 566.00 = 976.00 FEET.

*****
FLOW PROCESS FROM NODE      564.00 TO NODE      566.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.775
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 5.56
TOTAL AREA(ACRES) = 4.0 TOTAL RUNOFF(CFS) = 13.70
Tc(MIN.) = 7.73

*****
FLOW PROCESS FROM NODE      566.00 TO NODE      568.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.28
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.70
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 7.82
LONGEST FLOWPATH FROM NODE 560.00 TO NODE 568.00 = 1106.00 FEET.

*****
FLOW PROCESS FROM NODE      568.00 TO NODE      568.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.82
RAINFALL INTENSITY(INCH/HR) = 4.74
TOTAL STREAM AREA(ACRES) = 4.04
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.70

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 38.24 9.00 4.328 15.49
2 13.70 7.82 4.738 4.04

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100PR. OUT

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	46.93	7.82	4.738
2	50.75	9.00	4.328

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 50.75 Tc(MIN.) = 9.00
 TOTAL AREA(ACRES) = 19.5
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 568.00 = 1608.00 FEET.

 FLOW PROCESS FROM NODE 568.00 TO NODE 19.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 335.00
 FLOW LENGTH(FEET) = 180.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.03
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 50.75
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 9.12
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 19.00 = 1788.00 FEET.

 FLOW PROCESS FROM NODE 19.00 TO NODE 19.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.12
 RAINFALL INTENSITY(INCH/HR) = 4.29
 TOTAL STREAM AREA(ACRES) = 19.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 50.75

 FLOW PROCESS FROM NODE 18.00 TO NODE 19.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 237.00
 UPSTREAM ELEVATION(FEET) = 370.00
 DOWNSTREAM ELEVATION(FEET) = 340.00
 ELEVATION DIFFERENCE(FEET) = 30.00
 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/HR) = 5.466
 SUBAREA RUNOFF(CFS) = 0.46
 TOTAL AREA(ACRES) = 0.24 TOTAL RUNOFF(CFS) = 0.46

100PR. OUT

FLOW PROCESS FROM NODE 19.00 TO NODE 19.00 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) = 5.47
 TOTAL STREAM AREA(ACRES) = 0.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.46

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	50.75	9.12	4.291	19.53
2	0.46	6.27	5.466	0.24

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	40.30	6.27	5.466
2	51.11	9.12	4.291

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 51.11 Tc(MIN.) = 9.12
 TOTAL AREA(ACRES) = 19.8
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 19.00 = 1788.00 FEET.

 FLOW PROCESS FROM NODE 19.00 TO NODE 586.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00
 FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.04
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 51.11
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 9.25
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 586.00 = 1988.00 FEET.

 FLOW PROCESS FROM NODE 586.00 TO NODE 586.00 IS CODE = 10

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

=====

 FLOW PROCESS FROM NODE 570.00 TO NODE 572.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 104.00
 UPSTREAM ELEVATION(FEET) = 387.90

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DOWNSTREAM ELEVATION(FEET) = 387.00
ELEVATION DIFFERENCE(FEET) = 0.90
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.752
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 60.96
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/ HOUR) = 5.777
SUBAREA RUNOFF(CFS) = 0.37
TOTAL AREA(ACRES) = 0.09 TOTAL RUNOFF(CFS) = 0.37

FLOW PROCESS FROM NODE 572.00 TO NODE 574.00 IS CODE = 62

>>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 387.00 DOWNSTREAM ELEVATION(FEET) = 380.00
STREET LENGTH(FEET) = 292.00 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 = 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) = 1.39
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.25
HALFSTREET FLOOD WIDTH(FEET) = 6.42
AVERAGE FLOW VELOCITY(FEET/ SEC.) = 2.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/ SEC.) = 0.67
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 7.62
100 YEAR RAINFALL INTENSITY(INCH/ HOUR) = 4.821
RESIDENTIAL (24. DU/ AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 2.02
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 2.33

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.20
FLOW VELOCITY(FEET/ SEC.) = 2.94 DEPTH*VELOCITY(FT*FT/ SEC.) = 0.85
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 574.00 = 396.00 FEET.

FLOW PROCESS FROM NODE 574.00 TO NODE 575.00 IS CODE = 31

>>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>> USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW) <<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 380.00 DOWNSTREAM(FEET) = 376.80
FLOW LENGTH(FEET) = 208.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.0 INCHES
PIPE-FLOW VELOCITY(FEET/ SEC.) = 5.80
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.33

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PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 8.21
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 575.00 = 604.00 FEET.

FLOW PROCESS FROM NODE 575.00 TO NODE 575.00 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.) = 8.21
RAINFALL INTENSITY(INCH/ HR) = 4.59
TOTAL STREAM AREA(ACRES) = 0.68
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.33

FLOW PROCESS FROM NODE 571.00 TO NODE 573.00 IS CODE = 21

>>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

RESIDENTIAL (24. DU/ AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 117.00
UPSTREAM ELEVATION(FEET) = 383.70
DOWNSTREAM ELEVATION(FEET) = 383.00
ELEVATION DIFFERENCE(FEET) = 0.70
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.062
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 52.95
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/ HOUR) = 5.585
SUBAREA RUNOFF(CFS) = 0.48
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.48

FLOW PROCESS FROM NODE 573.00 TO NODE 575.00 IS CODE = 62

>>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 383.00 DOWNSTREAM ELEVATION(FEET) = 376.80
STREET LENGTH(FEET) = 476.00 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 = 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) = 3.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.48
AVERAGE FLOW VELOCITY(FEET/ SEC.) = 2.60
PRODUCT OF DEPTH&VELOCITY(FT*FT/ SEC.) = 0.93
STREET FLOW TRAVEL TIME(MIN.) = 3.05 Tc(MIN.) = 9.11
100 YEAR RAINFALL INTENSITY(INCH/ HOUR) = 4.294

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100PR. OUT

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
 SUBAREA AREA(ACRES) = 2.13 SUBAREA RUNOFF(CFS) = 6.49
 TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.86

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
 FLOW VELOCITY(FEET/SEC.) = 2.66 DEPTH*VELOCITY(FT*FT/SEC.) = 0.97
 LONGEST FLOWPATH FROM NODE 571.00 TO NODE 575.00 = 593.00 FEET.

 FLOW PROCESS FROM NODE 575.00 TO NODE 575.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.11
 RAINFALL INTENSITY(INCH/HR) = 4.29
 TOTAL STREAM AREA(ACRES) = 2.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.86

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	2.33	8.21	4.591	0.68
2	6.86	9.11	4.294	2.25

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	8.51	8.21	4.591
2	9.04	9.11	4.294

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 9.04 Tc(MIN.) = 9.11
 TOTAL AREA(ACRES) = 2.9
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 575.00 = 604.00 FEET.

 FLOW PROCESS FROM NODE 575.00 TO NODE 578.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 376.80 DOWNSTREAM(FEET) = 373.00
 FLOW LENGTH(FEET) = 320.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.50
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.04
 PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 9.82
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 578.00 = 924.00 FEET.

 FLOW PROCESS FROM NODE 575.00 TO NODE 578.00 IS CODE = 81

100PR. OUT

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.090
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.90
 TOTAL AREA(ACRES) = 3.9 TOTAL RUNOFF(CFS) = 11.41
 TC(MIN.) = 9.82

 FLOW PROCESS FROM NODE 578.00 TO NODE 584.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 370.50
 FLOW LENGTH(FEET) = 189.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.16
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 11.41
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.21
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 584.00 = 1113.00 FEET.

 FLOW PROCESS FROM NODE 584.00 TO NODE 584.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.21
 RAINFALL INTENSITY(INCH/HR) = 3.99
 TOTAL STREAM AREA(ACRES) = 3.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.41

 FLOW PROCESS FROM NODE 580.00 TO NODE 582.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 110.00
 UPSTREAM ELEVATION(FEET) = 378.00
 DOWNSTREAM ELEVATION(FEET) = 376.50
 ELEVATION DIFFERENCE(FEET) = 1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.245
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 68.64
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.131
 SUBAREA RUNOFF(CFS) = 0.52
 TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.52

 FLOW PROCESS FROM NODE 582.00 TO NODE 584.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

100PR. OUT

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 376.50 DOWNSTREAM ELEVATION(FEET) = 370.50
 STREET LENGTH(FEET) = 478.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.04
 STREET FLOW SPLITS OVER STREET-CROWN
 FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
 FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.61
 SPLIT DEPTH(FEET) = 0.25 SPLIT FLOOD WIDTH(FEET) = 6.33
 SPLIT FLOW(CFS) = 0.97 SPLIT VELOCITY(FEET/SEC.) = 1.88
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.37
 HALFSTREET FLOOD WIDTH(FEET) = 12.00
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.61
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.96
 STREET FLOW TRAVEL TIME(MIN.) = 3.05 Tc(MIN.) = 8.30
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.561
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
 SUBAREA AREA(ACRES) = 2.79 SUBAREA RUNOFF(CFS) = 9.03
 TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 9.42

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.00
 FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
 LONGEST FLOWPATH FROM NODE 580.00 TO NODE 584.00 = 588.00 FEET.

FLOW PROCESS FROM NODE	584.00 TO NODE	584.00 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.) = 8.30
 RAINFALL INTENSITY(INCH/HR) = 4.56
 TOTAL STREAM AREA(ACRES) = 2.91
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.42

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	11.41	10.21	3.990	3.93
2	9.42	8.30	4.561	2.91

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

** PEAK FLOW RATE TABLE **

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100PR. OUT

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	19.41	8.30	4.561
2	19.66	10.21	3.990

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 19.66 Tc(MIN.) = 10.21
 TOTAL AREA(ACRES) = 6.8
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 584.00 = 1113.00 FEET.

FLOW PROCESS FROM NODE	584.00 TO NODE	586.00 IS CODE =	31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 370.50 DOWNSTREAM(FEET) = 315.00
 FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 32.25
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 19.66
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 10.29
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 586.00 = 1274.00 FEET.

FLOW PROCESS FROM NODE	586.00 TO NODE	586.00 IS CODE =	11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	19.66	10.29	3.969	6.84

LONGEST FLOWPATH FROM NODE 570.00 TO NODE 586.00 = 1274.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	51.11	9.25	4.251	19.77

LONGEST FLOWPATH FROM NODE 501.00 TO NODE 586.00 = 1988.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	68.78	9.25	4.251
2	67.38	10.29	3.969

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 68.78 Tc(MIN.) = 9.25
 TOTAL AREA(ACRES) = 26.6

FLOW PROCESS FROM NODE	586.00 TO NODE	586.00 IS CODE =	12

>>>>CLEAR MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE	586.00 TO NODE	594.00 IS CODE =	31

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100PR. OUT

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 295.00
FLOW LENGTH(FEET) = 186.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 28.11
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.78
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 9.36
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 594.00 = 2174.00 FEET.

FLOW PROCESS FROM NODE 594.00 TO NODE 594.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.36
RAINFALL INTENSITY(INCH/HR) = 4.22
TOTAL STREAM AREA(ACRES) = 26.61
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.78

FLOW PROCESS FROM NODE 590.00 TO NODE 592.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(Feet) = 92.00
UPSTREAM ELEVATION(Feet) = 382.20
DOWNSTREAM ELEVATION(Feet) = 378.00
ELEVATION DIFFERENCE(Feet) = 4.20
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.339
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 87.83
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.88
TOTAL AREA(ACRES) = 0.16 TOTAL RUNOFF(CFS) = 0.88

FLOW PROCESS FROM NODE 592.00 TO NODE 594.00 IS CODE = 62

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(Feet) = 378.00 DOWNSTREAM ELEVATION(Feet) = 295.00
STREET LENGTH(Feet) = 826.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0160

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Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.28
HALFSTREET FLOOD WIDTH(Feet) = 7.83
AVERAGE FLOW VELOCITY(Feet/Sec.) = 5.91
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.67
STREET FLOW TRAVEL TIME(MIN.) = 2.33 Tc(MIN.) = 4.67
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 1.25 SUBAREA RUNOFF(CFS) = 6.88
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 7.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.33 HALFSTREET FLOOD WIDTH(Feet) = 10.17
FLOW VELOCITY(Feet/Sec.) = 6.73 DEPTH*VELOCITY(FT*FT/SEC.) = 2.22
LONGEST FLOWPATH FROM NODE 590.00 TO NODE 594.00 = 918.00 FEET.

FLOW PROCESS FROM NODE 594.00 TO NODE 594.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 4.67
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 1.41
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.76

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	68.78	9.36	4.219	26.61
2	7.76	4.67	6.323	1.41

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	42.05	4.67	6.323
2	73.96	9.36	4.219

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 73.96 Tc(MIN.) = 9.36
TOTAL AREA(ACRES) = 28.0
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 594.00 = 2174.00 FEET.

FLOW PROCESS FROM NODE 594.00 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) = 295.00 DOWNSTREAM(Feet) = 294.00

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100PR. OUT
FLOW LENGTH(FEET) = 71.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.34
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 73.96
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 9.45
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 1.00 = 2245.00 FEET.

FLOW PROCESS FROM NODE 594.00 TO NODE 1.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.193
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6113
SUBAREA AREA(ACRES) = 2.07 SUBAREA RUNOFF(CFS) = 3.04
TOTAL AREA(ACRES) = 30.1 TOTAL RUNOFF(CFS) = 77.13
Tc(MIN.) = 9.45

FLOW PROCESS FROM NODE 1.00 TO NODE 27.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 294.00 DOWNSTREAM(FEET) = 285.00
FLOW LENGTH(FEET) = 98.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.54
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 77.13
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.51
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 27.00 = 2343.00 FEET.

FLOW PROCESS FROM NODE 27.00 TO NODE 27.00 IS CODE = 10

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

+-----+
| BEGIN OFFSITE HYD |
| |
+-----+

FLOW PROCESS FROM NODE 23.00 TO NODE 24.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 66.00
UPSTREAM ELEVATION(FEET) = 476.00
DOWNSTREAM ELEVATION(FEET) = 460.00
ELEVATION DIFFERENCE(FEET) = 16.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.091
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
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100PR. OUT
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.250
SUBAREA RUNOFF(CFS) = 0.35
TOTAL AREA(ACRES) = 0.16 TOTAL RUNOFF(CFS) = 0.35

FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 372.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 336.00 CHANNEL SLOPE = 0.2619
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.35
FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 6.27
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 402.00 FEET.

FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.464
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 2.46 SUBAREA RUNOFF(CFS) = 4.70
TOTAL AREA(ACRES) = 2.6 TOTAL RUNOFF(CFS) = 5.01
Tc(MIN.) = 6.27

FLOW PROCESS FROM NODE 25.00 TO NODE 26.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 305.00
FLOW LENGTH(FEET) = 897.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.69
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.01
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 7.45
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 26.00 = 1299.00 FEET.

FLOW PROCESS FROM NODE 26.00 TO NODE 27.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 305.00 DOWNSTREAM(FEET) = 284.00
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.01
PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 7.66
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                                100PR. OUT
LONGEST FLOWPATH FROM NODE    23.00 TO NODE    27.00 =    1484.00 FEET.

*****
FLOW PROCESS FROM NODE        27.00 TO NODE        27.00 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         5.01      7.66      4.803      2.62
LONGEST FLOWPATH FROM NODE    23.00 TO NODE    27.00 =    1484.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM    RUNOFF      Tc      INTENSITY      AREA
NUMBER    (CFS)      (MIN.) (INCH/HOUR) (ACRE)
  1        77.13     9.51      4.176     30.09
LONGEST FLOWPATH FROM NODE    501.00 TO NODE    27.00 =    2343.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF      Tc      INTENSITY
NUMBER    (CFS)      (MIN.) (INCH/HOUR)
  1        67.12     7.66      4.803
  2        81.49     9.51      4.176

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      81.49   Tc(MIN.) =      9.51
TOTAL AREA(ACRES) =      32.7

*****
FLOW PROCESS FROM NODE        27.00 TO NODE        27.00 IS CODE =   12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====

*****
FLOW PROCESS FROM NODE        27.00 TO NODE        28.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 283.90 DOWNSTREAM(FEET) = 264.00
FLOW LENGTH(FEET) = 343.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.49
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) =      81.49
PIPE TRAVEL TIME(MIN.) = 0.24   Tc(MIN.) = 9.75
LONGEST FLOWPATH FROM NODE    501.00 TO NODE    28.00 =    2686.00 FEET.

*****
FLOW PROCESS FROM NODE        28.00 TO NODE        28.00 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.75
RAINFALL INTENSITY(INCH/HR) = 4.11
TOTAL STREAM AREA(ACRES) = 32.71
PEAK FLOW RATE(CFS) AT CONFLUENCE =      81.49

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                                100PR. OUT
*****
FLOW PROCESS FROM NODE        600.00 TO NODE        602.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 75.00
UPSTREAM ELEVATION(FEET) = 296.00
DOWNSTREAM ELEVATION(FEET) = 285.00
ELEVATION DIFFERENCE(FEET) = 11.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.664
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.66
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.66

*****
FLOW PROCESS FROM NODE        602.00 TO NODE        28.00 IS CODE =   62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 285.00 DOWNSTREAM ELEVATION(FEET) = 262.00
STREET LENGTH(FEET) = 386.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.26
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 6.52
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.07
STREET FLOW TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 3.21
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 0.58 SUBAREA RUNOFF(CFS) = 3.19
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 3.85

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.39
FLOW VELOCITY(FEET/SEC.) = 4.68 DEPTH*VELOCITY(FT*FT/SEC.) = 1.38
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    28.00 =    461.00 FEET.

*****
FLOW PROCESS FROM NODE        28.00 TO NODE        28.00 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

```

100PR. OUT

>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 3.21
 RAINFALL INTENSITY(INCH/HR) = 6.32
 TOTAL STREAM AREA(ACRES) = 0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.85

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	81.49	9.75	4.109	32.71
2	3.85	3.21	6.323	0.70

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	30.68	3.21	6.323
2	83.99	9.75	4.109

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 83.99 Tc(MIN.) = 9.75
 TOTAL AREA(ACRES) = 33.4
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 IS CODE = 11

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

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	83.99	9.75	4.109	33.41

LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	91.67	19.51	2.628	63.88

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 28.00 = 4412.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	129.82	9.75	4.109
2	145.38	19.51	2.628

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 145.38 Tc(MIN.) = 19.51
 TOTAL AREA(ACRES) = 97.3

FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 1 <<<<<

=====

100PR. OUT

FLOW PROCESS FROM NODE 28.00 TO NODE 126.00 IS CODE = 52

>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<

>>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 248.00 DOWNSTREAM(FEET) = 232.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 249.00 CHANNEL SLOPE = 0.0643
 CHANNEL FLOW THRU SUBAREA(CFS) = 145.38
 FLOW VELOCITY(FEET/SEC) = 13.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 19.82
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 4661.60 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 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.) = 19.82
 RAINFALL INTENSITY(INCH/HR) = 2.60
 TOTAL STREAM AREA(ACRES) = 97.29
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 145.38

FLOW PROCESS FROM NODE 30.00 TO NODE 32.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 123.00
 UPSTREAM ELEVATION(FEET) = 452.00
 DOWNSTREAM ELEVATION(FEET) = 420.00
 ELEVATION DIFFERENCE(FEET) = 32.00
 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/HR) = 5.466
 SUBAREA RUNOFF(CFS) = 0.63
 TOTAL AREA(ACRES) = 0.33 TOTAL RUNOFF(CFS) = 0.63

FLOW PROCESS FROM NODE 32.00 TO NODE 34.00 IS CODE = 52

>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<

>>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 418.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 391.00 CHANNEL SLOPE = 0.0051
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.63
 FLOW VELOCITY(FEET/SEC) = 1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 6.07 Tc(MIN.) = 12.34
 LONGEST FLOWPATH FROM NODE 30.00 TO NODE 34.00 = 514.00 FEET.

FLOW PROCESS FROM NODE 32.00 TO NODE 34.00 IS CODE = 81

100PR. OUT
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.531
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 89
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5973
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 5.56
TOTAL AREA(ACRES) = 2.8 TOTAL RUNOFF(CFS) = 5.97
TC(MIN.) = 12.34

FLOW PROCESS FROM NODE 34.00 TO NODE 126.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 232.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1437.70 CHANNEL SLOPE = 0.1294
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 5.97
FLOW VELOCITY(FEET/SEC) = 6.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 3.44 Tc(MIN.) = 15.78
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 126.00 = 1951.70 FEET.

FLOW PROCESS FROM NODE 34.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.012
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3846
SUBAREA AREA(ACRES) = 17.40 SUBAREA RUNOFF(CFS) = 18.35
TOTAL AREA(ACRES) = 20.2 TOTAL RUNOFF(CFS) = 23.44
TC(MIN.) = 15.78

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 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.) = 15.78
RAINFALL INTENSITY(INCH/HR) = 3.01
TOTAL STREAM AREA(ACRES) = 20.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.44

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	145.38	19.82	2.601	97.29
2	23.44	15.78	3.012	20.23

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

** PEAK FLOW RATE TABLE **

STREAM	RUNOFF	Tc	INTENSITY
--------	--------	----	-----------

100PR. OUT

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)
1	139.23	15.78	3.012
2	165.62	19.82	2.601

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 165.62 Tc(MIN.) = 19.82
TOTAL AREA(ACRES) = 117.5
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 4661.60 FEET.

+-----+
| EDN PROPOSED CONDITION HYD
| SUNBOW PA-23
|-----+
+-----+

=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 117.5 TC(MIN.) = 19.82
PEAK FLOW RATE(CFS) = 165.62

=====

END OF RATIONAL METHOD ANALYSIS

▲

PROPOSED CONDITION (ATTENUATED)

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE

Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT

2003, 1985, 1981 HYDROLOGY MANUAL

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Ver. 22.0 Release Date: 07/01/2015 License ID 1239

Analysis prepared by:

FILE NAME: R:\1561\HYD\DR\CALCS\TM\AES\PRATT.DAT

TIME/DATE OF STUDY: 12:36 06/19/2020

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00

6-HOUR DURATION PRECIPITATION (INCHES) = 2.400

SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00

SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	12.0	6.0	0.020/0.020/0.020	0.50	1.50 0.0313 0.125	0.0160
2	15.0	7.5	0.020/0.020/0.020	0.33	1.50 0.0313 0.125	0.0130

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.50 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 5.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+-----+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW |
+-----+*****
FLOW PROCESS FROM NODE 100.00 TO NODE 102.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500

SOIL CLASSIFICATION IS "D"

S.C.S. CURVE NUMBER (AMC II) = 88

INITIAL SUBAREA FLOW-LENGTH(Feet) = 88.00

UPSTREAM ELEVATION(Feet) = 474.00

DOWNSTREAM ELEVATION(Feet) = 460.00

ELEVATION DIFFERENCE(Feet) = 14.00

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.879

WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.696

SUBAREA RUNOFF(CFS) = 0.40

TOTAL AREA(ACRES) = 0.20 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(Feet) = 460.00 DOWNSTREAM(Feet) = 438.00

CHANNEL LENGTH THRU SUBAREA(Feet) = 317.00 CHANNEL SLOPE = 0.0694

NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION

CHANNEL FLOW THRU SUBAREA(CFS) = 0.40

FLOW VELOCITY(Feet/Sec) = 3.95 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)

TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 7.22

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 405.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.991

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500

SOIL CLASSIFICATION IS "D"

S.C.S. CURVE NUMBER (AMC II) = 88

AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 3.02

TOTAL AREA(ACRES) = 1.9 TOTAL RUNOFF(CFS) = 3.37

Tc(MIN.) = 7.22

FLOW PROCESS FROM NODE 104.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(Feet) = 438.00 DOWNSTREAM(Feet) = 403.20

FLOW LENGTH(Feet) = 594.00 MANNING'S N = 0.012

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.) = 10.37

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.37

PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 8.17

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 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<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500

SOIL CLASSIFICATION IS "D"

100PRATT. OUT

S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 342.00
 UPSTREAM ELEVATION(FEET) = 464.00
 DOWNSTREAM ELEVATION(FEET) = 434.00
 ELEVATION DIFFERENCE(FEET) = 30.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.546
 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) = 5.315
 SUBAREA RUNOFF(CFS) = 0.35
 TOTAL AREA(ACRES) = 0.19 TOTAL RUNOFF(CFS) = 0.35

FLOW PROCESS FROM NODE 112.00 TO NODE 114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 434.00 DOWNSTREAM(FEET) = 408.60
 FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 0.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.54
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.35
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 6.64
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 402.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 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.) = 6.64
 RAINFALL INTENSITY(INCH/HR) = 5.27
 TOTAL STREAM AREA(ACRES) = 0.19
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.35

FLOW PROCESS FROM NODE 116.00 TO NODE 114.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
 UPSTREAM ELEVATION(FEET) = 440.00
 DOWNSTREAM ELEVATION(FEET) = 412.00
 ELEVATION DIFFERENCE(FEET) = 28.00
 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) = 5.466
 SUBAREA RUNOFF(CFS) = 0.42
 TOTAL AREA(ACRES) = 0.22 TOTAL RUNOFF(CFS) = 0.42

100PRATT. OUT

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 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) = 5.47
 TOTAL STREAM AREA(ACRES) = 0.22
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.42

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.35	6.64	5.265	0.19
2	0.42	6.27	5.466	0.22

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	0.75	6.27	5.466
2	0.76	6.64	5.265

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 0.76 Tc(MIN.) = 6.64
 TOTAL AREA(ACRES) = 0.4
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 402.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 408.00 DOWNSTREAM(FEET) = 402.70
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.33
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 0.76
 PIPE TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 9.89
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 124.00 = 1052.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.89
 RAINFALL INTENSITY(INCH/HR) = 4.07
 TOTAL STREAM AREA(ACRES) = 0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.76

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

100PRATT. OUT

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500

SOIL CLASSIFICATION IS "D"

S.C.S. CURVE NUMBER (AMC II) = 88

INITIAL SUBAREA FLOW-LENGTH(Feet) = 100.00

UPSTREAM ELEVATION(Feet) = 460.00

DOWNSTREAM ELEVATION(Feet) = 420.00

ELEVATION DIFFERENCE(Feet) = 40.00

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) = 5.466

SUBAREA RUNOFF(CFS) = 0.27

TOTAL AREA(ACRES) = 0.14 TOTAL RUNOFF(CFS) = 0.27

FLOW PROCESS FROM NODE 122.00 TO NODE 124.00 IS CODE = 62

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(Feet) = 408.60 DOWNSTREAM ELEVATION(Feet) = 402.70

STREET LENGTH(Feet) = 788.00 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 = 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) = 4.15

STREET FLOW SPLITS OVER STREET-CROWN

FULL DEPTH(Feet) = 0.37 FLOOD WIDTH(Feet) = 12.00

FULL HALF-STREET VELOCITY(Feet/SEC.) = 2.01

SPLIT DEPTH(Feet) = 0.27 SPLIT FLOOD WIDTH(Feet) = 7.27

SPLIT FLOW(CFS) = 1.01 SPLIT VELOCITY(Feet/SEC.) = 1.57

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(Feet) = 0.37

HALFSTREET FLOOD WIDTH(Feet) = 12.00

AVERAGE FLOW VELOCITY(Feet/SEC.) = 2.01

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.74

STREET FLOW TRAVEL TIME(MIN.) = 6.52 Tc(MIN.) = 12.79

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.451

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100

SOIL CLASSIFICATION IS "D"

S.C.S. CURVE NUMBER (AMC II) = 92

AREA-AVERAGE RUNOFF COEFFICIENT = 0.695

SUBAREA AREA(ACRES) = 3.17 SUBAREA RUNOFF(CFS) = 7.77

TOTAL AREA(ACRES) = 3.3 PEAK FLOW RATE(CFS) = 7.94

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(Feet) = 0.39 HALFSTREET FLOOD WIDTH(Feet) = 12.00

FLOW VELOCITY(Feet/SEC.) = 2.20 DEPTH*VELOCITY(FT*FT/SEC.) = 0.85

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 888.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

100PRATT. OUT

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 12.79

RAINFALL INTENSITY(INCH/HR) = 3.45

TOTAL STREAM AREA(ACRES) = 3.31

PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.94

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.76	9.89	4.072	0.41
2	7.94	12.79	3.451	3.31

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	6.90	9.89	4.072
2	8.58	12.79	3.451

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 8.58 Tc(MIN.) = 12.79

TOTAL AREA(ACRES) = 3.7

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 124.00 = 1052.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 127.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(Feet) = 402.70 DOWNSTREAM(Feet) = 402.00

FLOW LENGTH(Feet) = 60.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES

PIPE-FLOW VELOCITY(Feet/SEC.) = 7.36

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.58

PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 12.92

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 1112.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 12.92

RAINFALL INTENSITY(INCH/HR) = 3.43

TOTAL STREAM AREA(ACRES) = 3.72

PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.58

FLOW PROCESS FROM NODE 121.00 TO NODE 123.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500

100PRATT. OUT

SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 143.00
 UPSTREAM ELEVATION(FEET) = 474.00
 DOWNSTREAM ELEVATION(FEET) = 460.00
 ELEVATION DIFFERENCE(FEET) = 14.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.311
 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) = 5.441
 SUBAREA RUNOFF(CFS) = 0.34
 TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.34

 FLOW PROCESS FROM NODE 123.00 TO NODE 125.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 440.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.0873
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.34
 FLOW VELOCITY(FEET/SEC) = 4.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 7.17
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 125.00 = 372.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.011
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) = 1.39 SUBAREA RUNOFF(CFS) = 2.44
 TOTAL AREA(ACRES) = 1.6 TOTAL RUNOFF(CFS) = 2.75
 Tc(MIN.) = 7.17

 FLOW PROCESS FROM NODE 125.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 408.00 DOWNSTREAM(FEET) = 402.00
 FLOW LENGTH(FEET) = 290.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.76
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.75
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 7.89
 LONGEST FLOWPATH FROM NODE 121.00 TO NODE 127.00 = 662.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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100PRATT. OUT

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 7.89
 RAINFALL INTENSITY(INCH/HR) = 4.71
 TOTAL STREAM AREA(ACRES) = 1.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.75

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.58	12.92	3.428	3.72
2	2.75	7.89	4.713	1.57

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	8.99	7.89	4.713
2	10.58	12.92	3.428

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.58 Tc(MIN.) = 12.92
 TOTAL AREA(ACRES) = 5.3
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 127.00 = 1112.00 FEET.

 FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.20
 FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.14
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.58
 PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.11
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 128.00 = 1192.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.58	13.11	3.396	5.29

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 128.00 = 1192.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	3.37	8.17	4.607	1.93

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 999.00 FEET.

** PEAK FLOW RATE TABLE **

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100PRATT. OUT
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.) (INCH/HOUR)
  1         9.97       8.17      4.607
  2        13.07      13.11      3.396

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      13.07   Tc(MIN.) =      13.11
TOTAL AREA(ACRES) =       7.2

*****
FLOW PROCESS FROM NODE      128.00 TO NODE      128.00 IS CODE =  12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE      128.00 TO NODE      134.00 IS CODE =  31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 403.20 DOWNSTREAM( FEET) = 402.45
FLOW LENGTH( FEET) = 30.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.6 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 10.87
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.07
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 13.15
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 134.00 = 1222.00 FEET.

*****
FLOW PROCESS FROM NODE      134.00 TO NODE      134.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.15
RAINFALL INTENSITY(INCH/HR) = 3.39
TOTAL STREAM AREA(ACRES) = 7.22
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.07

*****
FLOW PROCESS FROM NODE      130.00 TO NODE      132.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH( FEET) = 101.00
UPSTREAM ELEVATION( FEET) = 450.00
DOWNSTREAM ELEVATION( FEET) = 417.00
ELEVATION DIFFERENCE( FEET) = 33.00
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) = 5.466
SUBAREA RUNOFF(CFS) = 0.23
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.23

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100PRATT. OUT
*****
FLOW PROCESS FROM NODE      132.00 TO NODE      134.00 IS CODE =  62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION( FEET) = 417.00 DOWNSTREAM ELEVATION( FEET) = 402.45
STREET LENGTH( FEET) = 673.30 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 = 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) = 3.49
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH( FEET) = 0.33
HALFSTREET FLOOD WIDTH( FEET) = 10.08
AVERAGE FLOW VELOCITY( FEET/SEC.) = 3.08
PRODUCT OF DEPTH&VELOCITY( FT*FT/SEC.) = 1.01
STREET FLOW TRAVEL TIME(MIN.) = 3.65 Tc(MIN.) = 9.91
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.067
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.589
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.59
TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 6.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH( FEET) = 0.37 HALFSTREET FLOOD WIDTH( FEET) = 12.00
FLOW VELOCITY( FEET/SEC.) = 3.42 DEPTH*VELOCITY( FT*FT/SEC.) = 1.25
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 774.30 FEET.

*****
FLOW PROCESS FROM NODE      134.00 TO NODE      134.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.91
RAINFALL INTENSITY(INCH/HR) = 4.07
TOTAL STREAM AREA(ACRES) = 2.82
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.76

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.) (INCH/HOUR) (ACRE)
  1         13.07      13.15      3.388         7.22
  2          6.76       9.91      4.067         2.82

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

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

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100PRATT. OUT

NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
1           16.61      9.91         4.067
2           18.70      13.15        3.388

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 18.70 Tc(MIN.) = 13.15
TOTAL AREA(ACRES) = 10.0
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 134.00 = 1222.00 FEET.

*****
FLOW PROCESS FROM NODE 134.00 TO NODE 146.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 402.45 DOWNSTREAM(FEET) = 392.90
FLOW LENGTH(FEET) = 352.60 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.30
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.70
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 13.63
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 146.00 = 1574.60 FEET.

*****
FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE 140.00 TO NODE 142.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 106.00
UPSTREAM ELEVATION(FEET) = 435.00
DOWNSTREAM ELEVATION(FEET) = 415.00
ELEVATION DIFFERENCE(FEET) = 20.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.178
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) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.46
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.46

*****
FLOW PROCESS FROM NODE 142.00 TO NODE 144.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 415.60 DOWNSTREAM ELEVATION(FEET) = 398.00
STREET LENGTH(FEET) = 643.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 12.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 6.00

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100PRATT. OUT

INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.10
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 10.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.49
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
STREET FLOW TRAVEL TIME(MIN.) = 3.07 Tc(MIN.) = 7.24
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.978
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.17
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 7.53

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 3.85 DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 144.00 = 749.00 FEET.

*****
FLOW PROCESS FROM NODE 144.00 TO NODE 145.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 393.00
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.012
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.) = 9.82
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.53
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 7.56
LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 934.00 FEET.

*****
FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 7.56
RAINFALL INTENSITY(INCH/HR) = 4.84
TOTAL STREAM AREA(ACRES) = 2.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.53

*****
FLOW PROCESS FROM NODE 141.00 TO NODE 143.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"

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100PRATT. OUT

S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 150.00
 UPSTREAM ELEVATION(FEET) = 407.00
 DOWNSTREAM ELEVATION(FEET) = 406.00
 ELEVATION DIFFERENCE(FEET) = 1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.640
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 55.00
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.810
 SUBAREA RUNOFF(CFS) = 0.52
 TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.52

FLOW PROCESS FROM NODE 143.00 TO NODE 145.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 406.00 DOWNSTREAM ELEVATION(FEET) = 393.00
 STREET LENGTH(FEET) = 478.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.31
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.28
 HALFSTREET FLOOD WIDTH(FEET) = 7.92
 AVERAGE FLOW VELOCITY(FT/SEC.) = 3.10
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.88
 STREET FLOW TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 10.21
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.990
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
 SUBAREA AREA(ACRES) = 1.49 SUBAREA RUNOFF(CFS) = 3.57
 TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 4.00

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.17
 FLOW VELOCITY(FT/SEC.) = 3.47 DEPTH*VELOCITY(FT*FT/SEC.) = 1.14
 LONGEST FLOWPATH FROM NODE 141.00 TO NODE 145.00 = 628.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 145.00 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.) = 10.21
 RAINFALL INTENSITY(INCH/HR) = 3.99

100PRATT. OUT

TOTAL STREAM AREA(ACRES) = 1.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.00

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	7.53	7.56	4.844	2.52
2	4.00	10.21	3.990	1.67

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	10.49	7.56	4.844
2	10.20	10.21	3.990

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.49 Tc(MIN.) = 7.56
 TOTAL AREA(ACRES) = 4.2
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 145.00 = 934.00 FEET.

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 393.00
 FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
 PIPE-FLOW VELOCITY(FT/SEC.) = 9.90
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.49
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 7.63
 LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 979.00 FEET.

FLOW PROCESS FROM NODE 146.00 TO NODE 146.00 IS CODE = 11

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

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.49	7.63	4.813	4.19

LONGEST FLOWPATH FROM NODE 140.00 TO NODE 146.00 = 979.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	18.70	13.63	3.311	10.04

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 146.00 = 1574.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	20.96	7.63	4.813
2	25.91	13.63	3.311

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

                                100PRATT. OUT
PEAK FLOW RATE(CFS) =      25.91   Tc(MIN.) = 13.63
TOTAL AREA(ACRES) =      14.2

*****
FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE    146.00 TO NODE    154.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 392.90 DOWNSTREAM(FEET) = 391.00
FLOW LENGTH(FEET) = 84.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 12.44
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 25.91
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.74
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 154.00 = 1658.60 FEET.

*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) = 13.74
RAINFALL INTENSITY(INCH/HR) = 3.29
TOTAL STREAM AREA(ACRES) = 14.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.91

*****
FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 140.00
UPSTREAM ELEVATION(FEET) = 401.00
DOWNSTREAM ELEVATION(FEET) = 400.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.563
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH = 56.43
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.842
SUBAREA RUNOFF(CFS) = 0.52
TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.52

*****
FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

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                                100PRATT. OUT
UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 391.00
STREET LENGTH(FEET) = 358.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 8.02
AVERAGE FLOW VELOCITY(FT/SEC.) = 2.99
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.86
STREET FLOW TRAVEL TIME(MIN.) = 1.99 Tc(MIN.) = 9.56
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.164
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.50
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.95

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.27
FLOW VELOCITY(FT/SEC.) = 3.37 DEPTH*VELOCITY(FT*FT/SEC.) = 1.12
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 498.00 FEET.

*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) = 9.56
RAINFALL INTENSITY(INCH/HR) = 4.16
TOTAL STREAM AREA(ACRES) = 1.58
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.95

*****
FLOW PROCESS FROM NODE    151.00 TO NODE    153.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 140.00
UPSTREAM ELEVATION(FEET) = 401.00
DOWNSTREAM ELEVATION(FEET) = 400.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.563
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH = 56.43
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.842

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100PRATT. OUT

SUBAREA RUNOFF(CFS) = 0.52
TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.52

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 391.40
STREET LENGTH(Feet) = 358.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.22
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.25
HALFSTREET FLOOD WIDTH(Feet) = 5.96
AVERAGE FLOW VELOCITY(Feet/Sec.) = 2.58
PRODUCT OF DEPTH&VELOCITY(Ft*Ft/Sec.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 9.88
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.076
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.600
SUBAREA AREA(ACRES) = 0.57 SUBAREA RUNOFF(CFS) = 1.39
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.27 HALFSTREET FLOOD WIDTH(Feet) = 7.36
FLOW VELOCITY(Feet/Sec.) = 2.78 DEPTH*VELOCITY(Ft*Ft/Sec.) = 0.76
LONGEST FLOWPATH FROM NODE 151.00 TO NODE 154.00 = 498.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 9.88
RAINFALL INTENSITY(INCH/HR) = 4.08
TOTAL STREAM AREA(ACRES) = 0.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.83

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 25.91 13.74 3.294 14.23
2 3.95 9.56 4.164 1.58
3 1.83 9.88 4.076 0.75

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
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100PRATT. OUT

CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 23.74 9.56 4.164
2 24.32 9.88 4.076
3 30.52 13.74 3.294

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 30.52 Tc(MIN.) = 13.74
TOTAL AREA(ACRES) = 16.6
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 154.00 = 1658.60 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 169.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 391.40 DOWNSTREAM(Feet) = 390.10
FLOW LENGTH(Feet) = 30.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 16.32
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.52
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 13.77
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 169.00 = 1688.60 FEET.

FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 160.00 TO NODE 162.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 108.00
UPSTREAM ELEVATION(Feet) = 396.00
DOWNSTREAM ELEVATION(Feet) = 395.00
ELEVATION DIFFERENCE(Feet) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.707
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 62.78
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.807
SUBAREA RUNOFF(CFS) = 0.54
TOTAL AREA(ACRES) = 0.13 TOTAL RUNOFF(CFS) = 0.54

FLOW PROCESS FROM NODE 162.00 TO NODE 164.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(Feet) = 396.00 DOWNSTREAM ELEVATION(Feet) = 392.30
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100PRATT. OUT
STREET LENGTH(FEET) = 340.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.67
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 10.36
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.24
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.75
STREET FLOW TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 8.24
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.583
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 4.23
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 4.65

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 164.00 = 448.00 FEET.

*****
FLOW PROCESS FROM NODE 164.00 TO NODE 168.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 392.30 DOWNSTREAM(FEET) = 390.00
FLOW LENGTH(FEET) = 233.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.97
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.65
PIPE TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 8.89
LONGEST FLOWPATH FROM NODE 160.00 TO NODE 168.00 = 681.00 FEET.

*****
FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.89
RAINFALL INTENSITY(INCH/HR) = 4.36
TOTAL STREAM AREA(ACRES) = 1.43
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.65

*****
FLOW PROCESS FROM NODE 161.00 TO NODE 163.00 IS CODE = 21
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100PRATT. OUT
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 118.00
UPSTREAM ELEVATION(FEET) = 396.00
DOWNSTREAM ELEVATION(FEET) = 395.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.766
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 60.42
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.768
SUBAREA RUNOFF(CFS) = 0.53
TOTAL AREA(ACRES) = 0.13 TOTAL RUNOFF(CFS) = 0.53

*****
FLOW PROCESS FROM NODE 163.00 TO NODE 168.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 395.00 DOWNSTREAM ELEVATION(FEET) = 390.00
STREET LENGTH(FEET) = 580.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.16
SPLIT DEPTH(FEET) = 0.16 SPLIT FLOOD WIDTH(FEET) = 1.54
SPLIT FLOW(CFS) = 0.13 SPLIT VELOCITY(FEET/SEC.) = 0.94
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79
STREET FLOW TRAVEL TIME(MIN.) = 4.47 Tc(MIN.) = 10.24
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.983
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.94
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.31

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.16 DEPTH*VELOCITY(FT*FT/SEC.) = 0.79
LONGEST FLOWPATH FROM NODE 161.00 TO NODE 168.00 = 698.00 FEET.

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100PRATT. OUT
FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.24
RAINFALL INTENSITY(INCH/HR) = 3.98
TOTAL STREAM AREA(ACRES) = 2.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.31
*****
FLOW PROCESS FROM NODE 165.00 TO NODE 167.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 121.00
UPSTREAM ELEVATION(FEET) = 394.20
DOWNSTREAM ELEVATION(FEET) = 392.80
ELEVATION DIFFERENCE(FEET) = 1.40
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.456
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 66.57
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.977
SUBAREA RUNOFF(CFS) = 0.64
TOTAL AREA(ACRES) = 0.15 TOTAL RUNOFF(CFS) = 0.64
*****
FLOW PROCESS FROM NODE 167.00 TO NODE 168.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 392.80 DOWNSTREAM ELEVATION(FEET) = 390.00
STREET LENGTH(FEET) = 284.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.58
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 8.39
AVERAGE FLOW VELOCITY(FT*FT/SEC.) = 1.92
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 7.92
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.699
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710

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100PRATT. OUT
SUBAREA AREA(ACRES) = 0.56 SUBAREA RUNOFF(CFS) = 1.87
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 2.37

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.08
FLOW VELOCITY(FT/SEC.) = 2.09 DEPTH*VELOCITY(FT*FT/SEC.) = 0.68
LONGEST FLOWPATH FROM NODE 165.00 TO NODE 168.00 = 405.00 FEET.
*****
FLOW PROCESS FROM NODE 168.00 TO NODE 169.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 391.00 DOWNSTREAM(FEET) = 390.50
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 4.99
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.37
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 8.09
LONGEST FLOWPATH FROM NODE 165.00 TO NODE 169.00 = 455.00 FEET.
*****
FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 8.09
RAINFALL INTENSITY(INCH/HR) = 4.64
TOTAL STREAM AREA(ACRES) = 0.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.37

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 4.65 8.89 4.364 1.43
2 6.31 10.24 3.983 2.23
3 2.37 8.09 4.636 0.71

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 11.59 8.09 4.636
2 12.36 8.89 4.364
3 12.59 10.24 3.983

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 12.59 Tc(MIN.) = 10.24
TOTAL AREA(ACRES) = 4.4
LONGEST FLOWPATH FROM NODE 161.00 TO NODE 169.00 = 698.00 FEET.
*****
FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

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100PRATT. OUT

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	12.59	10.24	3.983	4.37

LONGEST FLOWPATH FROM NODE 161.00 TO NODE 169.00 = 698.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	30.52	13.77	3.289	16.56

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 169.00 = 1688.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	35.27	10.24	3.983
2	40.91	13.77	3.289

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 40.91 Tc(MIN.) = 13.77
 TOTAL AREA(ACRES) = 20.9

 FLOW PROCESS FROM NODE 169.00 TO NODE 169.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 169.00 TO NODE 198.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(Feet) = 390.10 DOWNSTREAM(Feet) = 388.90
 FLOW LENGTH(Feet) = 113.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 10.30
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 40.91
 PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 13.96
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 198.00 = 1801.60 FEET.

 FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 170.00 TO NODE 172.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 88
 INITIAL SUBAREA FLOW-LENGTH(Feet) = 120.00
 UPSTREAM ELEVATION(Feet) = 440.00
 DOWNSTREAM ELEVATION(Feet) = 410.00
 ELEVATION DIFFERENCE(Feet) = 30.00

100PRATT. OUT

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) = 5.466
 SUBAREA RUNOFF(CFS) = 0.33
 TOTAL AREA(ACRES) = 0.17 TOTAL RUNOFF(CFS) = 0.33

 FLOW PROCESS FROM NODE 172.00 TO NODE 176.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(Feet) = 408.00 DOWNSTREAM ELEVATION(Feet) = 388.50
 STREET LENGTH(Feet) = 671.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.12
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(Feet) = 0.28
 HALFSTREET FLOOD WIDTH(Feet) = 7.55
 AVERAGE FLOW VELOCITY(Feet/Sec.) = 3.08
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.85
 STREET FLOW TRAVEL TIME(MIN.) = 3.63 Tc(MIN.) = 9.90
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.070
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.667
 SUBAREA AREA(ACRES) = 1.26 SUBAREA RUNOFF(CFS) = 3.64
 TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.88

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(Feet) = 0.32 HALFSTREET FLOOD WIDTH(Feet) = 9.89
 FLOW VELOCITY(Feet/Sec.) = 3.54 DEPTH*VELOCITY(FT*FT/SEC.) = 1.15
 LONGEST FLOWPATH FROM NODE 170.00 TO NODE 176.00 = 791.00 FEET.

 FLOW PROCESS FROM NODE 176.00 TO NODE 176.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.90
 RAINFALL INTENSITY(INCH/HR) = 4.07
 TOTAL STREAM AREA(ACRES) = 1.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.88

 FLOW PROCESS FROM NODE 171.00 TO NODE 173.00 IS CODE = 21

100PRATT. OUT

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

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=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 60.00
UPSTREAM ELEVATION(FEET) = 394.50
DOWNSTREAM ELEVATION(FEET) = 394.00
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.778
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.760
SUBAREA RUNOFF(CFS) = 0.29
TOTAL AREA(ACRES) = 0.07 TOTAL RUNOFF(CFS) = 0.29

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*****
FLOW PROCESS FROM NODE 173.00 TO NODE 176.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

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=====
UPSTREAM ELEVATION(FEET) = 394.00 DOWNSTREAM ELEVATION(FEET) = 388.50
STREET LENGTH(FEET) = 460.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 12.00

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

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.67
AVERAGE FLOW VELOCITY(FT/SEC.) = 2.11
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 3.63 Tc(MIN.) = 9.41
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.206
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 1.02 SUBAREA RUNOFF(CFS) = 3.05
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.25

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.02
FLOW VELOCITY(FT/SEC.) = 2.44 DEPTH*VELOCITY(FT*FT/SEC.) = 0.85
LONGEST FLOWPATH FROM NODE 171.00 TO NODE 176.00 = 520.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 176.00 TO NODE 176.00 IS CODE = 1
-----

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```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

```

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.41
RAINFALL INTENSITY(INCH/HR) = 4.21

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100PRATT. OUT

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TOTAL STREAM AREA(ACRES) = 1.09
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.25

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```

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 3.88 9.90 4.070 1.43
2 3.25 9.41 4.206 1.09

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

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** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 6.95 9.41 4.206
2 7.03 9.90 4.070

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```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 7.03 Tc(MIN.) = 9.90
TOTAL AREA(ACRES) = 2.5
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 176.00 = 791.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 176.00 TO NODE 198.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 388.50 DOWNSTREAM(FEET) = 388.25
FLOW LENGTH(FEET) = 25.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 6.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.03
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.96
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 198.00 = 816.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 11
-----

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

```

```

** MAIN STREAM CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 7.03 9.96 4.054 2.52
LONGEST FLOWPATH FROM NODE 170.00 TO NODE 198.00 = 816.00 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 40.91 13.96 3.261 20.93
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 198.00 = 1801.60 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 36.23 9.96 4.054
2 46.57 13.96 3.261

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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```

                                100PRATT. OUT
PEAK FLOW RATE(CFS) =      46.57   Tc(MIN.) =   13.96
TOTAL AREA(ACRES) =      23.5

*****
FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE    180.00 TO NODE    182.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   92
INITIAL SUBAREA FLOW-LENGTH(FEET) =   80.00
UPSTREAM ELEVATION(FEET) =   409.50
DOWNSTREAM ELEVATION(FEET) =   408.50
ELEVATION DIFFERENCE(FEET) =     1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =   5.354
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =   67.50
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   6.050
SUBAREA RUNOFF(CFS) =     0.52
TOTAL AREA(ACRES) =     0.12   TOTAL RUNOFF(CFS) =     0.52

*****
FLOW PROCESS FROM NODE    182.00 TO NODE    184.00 IS CODE =   62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 406.00   DOWNSTREAM ELEVATION(FEET) = 394.40
STREET LENGTH(FEET) = 529.30   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 =   1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     4.50
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 11.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.33
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
STREET FLOW TRAVEL TIME(MIN.) = 2.65   Tc(MIN.) = 8.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.668

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                                100PRATT. OUT
RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   94
AREA-AVERAGE RUNOFF COEFFICIENT = 0.786
SUBAREA AREA(ACRES) =   2.15   SUBAREA RUNOFF(CFS) =   7.93
TOTAL AREA(ACRES) =   2.3     PEAK FLOW RATE(CFS) =   8.33

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 3.45   DEPTH*VELOCITY(FT*FT/SEC.) = 1.26
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =   609.30 FEET.

*****
FLOW PROCESS FROM NODE    184.00 TO NODE    196.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 394.50   DOWNSTREAM(FEET) = 390.50
FLOW LENGTH(FEET) = 421.00   MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.74
ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =   8.33
PIPE TRAVEL TIME(MIN.) = 1.04   Tc(MIN.) = 9.04
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    196.00 = 1030.30 FEET.

*****
FLOW PROCESS FROM NODE    196.00 TO NODE    196.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.04
RAINFALL INTENSITY(INCH/HR) = 4.31
TOTAL STREAM AREA(ACRES) = 2.27
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.33

*****
FLOW PROCESS FROM NODE    190.00 TO NODE    192.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =   92
INITIAL SUBAREA FLOW-LENGTH(FEET) =   96.00
UPSTREAM ELEVATION(FEET) =   404.00
DOWNSTREAM ELEVATION(FEET) =   403.00
ELEVATION DIFFERENCE(FEET) =     1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =   5.601
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =   65.42
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   5.877
SUBAREA RUNOFF(CFS) =     0.42
TOTAL AREA(ACRES) =     0.10   TOTAL RUNOFF(CFS) =     0.42

*****
FLOW PROCESS FROM NODE    192.00 TO NODE    194.00 IS CODE =   62
-----

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100PRATT. OUT

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 403.00 DOWNSTREAM ELEVATION(FEET) = 395.30
STREET LENGTH(FEET) = 704.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.75
STREET FLOW SPLITS OVER STREET-CROWN
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.43
SPLIT DEPTH(FEET) = 0.34 SPLIT FLOOD WIDTH(FEET) = 10.83
SPLIT FLOW(CFS) = 2.96 SPLIT VELOCITY(FEET/SEC.) = 2.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.89
STREET FLOW TRAVEL TIME(MIN.) = 4.82 Tc(MIN.) = 10.42
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.938
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 4.41 SUBAREA RUNOFF(CFS) = 12.33
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 12.61

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.97 DEPTH*VELOCITY(FT*FT/SEC.) = 1.23
LONGEST FLOWPATH FROM NODE 190.00 TO NODE 194.00 = 800.00 FEET.

FLOW PROCESS FROM NODE 194.00 TO NODE 196.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.30 DOWNSTREAM(FEET) = 390.00
FLOW LENGTH(FEET) = 42.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.83
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.61
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 190.00 TO NODE 196.00 = 842.00 FEET.

FLOW PROCESS FROM NODE 196.00 TO NODE 196.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.46
RAINFALL INTENSITY(INCH/HR) = 3.93
TOTAL STREAM AREA(ACRES) = 4.51
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.61

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.33	9.04	4.314	2.27
2	12.61	10.46	3.929	4.51

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	19.24	9.04	4.314
2	20.19	10.46	3.929

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 20.19 Tc(MIN.) = 10.46
TOTAL AREA(ACRES) = 6.8
LONGEST FLOWPATH FROM NODE 180.00 TO NODE 196.00 = 1030.30 FEET.

FLOW PROCESS FROM NODE 196.00 TO NODE 198.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 388.90
FLOW LENGTH(FEET) = 115.30 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.36
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.19
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 10.69
LONGEST FLOWPATH FROM NODE 180.00 TO NODE 198.00 = 1145.60 FEET.

FLOW PROCESS FROM NODE 198.00 TO NODE 198.00 IS CODE = 11

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

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	20.19	10.69	3.875	6.78

LONGEST FLOWPATH FROM NODE 180.00 TO NODE 198.00 = 1145.60 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	46.57	13.96	3.261	23.45

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 198.00 = 1801.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
------------------	-----------------	--------------	--------------------------

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100PRATT. OUT
1      55.85      10.69      3.875
2      63.57      13.96      3.261

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      63.57      Tc(MIN.) =      13.96
TOTAL AREA(ACRES) =      30.2

*****
FLOW PROCESS FROM NODE      198.00 TO NODE      198.00 IS CODE =      12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE      198.00 TO NODE      204.00 IS CODE =      31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =      388.90 DOWNSTREAM(FEET) =      379.20
FLOW LENGTH(FEET) =      262.50 MANNING'S N =      0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =      18.67
ESTIMATED PIPE DIAMETER(INCH) =      30.00 NUMBER OF PIPES =      1
PIPE-FLOW(CFS) =      63.57
PIPE TRAVEL TIME(MIN.) =      0.23 Tc(MIN.) =      14.19
LONGEST FLOWPATH FROM NODE      110.00 TO NODE      204.00 =      2064.10 FEET.

*****
FLOW PROCESS FROM NODE      204.00 TO NODE      204.00 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.) =      14.19
RAINFALL INTENSITY(INCH/HR) =      3.23
TOTAL STREAM AREA(ACRES) =      30.23
PEAK FLOW RATE(CFS) AT CONFLUENCE =      63.57

*****
FLOW PROCESS FROM NODE      200.00 TO NODE      202.00 IS CODE =      21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =      92
INITIAL SUBAREA FLOW-LENGTH(FEET) =      90.00
UPSTREAM ELEVATION(FEET) =      392.80
DOWNSTREAM ELEVATION(FEET) =      391.80
ELEVATION DIFFERENCE(FEET) =      1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =      5.511
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH =      66.11
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =      5.939
SUBAREA RUNOFF(CFS) =      0.25
TOTAL AREA(ACRES) =      0.06 TOTAL RUNOFF(CFS) =      0.25

*****
FLOW PROCESS FROM NODE      202.00 TO NODE      204.00 IS CODE =      62

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100PRATT. OUT
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) =      391.80 DOWNSTREAM ELEVATION(FEET) =      379.20
STREET LENGTH(FEET) =      481.00 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 =      1
STREET PARKWAY CROSSFALL(DECIMAL) =      0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) =      0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =      0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =      0.25
HALFSTREET FLOOD WIDTH(FEET) =      6.23
AVERAGE FLOW VELOCITY(FEET/SEC.) =      2.70
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =      0.68
STREET FLOW TRAVEL TIME(MIN.) =      2.96 Tc(MIN.) =      8.48
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =      4.499
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =      92
AREA-AVERAGE RUNOFF COEFFICIENT =      0.710
SUBAREA AREA(ACRES) =      0.69 SUBAREA RUNOFF(CFS) =      2.20
TOTAL AREA(ACRES) =      0.8 PEAK FLOW RATE(CFS) =      2.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) =      0.29 HALFSTREET FLOOD WIDTH(FEET) =      8.11
FLOW VELOCITY(FEET/SEC.) =      3.09 DEPTH*VELOCITY(FT*FT/SEC.) =      0.89
LONGEST FLOWPATH FROM NODE      200.00 TO NODE      204.00 =      571.00 FEET.

*****
FLOW PROCESS FROM NODE      204.00 TO NODE      204.00 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.) =      8.48
RAINFALL INTENSITY(INCH/HR) =      4.50
TOTAL STREAM AREA(ACRES) =      0.75
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.40

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 63.57 14.19 3.226 30.23
2 2.40 8.48 4.499 0.75

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 40.36 8.48 4.499

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                100PRATT. OUT
2      65.29   14.19   3.226

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 65.29 Tc(MIN.) = 14.19
TOTAL AREA(ACRES) = 31.0
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 204.00 = 2064.10 FEET.

*****
FLOW PROCESS FROM NODE 204.00 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) = 375.00 DOWNSTREAM(FEET) = 374.00
FLOW LENGTH(FEET) = 51.50 MANNING'S N = 0.012
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.67
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.29
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 14.25
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 2.00 = 2115.60 FEET.

*****
FLOW PROCESS FROM NODE 204.00 TO NODE 2.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.218
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6174
SUBAREA AREA(ACRES) = 1.74 SUBAREA RUNOFF(CFS) = 1.96
TOTAL AREA(ACRES) = 32.7 TOTAL RUNOFF(CFS) = 65.29
Tc(MIN.) = 14.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
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 210.00 TO NODE 212.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 138.00
UPSTREAM ELEVATION(FEET) = 392.60
DOWNSTREAM ELEVATION(FEET) = 390.00
ELEVATION DIFFERENCE(FEET) = 2.60
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.884
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 73.84
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.49

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                100PRATT. OUT
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.49

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 214.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 384.20
STREET LENGTH(FEET) = 474.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.32
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.58
SPLIT DEPTH(FEET) = 0.27 SPLIT FLOOD WIDTH(FEET) = 7.36
SPLIT FLOW(CFS) = 1.31 SPLIT VELOCITY(FEET/SEC.) = 1.98
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.58
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 3.07 Tc(MIN.) = 7.95
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.688
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 9.65
TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 10.02

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.81 DEPTH*VELOCITY(FT*FT/SEC.) = 1.08
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 612.00 FEET.

*****
FLOW PROCESS FROM NODE 214.00 TO NODE 224.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 384.20 DOWNSTREAM(FEET) = 379.20
FLOW LENGTH(FEET) = 526.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.94
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.02
PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 9.21
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 224.00 = 1138.00 FEET.

*****
FLOW PROCESS FROM NODE 221.00 TO NODE 224.00 IS CODE = 1

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100PRATT. OUT

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.21
RAINFALL INTENSITY(INCH/HR) = 4.26
TOTAL STREAM AREA(ACRES) = 3.01
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.02

FLOW PROCESS FROM NODE 220.00 TO NODE 222.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 92.00
UPSTREAM ELEVATION(Feet) = 396.70
DOWNSTREAM ELEVATION(Feet) = 396.00
ELEVATION DIFFERENCE(Feet) = 0.70
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.847
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 57.83
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.716
SUBAREA RUNOFF(CFS) = 0.32
TOTAL AREA(ACRES) = 0.08 TOTAL RUNOFF(CFS) = 0.32

FLOW PROCESS FROM NODE 222.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(Feet) = 396.00 DOWNSTREAM ELEVATION(Feet) = 390.60
STREET LENGTH(Feet) = 458.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.12
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.31
HALFSTREET FLOOD WIDTH(Feet) = 9.23
AVERAGE FLOW VELOCITY(Feet/Sec.) = 2.18
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 9.34
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.225
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 1.18 SUBAREA RUNOFF(CFS) = 3.54

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TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 3.78

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.36 HALFSTREET FLOOD WIDTH(Feet) = 11.77
FLOW VELOCITY(Feet/Sec.) = 2.52 DEPTH*VELOCITY(FT*FT/SEC.) = 0.91
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 224.00 = 550.00 FEET.

FLOW PROCESS FROM NODE 224.00 TO NODE 224.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.34
RAINFALL INTENSITY(INCH/HR) = 4.22
TOTAL STREAM AREA(ACRES) = 1.26
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.78

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.02	9.21	4.263	3.01
2	3.78	9.34	4.225	1.26

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	13.75	9.21	4.263
2	13.71	9.34	4.225

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 13.75 Tc(MIN.) = 9.21
TOTAL AREA(ACRES) = 4.3
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 224.00 = 1138.00 FEET.

FLOW PROCESS FROM NODE 224.00 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) = 375.40 DOWNSTREAM(Feet) = 374.00
FLOW LENGTH(Feet) = 140.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 7.76
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.75
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.52
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 2.00 = 1278.00 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
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NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
1           13.75      9.52         4.175           4.27
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 2.00 = 1278.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
1           65.29      14.25      3.218           32.72
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 2.00 = 2115.60 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
1           57.34      9.52         4.175
2           75.88      14.25      3.218

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 75.88 Tc(MIN.) = 14.25
TOTAL AREA(ACRES) = 37.0

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

+-----+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW |
+-----+

*****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 7
-----
>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<
=====
USER-SPECIFIED VALUES ARE AS FOLLOWS:
Tc(MIN) = 59.25 RAIN INTENSITY(INCH/HOUR) = 1.28
TOTAL AREA(ACRES) = 37.00 TOTAL RUNOFF(CFS) = 5.80

*****
FLOW PROCESS FROM NODE 2.00 TO NODE 10.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
FLOW LENGTH(FEET) = 503.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.99
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.80
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 59.77
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 10.00 = 2618.60 FEET.

*****
FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2

```

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100PRATT. OUT
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 59.77
RAINFALL INTENSITY(INCH/HR) = 1.28
TOTAL STREAM AREA(ACRES) = 37.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.80

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 232.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 379.20
DOWNSTREAM ELEVATION(FEET) = 374.00
ELEVATION DIFFERENCE(FEET) = 5.20
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.272
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 90.40
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.61
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.61

*****
FLOW PROCESS FROM NODE 232.00 TO NODE 10.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 374.00 DOWNSTREAM ELEVATION(FEET) = 320.00
STREET LENGTH(FEET) = 480.00 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 = 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) = 2.61
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 5.89
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.37
STREET FLOW TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 3.70
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 4.02
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 4.62

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100PRATT. OUT

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 7.92
 FLOW VELOCITY(FEET/SEC.) = 6.20 DEPTH*VELOCITY(FT*FT/SEC.) = 1.76
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 10.00 = 580.00 FEET.

FLOW PROCESS FROM NODE 10.00 TO NODE 10.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 3.70
 RAINFALL INTENSITY(INCH/HR) = 6.32
 TOTAL STREAM AREA(ACRES) = 0.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.62

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	5.80	59.77	1.276	37.00
2	4.62	3.70	6.323	0.84

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	4.98	3.70	6.323
2	6.73	59.77	1.276

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 6.73 Tc(MIN.) = 59.77
 TOTAL AREA(ACRES) = 37.8
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 10.00 = 2618.60 FEET.

FLOW PROCESS FROM NODE 10.00 TO NODE 14.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 276.20
 FLOW LENGTH(FEET) = 535.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.25
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.73
 PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 60.40
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 14.00 = 3153.60 FEET.

FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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.) = 60.40
 RAINFALL INTENSITY(INCH/HR) = 1.27

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100PRATT. OUT

TOTAL STREAM AREA(ACRES) = 37.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.73

FLOW PROCESS FROM NODE 231.00 TO NODE 233.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 98
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 60.00
 UPSTREAM ELEVATION(FEET) = 323.00
 DOWNSTREAM ELEVATION(FEET) = 315.00
 ELEVATION DIFFERENCE(FEET) = 8.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.489
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.323
 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 233.00 TO NODE 14.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 315.00 DOWNSTREAM ELEVATION(FEET) = 274.00
 STREET LENGTH(FEET) = 449.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.48
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.25
 HALFSTREET FLOOD WIDTH(FEET) = 6.05
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.12
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.26
 STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 2.95
 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 3.85
 TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 4.40

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.11
 FLOW VELOCITY(FEET/SEC.) = 5.67 DEPTH*VELOCITY(FT*FT/SEC.) = 1.64
 LONGEST FLOWPATH FROM NODE 231.00 TO NODE 14.00 = 509.00 FEET.

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100PRATT. OUT
FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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.) = 2.95
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.40

-----+-----
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW |
-----+-----

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 134.00
UPSTREAM ELEVATION(FEET) = 400.00
DOWNSTREAM ELEVATION(FEET) = 350.00
ELEVATION DIFFERENCE(FEET) = 50.00
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) = 5.466
SUBAREA RUNOFF(CFS) = 0.38
TOTAL AREA(ACRES) = 0.20 TOTAL RUNOFF(CFS) = 0.38

FLOW PROCESS FROM NODE 13.00 TO NODE 14.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 260.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1386.00 CHANNEL SLOPE = 0.0649
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.38
FLOW VELOCITY(FEET/SEC) = 3.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 6.04 Tc(MIN.) = 12.31
LONGEST FLOWPATH FROM NODE 12.00 TO NODE 14.00 = 1520.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 14.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.536
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 12.50
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100PRATT. OUT
TOTAL AREA(ACRES) = 10.3 TOTAL RUNOFF(CFS) = 12.75
Tc(MIN.) = 12.31

FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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.) = 12.31
RAINFALL INTENSITY(INCH/HR) = 3.54
TOTAL STREAM AREA(ACRES) = 10.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.75

***** CONFLUENCE DATA *****

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	6.73	60.40	1.268	37.84
2	4.40	2.95	6.323	0.80
3	12.75	12.31	3.536	10.30

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

***** PEAK FLOW RATE TABLE *****

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	8.81	2.95	6.323
2	17.62	12.31	3.536
3	12.19	60.40	1.268

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 17.62 Tc(MIN.) = 12.31
TOTAL AREA(ACRES) = 48.9
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 14.00 = 3153.60 FEET.

FLOW PROCESS FROM NODE 14.00 TO NODE 28.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 260.00 DOWNSTREAM(FEET) = 248.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1259.00 CHANNEL SLOPE = 0.0095
CHANNEL FLOW THRU SUBAREA(CFS) = 17.62
FLOW VELOCITY(FEET/SEC) = 2.83 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 7.42 Tc(MIN.) = 19.73
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 28.00 = 4412.60 FEET.

FLOW PROCESS FROM NODE 14.00 TO NODE 28.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.609
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.2314
SUBAREA AREA(ACRES) = 14.95 SUBAREA RUNOFF(CFS) = 13.65
TOTAL AREA(ACRES) = 63.9 TOTAL RUNOFF(CFS) = 38.56
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TC(MIN.) = 19.73
100PRATT. OUT

*****
FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 500.00 TO NODE 504.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(Feet) = 218.00
UPSTREAM ELEVATION(Feet) = 402.60
DOWNSTREAM ELEVATION(Feet) = 400.80
ELEVATION DIFFERENCE(Feet) = 1.80
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.785
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH = 59.77
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.756
SUBAREA RUNOFF(CFS) = 1.76
TOTAL AREA(ACRES) = 0.43 TOTAL RUNOFF(CFS) = 1.76

*****
FLOW PROCESS FROM NODE 504.00 TO NODE 506.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(Feet) = 400.80 DOWNSTREAM(Feet) = 400.00
FLOW LENGTH(Feet) = 80.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 4.59
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.76
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.08
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 506.00 = 298.00 FEET.

*****
FLOW PROCESS FROM NODE 506.00 TO NODE 506.00 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.) = 6.08
RAINFALL INTENSITY(INCH/HR) = 5.58
TOTAL STREAM AREA(ACRES) = 0.43
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.76

*****
FLOW PROCESS FROM NODE 501.00 TO NODE 503.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500

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100PRATT. OUT

SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(Feet) = 97.00
UPSTREAM ELEVATION(Feet) = 445.00
DOWNSTREAM ELEVATION(Feet) = 412.00
ELEVATION DIFFERENCE(Feet) = 33.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.172
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.520
SUBAREA RUNOFF(CFS) = 0.35
TOTAL AREA(ACRES) = 0.18 TOTAL RUNOFF(CFS) = 0.35

*****
FLOW PROCESS FROM NODE 503.00 TO NODE 506.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(Feet) = 406.00 DOWNSTREAM ELEVATION(Feet) = 403.50
STREET LENGTH(Feet) = 264.00 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 = 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) = 1.54
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(Feet) = 0.29
HALFSTREET FLOOD WIDTH(Feet) = 8.39
AVERAGE FLOW VELOCITY(Feet/Sec.) = 1.88
PRODUCT OF DEPTH&VELOCITY(Ft*Ft/Sec.) = 0.55
STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 8.52
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.485
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.641
SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 2.42
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.70

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.34 HALFSTREET FLOOD WIDTH(Feet) = 10.73
FLOW VELOCITY(Feet/Sec.) = 2.13 DEPTH*VELOCITY(Ft*Ft/Sec.) = 0.73
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 506.00 = 361.00 FEET.

*****
FLOW PROCESS FROM NODE 506.00 TO NODE 506.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 8.52
RAINFALL INTENSITY(INCH/HR) = 4.48
TOTAL STREAM AREA(ACRES) = 0.94
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.70

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100PRATT. OUT

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	1.76	6.08	5.577	0.43
2	2.70	8.52	4.485	0.94

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	3.68	6.08	5.577
2	4.12	8.52	4.485

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 4.12 Tc(MIN.) = 8.52
TOTAL AREA(ACRES) = 1.4
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 506.00 = 361.00 FEET.

FLOW PROCESS FROM NODE 506.00 TO NODE 514.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 403.50 DOWNSTREAM(FEET) = 391.50
FLOW LENGTH(FEET) = 379.00 MANNING' S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.82
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.12
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 9.23
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 514.00 = 740.00 FEET.

FLOW PROCESS FROM NODE 506.00 TO NODE 514.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.257
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6890
SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 5.20
TOTAL AREA(ACRES) = 3.1 TOTAL RUNOFF(CFS) = 9.06
TC(MIN.) = 9.23

FLOW PROCESS FROM NODE 514.00 TO NODE 22.50 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 391.50 DOWNSTREAM(FEET) = 387.90
FLOW LENGTH(FEET) = 154.00 MANNING' S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.76
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

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100PRATT. OUT

PIPE-FLOW(CFS) = 9.06
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 9.50
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 22.50 = 894.00 FEET.

FLOW PROCESS FROM NODE 22.50 TO NODE 22.50 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.50
RAINFALL INTENSITY(INCH/HR) = 4.18
TOTAL STREAM AREA(ACRES) = 3.09
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.06

FLOW PROCESS FROM NODE 20.00 TO NODE 21.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 139.00
UPSTREAM ELEVATION(FEET) = 468.00
DOWNSTREAM ELEVATION(FEET) = 448.00
ELEVATION DIFFERENCE(FEET) = 20.00
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) = 5.466
SUBAREA RUNOFF(CFS) = 0.25
TOTAL AREA(ACRES) = 0.13 TOTAL RUNOFF(CFS) = 0.25

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 448.00 DOWNSTREAM(FEET) = 364.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 482.00 CHANNEL SLOPE = 0.1743
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.25
FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 7.96
LONGEST FLOWPATH FROM NODE 20.00 TO NODE 22.00 = 621.00 FEET.

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.685
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 5.56 SUBAREA RUNOFF(CFS) = 9.12

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```

100PRATT. OUT
TOTAL AREA(ACRES) =      5.7  TOTAL RUNOFF(CFS) =      9.33
TC(MIN.) =      7.96

*****
FLOW PROCESS FROM NODE      22.00 TO NODE      22.50 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   364.00 DOWNSTREAM(FEET) =   363.15
FLOW LENGTH(FEET) =    85.00 MANNING'S N =   0.012
DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    7.03
ESTIMATED PIPE DIAMETER(INCH) =   18.00  NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      9.33
PIPE TRAVEL TIME(MIN.) =    0.20  Tc(MIN.) =    8.16
LONGEST FLOWPATH FROM NODE      20.00 TO NODE      22.50 =    706.00 FEET.

*****
FLOW PROCESS FROM NODE      22.50 TO NODE      22.50 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) =    8.16
RAINFALL INTENSITY(INCH/HR) =    4.61
TOTAL STREAM AREA(ACRES) =    5.69
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33

*****
FLOW PROCESS FROM NODE      20.00 TO NODE      20.50 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =   468.00
DOWNSTREAM ELEVATION(FEET) =   450.00
ELEVATION DIFFERENCE(FEET) =    18.00
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) =   5.466
SUBAREA RUNOFF(CFS) =      0.21
TOTAL AREA(ACRES) =    0.11  TOTAL RUNOFF(CFS) =    0.21

*****
FLOW PROCESS FROM NODE      20.50 TO NODE      21.50 IS CODE =   52
-----
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   450.00 DOWNSTREAM(FEET) =   380.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   354.00 CHANNEL SLOPE = 0.1977
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) =      0.21
FLOW VELOCITY(FEET/SEC) =    4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =    1.24  Tc(MIN.) =    7.51
LONGEST FLOWPATH FROM NODE      20.00 TO NODE      21.50 =    454.00 FEET.

```

```

100PRATT. OUT
*****
FLOW PROCESS FROM NODE      20.50 TO NODE      21.50 IS CODE =   81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.864
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) =    1.10  SUBAREA RUNOFF(CFS) =    1.87
TOTAL AREA(ACRES) =    1.2  TOTAL RUNOFF(CFS) =    2.06
TC(MIN.) =    7.51

*****
FLOW PROCESS FROM NODE      21.50 TO NODE      22.50 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   380.00 DOWNSTREAM(FEET) =   378.00
FLOW LENGTH(FEET) =   195.00 MANNING'S N =   0.012
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.) =    4.84
ESTIMATED PIPE DIAMETER(INCH) =   18.00  NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      2.06
PIPE TRAVEL TIME(MIN.) =    0.67  Tc(MIN.) =    8.18
LONGEST FLOWPATH FROM NODE      20.00 TO NODE      22.50 =    649.00 FEET.

*****
FLOW PROCESS FROM NODE      22.50 TO NODE      22.50 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) =    8.18
RAINFALL INTENSITY(INCH/HR) =    4.60
TOTAL STREAM AREA(ACRES) =    1.21
PEAK FLOW RATE(CFS) AT CONFLUENCE =    2.06

** CONFLUENCE DATA **
STREAM  RUNOFF      Tc      INTENSITY      AREA
NUMBER  (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
1        9.06      9.50      4.181        3.09
2        9.33      8.16      4.610        5.69
3        2.06      8.18      4.602        1.21

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

** PEAK FLOW RATE TABLE **
STREAM  RUNOFF      Tc      INTENSITY
NUMBER  (CFS)      (MIN.)  (INCH/HOUR)
1        19.60      8.16      4.610
2        19.61      8.18      4.602
3        19.40      9.50      4.181

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    19.61  Tc(MIN.) =    8.18
TOTAL AREA(ACRES) =    10.0

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```

100PRATT. OUT
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 22.50 = 894.00 FEET.
*****
FLOW PROCESS FROM NODE 22.50 TO NODE 524.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 386.52 DOWNSTREAM(FEET) = 381.20
FLOW LENGTH(FEET) = 266.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.99
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.61
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 8.59
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 524.00 = 1160.00 FEET.
*****
FLOW PROCESS FROM NODE 524.00 TO NODE 524.00 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.) = 8.59
RAINFALL INTENSITY(INCH/HR) = 4.46
TOTAL STREAM AREA(ACRES) = 9.99
PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.61
*****
FLOW PROCESS FROM NODE 520.00 TO NODE 522.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 103.00
UPSTREAM ELEVATION(FEET) = 391.60
DOWNSTREAM ELEVATION(FEET) = 390.70
ELEVATION DIFFERENCE(FEET) = 0.90
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.745
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 61.21
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.782
SUBAREA RUNOFF(CFS) = 0.49
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.49
*****
FLOW PROCESS FROM NODE 522.00 TO NODE 524.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.20
STREET LENGTH(FEET) = 353.00 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

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```

100PRATT. OUT
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) = 1.57
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 6.70
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.72
STREET FLOW TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 7.87
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.719
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 0.64 SUBAREA RUNOFF(CFS) = 2.14
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.55

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 8.48
FLOW VELOCITY(FEET/SEC.) = 3.04 DEPTH*VELOCITY(FT*FT/SEC.) = 0.90
LONGEST FLOWPATH FROM NODE 520.00 TO NODE 524.00 = 456.00 FEET.
*****
FLOW PROCESS FROM NODE 524.00 TO NODE 524.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.87
RAINFALL INTENSITY(INCH/HR) = 4.72
TOTAL STREAM AREA(ACRES) = 0.76
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.55

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 19.61 8.59 4.462 9.99
2 2.55 7.87 4.719 0.76

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 21.09 7.87 4.719
2 22.02 8.59 4.462

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 22.02 Tc(MIN.) = 8.59
TOTAL AREA(ACRES) = 10.8
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 524.00 = 1160.00 FEET.
*****
FLOW PROCESS FROM NODE 524.00 TO NODE 556.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

100PRATT. OUT

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM( FEET ) = 381.00 DOWNSTREAM( FEET ) = 380.40
FLOW LENGTH( FEET ) = 60.00 MANNING' S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.2 INCHES
PIPE-FLOW VELOCITY( FEET/SEC. ) = 8.62
ESTIMATED PIPE DIAMETER( INCH ) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS ) = 22.02
PIPE TRAVEL TIME( MIN. ) = 0.12 Tc( MIN. ) = 8.70
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 556.00 = 1220.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 556.00 TO NODE 556.00 IS CODE = 10
-----

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

```

=====
FLOW PROCESS FROM NODE 530.00 TO NODE 532.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```

=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH( FEET ) = 100.00
UPSTREAM ELEVATION( FEET ) = 403.40
DOWNSTREAM ELEVATION( FEET ) = 401.80
ELEVATION DIFFERENCE( FEET ) = 1.60
SUBAREA OVERLAND TIME OF FLOW( MIN. ) = 5.057
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 ) = 6.277
SUBAREA RUNOFF( CFS ) = 0.49
TOTAL AREA( ACRES ) = 0.11 TOTAL RUNOFF( CFS ) = 0.49

```

```

*****
FLOW PROCESS FROM NODE 532.00 TO NODE 534.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

=====
UPSTREAM ELEVATION( FEET ) = 401.50 DOWNSTREAM ELEVATION( FEET ) = 395.80
STREET LENGTH( FEET ) = 246.00 CURB HEIGHT( INCHES ) = 6.0
STREET HALFWIDTH( FEET ) = 12.00

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```

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 = 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) = 1.29

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

```

STREET FLOW DEPTH( FEET ) = 0.25
HALFSTREET FLOOD WIDTH( FEET ) = 6.23
AVERAGE FLOW VELOCITY( FEET/SEC. ) = 2.56
PRODUCT OF DEPTH&VELOCITY( FT*FT/SEC. ) = 0.64

```

100PRATT. OUT

```

STREET FLOW TRAVEL TIME( MIN. ) = 1.60 Tc( MIN. ) = 6.66
100 YEAR RAINFALL INTENSITY( INCH/HOUR ) = 5.255
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA( ACRES ) = 0.43 SUBAREA RUNOFF( CFS ) = 1.60
TOTAL AREA( ACRES ) = 0.5 PEAK FLOW RATE( CFS ) = 2.01

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH( FEET ) = 0.28 HALFSTREET FLOOD WIDTH( FEET ) = 7.73
FLOW VELOCITY( FEET/SEC. ) = 2.81 DEPTH*VELOCITY( FT*FT/SEC. ) = 0.79
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 534.00 = 346.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 534.00 TO NODE 544.00 IS CODE = 31
-----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM( FEET ) = 395.50 DOWNSTREAM( FEET ) = 392.00
FLOW LENGTH( FEET ) = 153.00 MANNING' S N = 0.012
ESTIMATED PIPE DIAMETER( INCH ) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES
PIPE-FLOW VELOCITY( FEET/SEC. ) = 6.39
ESTIMATED PIPE DIAMETER( INCH ) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS ) = 2.01
PIPE TRAVEL TIME( MIN. ) = 0.40 Tc( MIN. ) = 7.06
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 544.00 = 499.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 544.00 TO NODE 544.00 IS CODE = 1
-----

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION( MIN. ) = 7.06
RAINFALL INTENSITY( INCH/HR ) = 5.06
TOTAL STREAM AREA( ACRES ) = 0.54
PEAK FLOW RATE( CFS ) AT CONFLUENCE = 2.01

```

```

*****
FLOW PROCESS FROM NODE 540.00 TO NODE 542.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```

=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH( FEET ) = 89.00
UPSTREAM ELEVATION( FEET ) = 397.60
DOWNSTREAM ELEVATION( FEET ) = 396.50
ELEVATION DIFFERENCE( FEET ) = 1.10
SUBAREA OVERLAND TIME OF FLOW( MIN. ) = 5.369
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH = 67.36
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY( INCH/HOUR ) = 6.040
SUBAREA RUNOFF( CFS ) = 0.43
TOTAL AREA( ACRES ) = 0.10 TOTAL RUNOFF( CFS ) = 0.43

```

100PRATT. OUT

 FLOW PROCESS FROM NODE 542.00 TO NODE 544.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 396.50 DOWNSTREAM ELEVATION(FEET) = 393.40
 STREET LENGTH(FEET) = 258.60 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 = 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) = 1.90
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.30
 HALFSTREET FLOOD WIDTH(FEET) = 8.77
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.15
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.65
 STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 7.38
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.921
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
 SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 2.94
 TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.28

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.11
 FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH*VELOCITY(FT*FT/SEC.) = 0.85
 LONGEST FLOWPATH FROM NODE 540.00 TO NODE 544.00 = 347.60 FEET.

 FLOW PROCESS FROM NODE 544.00 TO NODE 544.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 7.38
 RAINFALL INTENSITY(INCH/HR) = 4.92
 TOTAL STREAM AREA(ACRES) = 0.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.28

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	2.01	7.06	5.061	0.54
2	3.28	7.38	4.921	0.94

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

** PEAK FLOW RATE TABLE **

STREAM	RUNOFF	Tc	INTENSITY
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100PRATT. OUT

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)
1	5.16	7.06	5.061
2	5.24	7.38	4.921

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 5.24 Tc(MIN.) = 7.38
 TOTAL AREA(ACRES) = 1.5
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 544.00 = 499.00 FEET.

 FLOW PROCESS FROM NODE 544.00 TO NODE 545.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 392.00 DOWNSTREAM(FEET) = 388.00
 FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.67
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 5.24
 PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 7.68
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 545.00 = 659.00 FEET.

 FLOW PROCESS FROM NODE 545.00 TO NODE 545.00 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.) = 7.68
 RAINFALL INTENSITY(INCH/HR) = 4.79
 TOTAL STREAM AREA(ACRES) = 1.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.24

 FLOW PROCESS FROM NODE 541.00 TO NODE 543.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 80.00
 UPSTREAM ELEVATION(FEET) = 397.60
 DOWNSTREAM ELEVATION(FEET) = 396.00
 ELEVATION DIFFERENCE(FEET) = 1.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.825
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 75.00
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) = 0.40
 TOTAL AREA(ACRES) = 0.09 TOTAL RUNOFF(CFS) = 0.40

 FLOW PROCESS FROM NODE 543.00 TO NODE 545.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

100PRATT. OUT

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 396.00 DOWNSTREAM ELEVATION(FEET) = 389.70
 STREET LENGTH(FEET) = 278.00 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 = 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) = 2.18
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.29
 HALFSTREET FLOOD WIDTH(FEET) = 8.11
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.81
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.81
 STREET FLOW TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 6.47
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.353
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
 SUBAREA AREA(ACRES) = 0.93 SUBAREA RUNOFF(CFS) = 3.53
 TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.88

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.36
 FLOW VELOCITY(FEET/SEC.) = 3.25 DEPTH*VELOCITY(FT*FT/SEC.) = 1.09
 LONGEST FLOWPATH FROM NODE 541.00 TO NODE 545.00 = 358.00 FEET.

FLOW PROCESS FROM NODE 545.00 TO NODE 545.00 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.) = 6.47
 RAINFALL INTENSITY(INCH/HR) = 5.35
 TOTAL STREAM AREA(ACRES) = 1.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.88

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	5.24	7.68	4.793	1.48
2	3.88	6.47	5.353	1.02

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	8.57	6.47	5.353
2	8.71	7.68	4.793

100PRATT. OUT

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 8.71 Tc(MIN.) = 7.68
 TOTAL AREA(ACRES) = 2.5
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 545.00 = 659.00 FEET.

FLOW PROCESS FROM NODE 545.00 TO NODE 548.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 388.00 DOWNSTREAM(FEET) = 385.00
 FLOW LENGTH(FEET) = 145.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.22
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 8.71
 PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 7.94
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 548.00 = 804.00 FEET.

FLOW PROCESS FROM NODE 548.00 TO NODE 548.00 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.) = 7.94
 RAINFALL INTENSITY(INCH/HR) = 4.69
 TOTAL STREAM AREA(ACRES) = 2.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.71

FLOW PROCESS FROM NODE 546.00 TO NODE 547.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 80.00
 UPSTREAM ELEVATION(FEET) = 393.90
 DOWNSTREAM ELEVATION(FEET) = 392.50
 ELEVATION DIFFERENCE(FEET) = 1.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.960
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 72.50
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) = 0.40
 TOTAL AREA(ACRES) = 0.09 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 547.00 TO NODE 548.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 392.50 DOWNSTREAM ELEVATION(FEET) = 386.80
 STREET LENGTH(FEET) = 280.00 CURB HEIGHT(INCHES) = 6.0

100PRATT. OUT

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 = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.28

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.29

HALFSTREET FLOOD WIDTH(FEET) = 8.39

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.82

STREET FLOW TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 6.64

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.264

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100

SOIL CLASSIFICATION IS "D"

S.C.S. CURVE NUMBER (AMC II) = 92

AREA-AVERAGE RUNOFF COEFFICIENT = 0.710

SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 3.74

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 4.07

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.83

FLOW VELOCITY(FEET/SEC.) = 3.16 DEPTH*VELOCITY(FT*FT/SEC.) = 1.08

LONGEST FLOWPATH FROM NODE 546.00 TO NODE 548.00 = 360.00 FEET.

FLOW PROCESS FROM NODE 548.00 TO NODE 548.00 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.) = 6.64
RAINFALL INTENSITY(INCH/HR) = 5.26
TOTAL STREAM AREA(ACRES) = 1.09
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.07

```

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.71	7.94	4.691	2.50
2	4.07	6.64	5.264	1.09

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	11.84	6.64	5.264
2	12.34	7.94	4.691

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 12.34 Tc(MIN.) = 7.94

TOTAL AREA(ACRES) = 3.6

LONGEST FLOWPATH FROM NODE 530.00 TO NODE 548.00 = 804.00 FEET.

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100PRATT. OUT

FLOW PROCESS FROM NODE 548.00 TO NODE 554.00 IS CODE = 31-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 384.50 DOWNSTREAM(FEET) = 383.00
FLOW LENGTH(FEET) = 60.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.75
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.34
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 8.04
LONGEST FLOWPATH FROM NODE 530.00 TO NODE 554.00 = 864.00 FEET.

```

FLOW PROCESS FROM NODE 554.00 TO NODE 554.00 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.) = 8.04
RAINFALL INTENSITY(INCH/HR) = 4.66
TOTAL STREAM AREA(ACRES) = 3.59
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.34

```

FLOW PROCESS FROM NODE 550.00 TO NODE 552.00 IS CODE = 21-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

```

=====
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 144.00
UPSTREAM ELEVATION(FEET) = 403.00
DOWNSTREAM ELEVATION(FEET) = 399.00
ELEVATION DIFFERENCE(FEET) = 4.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.597
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH = 77.78
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
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 552.00 TO NODE 554.00 IS CODE = 62-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

=====
UPSTREAM ELEVATION(FEET) = 398.80 DOWNSTREAM ELEVATION(FEET) = 383.00
STREET LENGTH(FEET) = 675.00 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

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100PRATT. OUT

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) = 3.08
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.31
 HALFSTREET FLOOD WIDTH(FEET) = 9.33
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
 STREET FLOW TRAVEL TIME(MIN.) = 3.60 Tc(MIN.) = 6.20
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.503
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
 SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 5.03
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 5.51

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 11.95
 FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH*VELOCITY(FT*FT/SEC.) = 1.30
 LONGEST FLOWPATH FROM NODE 550.00 TO NODE 554.00 = 819.00 FEET.

 FLOW PROCESS FROM NODE 554.00 TO NODE 554.00 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.) = 6.20
 RAINFALL INTENSITY(INCH/HR) = 5.50
 TOTAL STREAM AREA(ACRES) = 1.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.51

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	12.34	8.04	4.656	3.59
2	5.51	6.20	5.503	1.15

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	15.95	6.20	5.503
2	17.00	8.04	4.656

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 17.00 Tc(MIN.) = 8.04
 TOTAL AREA(ACRES) = 4.7
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 554.00 = 864.00 FEET.

 FLOW PROCESS FROM NODE 554.00 TO NODE 556.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

100PRATT. OUT

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 382.20
 FLOW LENGTH(FEET) = 36.70 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.07
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 17.00
 PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 8.09
 LONGEST FLOWPATH FROM NODE 530.00 TO NODE 556.00 = 900.70 FEET.

 FLOW PROCESS FROM NODE 556.00 TO NODE 556.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	17.00	8.09	4.635	4.74

LONGEST FLOWPATH FROM NODE 530.00 TO NODE 556.00 = 900.70 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	22.02	8.70	4.423	10.75

LONGEST FLOWPATH FROM NODE 501.00 TO NODE 556.00 = 1220.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	37.48	8.09	4.635
2	38.24	8.70	4.423

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 38.24 Tc(MIN.) = 8.70
 TOTAL AREA(ACRES) = 15.5

 FLOW PROCESS FROM NODE 556.00 TO NODE 556.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<
 =====

 FLOW PROCESS FROM NODE 556.00 TO NODE 568.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 382.20 DOWNSTREAM(FEET) = 352.00
 FLOW LENGTH(FEET) = 388.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.64
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 38.24
 PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.00
 LONGEST FLOWPATH FROM NODE 501.00 TO NODE 568.00 = 1608.00 FEET.

 FLOW PROCESS FROM NODE 568.00 TO NODE 568.00 IS CODE = 1

100PRATT. OUT

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.00
RAINFALL INTENSITY(INCH/HR) = 4.33
TOTAL STREAM AREA(ACRES) = 15.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.24

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*****
FLOW PROCESS FROM NODE 560.00 TO NODE 562.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

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=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 90.00
UPSTREAM ELEVATION(FEET) = 394.00
DOWNSTREAM ELEVATION(FEET) = 384.50
ELEVATION DIFFERENCE(FEET) = 9.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 3.091
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.45
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.45

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*****
FLOW PROCESS FROM NODE 562.00 TO NODE 564.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

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=====
UPSTREAM ELEVATION(FEET) = 384.00 DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 564.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 12.00

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

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

```

```

***TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.60
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FT/SEC.) = 2.40
SPLIT DEPTH(FEET) = 0.25 SPLIT FLOOD WIDTH(FEET) = 6.14
SPLIT FLOW(CFS) = 0.86 SPLIT VELOCITY(FT/SEC.) = 1.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FT/SEC.) = 2.40
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.88
STREET FLOW TRAVEL TIME(MIN.) = 3.91 Tc(MIN.) = 7.01
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.087
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92

```

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100PRATT. OUT

```

AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 8.31
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 8.67

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FT/SEC.) = 2.55 DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 560.00 TO NODE 564.00 = 654.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 564.00 TO NODE 566.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 374.20
FLOW LENGTH(FEET) = 322.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 7.42
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.67
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 7.73
LONGEST FLOWPATH FROM NODE 560.00 TO NODE 566.00 = 976.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 564.00 TO NODE 566.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.775
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 5.56
TOTAL AREA(ACRES) = 4.0 TOTAL RUNOFF(CFS) = 13.70
Tc(MIN.) = 7.73

```

```

*****
FLOW PROCESS FROM NODE 566.00 TO NODE 568.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 23.28
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.70
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 7.82
LONGEST FLOWPATH FROM NODE 560.00 TO NODE 568.00 = 1106.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 568.00 TO NODE 568.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

```

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.82

```

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100PRATT. OUT
RAINFALL INTENSITY(INCH/HR) = 4.74
TOTAL STREAM AREA(ACRES) = 4.04
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.70

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	38.24	9.00	4.328	15.49
2	13.70	7.82	4.738	4.04

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	46.93	7.82	4.738
2	50.75	9.00	4.328

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 50.75 Tc(MIN.) = 9.00
TOTAL AREA(ACRES) = 19.5
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 568.00 = 1608.00 FEET.

FLOW PROCESS FROM NODE 568.00 TO NODE 19.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 335.00
FLOW LENGTH(FEET) = 180.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.03
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 50.75
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 9.12
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 19.00 = 1788.00 FEET.

FLOW PROCESS FROM NODE 19.00 TO NODE 19.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.12
RAINFALL INTENSITY(INCH/HR) = 4.29
TOTAL STREAM AREA(ACRES) = 19.53
PEAK FLOW RATE(CFS) AT CONFLUENCE = 50.75

FLOW PROCESS FROM NODE 18.00 TO NODE 19.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 237.00
UPSTREAM ELEVATION(FEET) = 370.00
DOWNSTREAM ELEVATION(FEET) = 340.00
ELEVATION DIFFERENCE(FEET) = 30.00

100PRATT. OUT
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/HR) = 5.466
SUBAREA RUNOFF(CFS) = 0.46
TOTAL AREA(ACRES) = 0.24 TOTAL RUNOFF(CFS) = 0.46

FLOW PROCESS FROM NODE 19.00 TO NODE 19.00 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) = 5.47
TOTAL STREAM AREA(ACRES) = 0.24
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.46

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	50.75	9.12	4.291	19.53
2	0.46	6.27	5.466	0.24

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	40.30	6.27	5.466
2	51.11	9.12	4.291

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 51.11 Tc(MIN.) = 9.12
TOTAL AREA(ACRES) = 19.8
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 19.00 = 1788.00 FEET.

FLOW PROCESS FROM NODE 19.00 TO NODE 586.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 200.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.04
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.11
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 9.25
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 586.00 = 1988.00 FEET.

FLOW PROCESS FROM NODE 586.00 TO NODE 586.00 IS CODE = 10

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

=====

100PRATT. OUT

 FLOW PROCESS FROM NODE 570.00 TO NODE 572.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 104.00
 UPSTREAM ELEVATION(FEET) = 387.90
 DOWNSTREAM ELEVATION(FEET) = 387.00
 ELEVATION DIFFERENCE(FEET) = 0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.752
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 60.96
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.777
 SUBAREA RUNOFF(CFS) = 0.37
 TOTAL AREA(ACRES) = 0.09 TOTAL RUNOFF(CFS) = 0.37

 FLOW PROCESS FROM NODE 572.00 TO NODE 574.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 387.00 DOWNSTREAM ELEVATION(FEET) = 380.00
 STREET LENGTH(FEET) = 292.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.39
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.25
 HALFSTREET FLOOD WIDTH(FEET) = 6.42
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.61
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.67
 STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 7.62
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.821
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
 SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 2.02
 TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 2.33

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.20
 FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH*VELOCITY(FT*FT/SEC.) = 0.85
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 574.00 = 396.00 FEET.

 FLOW PROCESS FROM NODE 574.00 TO NODE 575.00 IS CODE = 31

100PRATT. OUT

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 380.00 DOWNSTREAM(FEET) = 376.80
 FLOW LENGTH(FEET) = 208.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.80
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.33
 PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 8.21
 LONGEST FLOWPATH FROM NODE 570.00 TO NODE 575.00 = 604.00 FEET.

 FLOW PROCESS FROM NODE 575.00 TO NODE 575.00 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.) = 8.21
 RAINFALL INTENSITY(INCH/HR) = 4.59
 TOTAL STREAM AREA(ACRES) = 0.68
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.33

 FLOW PROCESS FROM NODE 571.00 TO NODE 573.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

=====

RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S. C. S. CURVE NUMBER (AMC II) = 92
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 117.00
 UPSTREAM ELEVATION(FEET) = 383.70
 DOWNSTREAM ELEVATION(FEET) = 383.00
 ELEVATION DIFFERENCE(FEET) = 0.70
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.062
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
 THE MAXIMUM OVERLAND FLOW LENGTH = 52.95
 (Reference: Table 3-1B of Hydrology Manual)
 THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.585
 SUBAREA RUNOFF(CFS) = 0.48
 TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.48

 FLOW PROCESS FROM NODE 573.00 TO NODE 575.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 383.00 DOWNSTREAM ELEVATION(FEET) = 376.80
 STREET LENGTH(FEET) = 476.00 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 = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160

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100PRATT. OUT
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.60
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.93
STREET FLOW TRAVEL TIME(MIN.) = 3.05 Tc(MIN.) = 9.11
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.294
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.13 SUBAREA RUNOFF(CFS) = 6.49
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.86

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FEET/SEC.) = 2.66 DEPTH*VELOCITY(FT*FT/SEC.) = 0.97
LONGEST FLOWPATH FROM NODE 571.00 TO NODE 575.00 = 593.00 FEET.

*****
FLOW PROCESS FROM NODE 575.00 TO NODE 575.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.11
RAINFALL INTENSITY(INCH/HR) = 4.29
TOTAL STREAM AREA(ACRES) = 2.25
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.86

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 2.33 8.21 4.591 0.68
2 6.86 9.11 4.294 2.25

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 8.51 8.21 4.591
2 9.04 9.11 4.294

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 9.04 Tc(MIN.) = 9.11
TOTAL AREA(ACRES) = 2.9
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 575.00 = 604.00 FEET.

*****
FLOW PROCESS FROM NODE 575.00 TO NODE 578.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 376.80 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 320.00 MANNING'S N = 0.012
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100PRATT. OUT
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.50
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.04
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 9.82
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 578.00 = 924.00 FEET.

*****
FLOW PROCESS FROM NODE 575.00 TO NODE 578.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.090
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.90
TOTAL AREA(ACRES) = 3.9 TOTAL RUNOFF(CFS) = 11.41
Tc(MIN.) = 9.82

*****
FLOW PROCESS FROM NODE 578.00 TO NODE 584.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 370.50
FLOW LENGTH(FEET) = 189.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.16
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.41
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.21
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 584.00 = 1113.00 FEET.

*****
FLOW PROCESS FROM NODE 584.00 TO NODE 584.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.21
RAINFALL INTENSITY(INCH/HR) = 3.99
TOTAL STREAM AREA(ACRES) = 3.93
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.41

*****
FLOW PROCESS FROM NODE 580.00 TO NODE 582.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 92
INITIAL SUBAREA FLOW-LENGTH(FEET) = 110.00
UPSTREAM ELEVATION(FEET) = 378.00
DOWNSTREAM ELEVATION(FEET) = 376.50
ELEVATION DIFFERENCE(FEET) = 1.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.245
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 68.64
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100PRATT. OUT
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.131
SUBAREA RUNOFF(CFS) = 0.52
TOTAL AREA(ACRES) = 0.12 TOTAL RUNOFF(CFS) = 0.52

*****
FLOW PROCESS FROM NODE 582.00 TO NODE 584.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 376.50 DOWNSTREAM ELEVATION(FEET) = 370.50
STREET LENGTH(FEET) = 478.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.04
***STREET FLOW SPLITS OVER STREET-CROWN***
FULL DEPTH(FEET) = 0.37 FLOOD WIDTH(FEET) = 12.00
FULL HALF-STREET VELOCITY(FT/SEC.) = 2.61
SPLIT DEPTH(FEET) = 0.25 SPLIT FLOOD WIDTH(FEET) = 6.33
SPLIT FLOW(CFS) = 0.97 SPLIT VELOCITY(FT/SEC.) = 1.88
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 12.00
AVERAGE FLOW VELOCITY(FT/SEC.) = 2.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.96
STREET FLOW TRAVEL TIME(MIN.) = 3.05 Tc(MIN.) = 8.30
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.561
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.710
SUBAREA AREA(ACRES) = 2.79 SUBAREA RUNOFF(CFS) = 9.03
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 9.42

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.00
FLOW VELOCITY(FT/SEC.) = 2.78 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 580.00 TO NODE 584.00 = 588.00 FEET.

*****
FLOW PROCESS FROM NODE 584.00 TO NODE 584.00 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.) = 8.30
RAINFALL INTENSITY(INCH/HR) = 4.56
TOTAL STREAM AREA(ACRES) = 2.91
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.42

```

```

100PRATT. OUT

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 11.41 10.21 3.990 3.93
2 9.42 8.30 4.561 2.91

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 19.41 8.30 4.561
2 19.66 10.21 3.990

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 19.66 Tc(MIN.) = 10.21
TOTAL AREA(ACRES) = 6.8
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 584.00 = 1113.00 FEET.

*****
FLOW PROCESS FROM NODE 584.00 TO NODE 586.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FT) = 370.50 DOWNSTREAM(FT) = 315.00
FLOW LENGTH(FT) = 161.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.8 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 32.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.66
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 10.29
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 586.00 = 1274.00 FEET.

*****
FLOW PROCESS FROM NODE 586.00 TO NODE 586.00 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 19.66 10.29 3.969 6.84
LONGEST FLOWPATH FROM NODE 570.00 TO NODE 586.00 = 1274.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 51.11 9.25 4.251 19.77
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 586.00 = 1988.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 68.78 9.25 4.251
2 67.38 10.29 3.969

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 68.78 Tc(MIN.) = 9.25
TOTAL AREA(ACRES) = 26.6

```

100PRATT. OUT

```
*****
FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 IS CODE = 12
-----
```

```
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE    586.00 TO NODE    594.00 IS CODE = 31
-----
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
```

```
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 295.00
FLOW LENGTH(FEET) = 186.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.11
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.78
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 9.36
LONGEST FLOWPATH FROM NODE    501.00 TO NODE    594.00 = 2174.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE    594.00 TO NODE    594.00 IS CODE = 1
-----
```

```
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
```

```
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.36
RAINFALL INTENSITY(INCH/HR) = 4.22
TOTAL STREAM AREA(ACRES) = 26.61
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.78
```

```
*****
FLOW PROCESS FROM NODE    590.00 TO NODE    592.00 IS CODE = 21
-----
```

```
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
```

```
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 92.00
UPSTREAM ELEVATION(FEET) = 382.20
DOWNSTREAM ELEVATION(FEET) = 378.00
ELEVATION DIFFERENCE(FEET) = 4.20
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.339
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH = 87.83
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.88
TOTAL AREA(ACRES) = 0.16 TOTAL RUNOFF(CFS) = 0.88
```

```
*****
FLOW PROCESS FROM NODE    592.00 TO NODE    594.00 IS CODE = 62
-----
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 295.00
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```

100PRATT. OUT

```
STREET LENGTH(FEET) = 826.00 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 = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for StreetFlow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 7.83
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.91
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.67
STREET FLOW TRAVEL TIME(MIN.) = 2.33 Tc(MIN.) = 4.67
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 1.25 SUBAREA RUNOFF(CFS) = 6.88
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 7.76
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.17
FLOW VELOCITY(FEET/SEC.) = 6.73 DEPTH*VELOCITY(FT*FT/SEC.) = 2.22
LONGEST FLOWPATH FROM NODE    590.00 TO NODE    594.00 = 918.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE    594.00 TO NODE    594.00 IS CODE = 1
-----
```

```
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
```

```
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 4.67
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 1.41
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.76
```

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	68.78	9.36	4.219	26.61
2	7.76	4.67	6.323	1.41

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	42.05	4.67	6.323
2	73.96	9.36	4.219

```
COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
PEAK FLOW RATE(CFS) = 73.96 Tc(MIN.) = 9.36
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```



```

100PRATT. OUT
TOTAL AREA(ACRES) = 28.0
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 594.00 = 2174.00 FEET.
*****
FLOW PROCESS FROM NODE 594.00 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) = 295.00 DOWNSTREAM(FEET) = 294.00
FLOW LENGTH(FEET) = 71.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.34
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 73.96
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 9.45
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 1.00 = 2245.00 FEET.
*****
FLOW PROCESS FROM NODE 594.00 TO NODE 1.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.193
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6113
SUBAREA AREA(ACRES) = 2.07 SUBAREA RUNOFF(CFS) = 3.04
TOTAL AREA(ACRES) = 30.1 TOTAL RUNOFF(CFS) = 77.13
Tc(MIN.) = 9.45
+-----+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW |
+-----+
*****
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) = 59.45 RAIN INTENSITY(INCH/HOUR) = 1.28
TOTAL AREA(ACRES) = 30.10 TOTAL RUNOFF(CFS) = 4.70
*****
FLOW PROCESS FROM NODE 1.00 TO NODE 27.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 294.00 DOWNSTREAM(FEET) = 285.00
FLOW LENGTH(FEET) = 98.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.70
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 59.57
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 27.00 = 2343.00 FEET.

```

```

100PRATT. OUT
*****
FLOW PROCESS FROM NODE 27.00 TO NODE 27.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====
+-----+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW |
+-----+
*****
FLOW PROCESS FROM NODE 23.00 TO NODE 24.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 66.00
UPSTREAM ELEVATION(FEET) = 476.00
DOWNSTREAM ELEVATION(FEET) = 460.00
ELEVATION DIFFERENCE(FEET) = 16.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.091
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.250
SUBAREA RUNOFF(CFS) = 0.35
TOTAL AREA(ACRES) = 0.16 TOTAL RUNOFF(CFS) = 0.35
*****
FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 372.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 336.00 CHANNEL SLOPE = 0.2619
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.35
FLOW VELOCITY(FEET/SEC) = 4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 6.27
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 402.00 FEET.
*****
FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.464
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) = 2.46 SUBAREA RUNOFF(CFS) = 4.70
TOTAL AREA(ACRES) = 2.6 TOTAL RUNOFF(CFS) = 5.01
Tc(MIN.) = 6.27
*****
FLOW PROCESS FROM NODE 25.00 TO NODE 26.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

```

100PRATT. OUT
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 305.00
FLOW LENGTH( FEET) = 897.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER( INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 12.69
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 5.01
PIPE TRAVEL TIME( MIN.) = 1.18 Tc( MIN.) = 7.45
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 26.00 = 1299.00 FEET.

*****
FLOW PROCESS FROM NODE 26.00 TO NODE 27.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 305.00 DOWNSTREAM( FEET) = 284.00
FLOW LENGTH( FEET) = 185.00 MANNING'S N = 0.012
ESTIMATED PIPE DIAMETER( INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.5 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 14.72
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 5.01
PIPE TRAVEL TIME( MIN.) = 0.21 Tc( MIN.) = 7.66
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 27.00 = 1484.00 FEET.

*****
FLOW PROCESS FROM NODE 27.00 TO NODE 27.00 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 5.01 7.66 4.803 2.62
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 27.00 = 1484.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 4.70 59.57 1.279 30.10
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 27.00 = 2343.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 5.61 7.66 4.803
2 6.03 59.57 1.279

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE( CFS) = 6.03 Tc( MIN.) = 59.57
TOTAL AREA( ACRES) = 32.7

*****
FLOW PROCESS FROM NODE 27.00 TO NODE 27.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====
*****
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```

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100PRATT. OUT
FLOW PROCESS FROM NODE 27.00 TO NODE 28.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 283.90 DOWNSTREAM( FEET) = 264.00
FLOW LENGTH( FEET) = 343.00 MANNING'S N = 0.012
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.) = 12.20
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 6.03
PIPE TRAVEL TIME( MIN.) = 0.47 Tc( MIN.) = 60.04
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

*****
FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 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.) = 60.04
RAINFALL INTENSITY( INCH/HR) = 1.27
TOTAL STREAM AREA( ACRES) = 32.72
PEAK FLOW RATE( CFS) AT CONFLUENCE = 6.03

*****
FLOW PROCESS FROM NODE 600.00 TO NODE 602.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH( FEET) = 75.00
UPSTREAM ELEVATION( FEET) = 296.00
DOWNSTREAM ELEVATION( FEET) = 285.00
ELEVATION DIFFERENCE( FEET) = 11.00
SUBAREA OVERLAND TIME OF FLOW( MIN.) = 1.664
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY( INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF( CFS) = 0.66
TOTAL AREA( ACRES) = 0.12 TOTAL RUNOFF( CFS) = 0.66

*****
FLOW PROCESS FROM NODE 602.00 TO NODE 28.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION( FEET) = 285.00 DOWNSTREAM ELEVATION( FEET) = 262.00
STREET LENGTH( FEET) = 386.00 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 = 1
STREET PARKWAY CROSSFALL( DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section( curb-to-curb) = 0.0160
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100PRATT. OUT
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.26
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 6.52
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.07
STREET FLOW TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 3.21
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 0.58 SUBAREA RUNOFF(CFS) = 3.19
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 3.85

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 8.39
FLOW VELOCITY(FEET/SEC.) = 4.68 DEPTH*VELOCITY(FT*FT/SEC.) = 1.38
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 28.00 = 461.00 FEET.

*****
FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 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.) = 3.21
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.85

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 6.03 60.04 1.273 32.72
2 3.85 3.21 6.323 0.70

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 4.17 3.21 6.323
2 6.81 60.04 1.273

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 6.81 Tc(MIN.) = 60.04
TOTAL AREA(ACRES) = 33.4
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

*****
FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

```

```

100PRATT. OUT
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 6.81 60.04 1.273 33.42
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 38.56 19.73 2.609 63.89
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 28.00 = 4412.60 FEET.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 40.80 19.73 2.609
2 25.62 60.04 1.273

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 40.80 Tc(MIN.) = 19.73
TOTAL AREA(ACRES) = 97.3

*****
FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 IS CODE = 12
-----
>>>>CLEAR MEMORY BANK # 1 <<<<
=====

*****
FLOW PROCESS FROM NODE 28.00 TO NODE 126.00 IS CODE = 52
-----
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 248.00 DOWNSTREAM(FEET) = 232.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 249.00 CHANNEL SLOPE = 0.0643
CHANNEL FLOW THRU SUBAREA(CFS) = 40.80
FLOW VELOCITY(FEET/SEC) = 9.26 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 20.18
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 4661.60 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.18
RAINFALL INTENSITY(INCH/HR) = 2.57
TOTAL STREAM AREA(ACRES) = 97.31
PEAK FLOW RATE(CFS) AT CONFLUENCE = 40.80

*****
FLOW PROCESS FROM NODE 30.00 TO NODE 32.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S. C. S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 123.00
UPSTREAM ELEVATION(FEET) = 452.00
DOWNSTREAM ELEVATION(FEET) = 420.00

```

100PRATT. OUT
ELEVATION DIFFERENCE(FEET) = 32.00
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) = 5.466
SUBAREA RUNOFF(CFS) = 0.63
TOTAL AREA(ACRES) = 0.33 TOTAL RUNOFF(CFS) = 0.63

FLOW PROCESS FROM NODE 32.00 TO NODE 34.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 418.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 391.00 CHANNEL SLOPE = 0.0051
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.63
FLOW VELOCITY(FEET/SEC) = 1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 6.07 Tc(MIN.) = 12.34
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 34.00 = 514.00 FEET.

FLOW PROCESS FROM NODE 32.00 TO NODE 34.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.531
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 89
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5973
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 5.56
TOTAL AREA(ACRES) = 2.8 TOTAL RUNOFF(CFS) = 5.97
TC(MIN.) = 12.34

FLOW PROCESS FROM NODE 34.00 TO NODE 126.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 232.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1437.70 CHANNEL SLOPE = 0.1294
NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 5.97
FLOW VELOCITY(FEET/SEC) = 6.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 3.44 Tc(MIN.) = 15.78
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 126.00 = 1951.70 FEET.

FLOW PROCESS FROM NODE 34.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.012
NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3846
SUBAREA AREA(ACRES) = 17.40 SUBAREA RUNOFF(CFS) = 18.35
Page 79

100PRATT. OUT
TOTAL AREA(ACRES) = 20.2 TOTAL RUNOFF(CFS) = 23.44
TC(MIN.) = 15.78

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 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.) = 15.78
RAINFALL INTENSITY(INCH/HR) = 3.01
TOTAL STREAM AREA(ACRES) = 20.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.44

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 40.80 20.18 2.571 97.31
2 23.44 15.78 3.012 20.23

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 55.36 15.78 3.012
2 60.81 20.18 2.571

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 60.81 Tc(MIN.) = 20.18
TOTAL AREA(ACRES) = 117.5
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 4661.60 FEET.

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 117.5 TC(MIN.) = 20.18
PEAK FLOW RATE(CFS) = 60.81

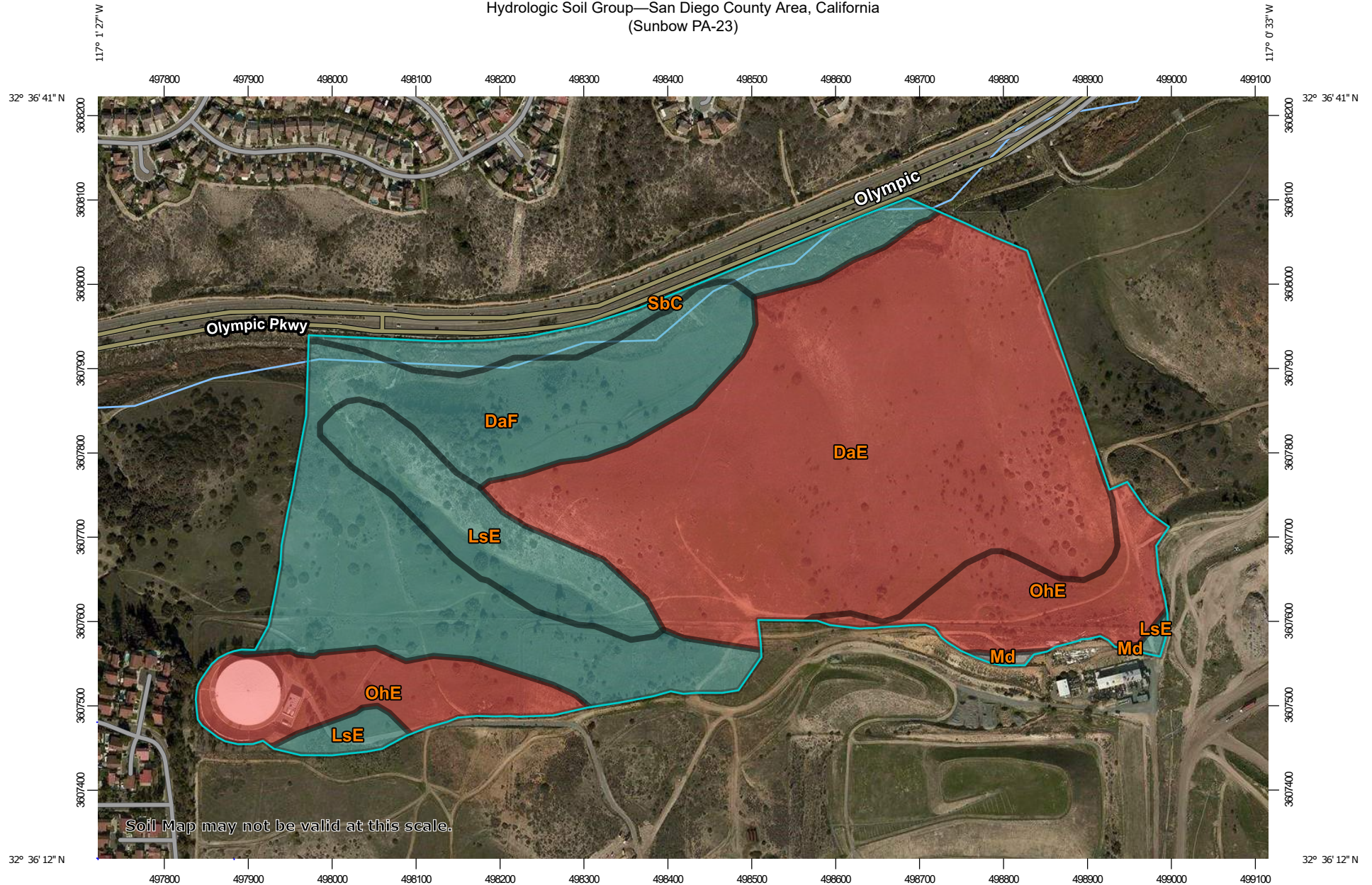
END OF RATIONAL METHOD ANALYSIS



CHAPTER 4

HYDROLOGIC SOIL GROUP

Hydrologic Soil Group—San Diego County Area, California (Sunbow PA-23)



Map Scale: 1:6,380 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters

0 300 600 1200 1800 Feet

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




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

1/8/2020
Page 1 of 5


MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 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 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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
DaE	Diablo clay, 15 to 30 percent slopes	D	53.0	45.2%
DaF	Diablo clay, 30 to 50 percent slopes, warm MAAT, MLRA 20	C	31.9	27.2%
LsE	Linne clay loam, 9 to 30 percent slopes	C	10.3	8.7%
Md	Made land		0.3	0.2%
OhE	Olivenhain cobbly loam, 9 to 30 percent slopes	D	16.3	13.9%
SbC	Salinas clay loam, 2 to 9 percent slopes	C	5.6	4.8%
Totals for Area of Interest			117.3	100.0%

CHAPTER 5

DETENTION ANALYSIS & CALCULATIONS




HEC-HMS

Project : Sunbow Detention

Basin Model : Basin 1

Jan 20 12:02:27 PST 2020

 Source-1



 BASIN-1

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 6/16/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.4 INCHES
BASIN AREA 30.1 ACRES
RUNOFF COEFFICIENT 0.6113
PEAK DISCHARGE 77.13 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 2.6
TIME (MIN) = 20	DISCHARGE (CFS) = 2.7
TIME (MIN) = 30	DISCHARGE (CFS) = 2.8
TIME (MIN) = 40	DISCHARGE (CFS) = 2.9
TIME (MIN) = 50	DISCHARGE (CFS) = 3
TIME (MIN) = 60	DISCHARGE (CFS) = 3
TIME (MIN) = 70	DISCHARGE (CFS) = 3.2
TIME (MIN) = 80	DISCHARGE (CFS) = 3.3
TIME (MIN) = 90	DISCHARGE (CFS) = 3.4
TIME (MIN) = 100	DISCHARGE (CFS) = 3.5
TIME (MIN) = 110	DISCHARGE (CFS) = 3.8
TIME (MIN) = 120	DISCHARGE (CFS) = 3.9
TIME (MIN) = 130	DISCHARGE (CFS) = 4.2
TIME (MIN) = 140	DISCHARGE (CFS) = 4.3
TIME (MIN) = 150	DISCHARGE (CFS) = 4.7
TIME (MIN) = 160	DISCHARGE (CFS) = 4.9
TIME (MIN) = 170	DISCHARGE (CFS) = 5.5
TIME (MIN) = 180	DISCHARGE (CFS) = 5.8
TIME (MIN) = 190	DISCHARGE (CFS) = 6.6
TIME (MIN) = 200	DISCHARGE (CFS) = 7.2
TIME (MIN) = 210	DISCHARGE (CFS) = 8.8
TIME (MIN) = 220	DISCHARGE (CFS) = 10
TIME (MIN) = 230	DISCHARGE (CFS) = 14.7
TIME (MIN) = 240	DISCHARGE (CFS) = 18
TIME (MIN) = 250	DISCHARGE (CFS) = 77.13
TIME (MIN) = 260	DISCHARGE (CFS) = 11.8
TIME (MIN) = 270	DISCHARGE (CFS) = 7.9
TIME (MIN) = 280	DISCHARGE (CFS) = 6.2
TIME (MIN) = 290	DISCHARGE (CFS) = 5.2
TIME (MIN) = 300	DISCHARGE (CFS) = 4.5
TIME (MIN) = 310	DISCHARGE (CFS) = 4
TIME (MIN) = 320	DISCHARGE (CFS) = 3.7
TIME (MIN) = 330	DISCHARGE (CFS) = 3.4
TIME (MIN) = 340	DISCHARGE (CFS) = 3.1
TIME (MIN) = 350	DISCHARGE (CFS) = 2.9
TIME (MIN) = 360	DISCHARGE (CFS) = 2.7
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Basin 1 (West Basin)
Elevation-Area & Elevation-Discharge Function

Elevation-Area Function

Elevation (FT)	Area (AC)
0.00	0.57870
0.05	0.58097
0.10	0.58325
0.15	0.58552
0.20	0.58780
0.25	0.59008
0.30	0.59235
0.35	0.59463
0.40	0.59691
0.45	0.59918
0.50	0.60146
0.55	0.60373
0.60	0.60601
0.65	0.60829
0.70	0.61056
0.75	0.61284
0.80	0.61511
0.85	0.61739
0.90	0.61967
0.95	0.62194
1.00	0.62422
1.05	0.62656
1.10	0.62890
1.15	0.63124
1.20	0.63359
1.25	0.63593
1.30	0.63827
1.35	0.64061
1.40	0.64295
1.45	0.64529
1.50	0.64764
1.55	0.64998
1.60	0.65232
1.65	0.65466
1.70	0.65700
1.75	0.65934
1.80	0.66169
1.85	0.66403
1.90	0.66637
1.95	0.66871
2.00	0.67105
2.05	0.67346
2.10	0.67586
2.15	0.67827
2.20	0.68067
2.25	0.68308
2.30	0.68549
2.35	0.68789
2.40	0.69030

Elevation (FT)	Area (AC)
2.40	0.69030
2.45	0.69270
2.50	0.69511
2.55	0.69752
2.60	0.69992
2.65	0.70233
2.70	0.70473
2.75	0.70714
2.80	0.70955
2.85	0.71195
2.90	0.71436
2.95	0.71676
3.00	0.71917
3.05	0.72164
3.10	0.72411
3.15	0.72659
3.20	0.72906
3.25	0.73153
3.30	0.73400
3.35	0.73648
3.40	0.73895
3.45	0.74142
3.50	0.74389
3.55	0.74637
3.60	0.74884
3.65	0.75131
3.70	0.75378
3.75	0.75626
3.80	0.75873
3.85	0.76120
3.90	0.76367
3.95	0.76615
4.00	0.76862
4.05	0.77115
4.10	0.77369
4.15	0.77623
4.20	0.77876
4.25	0.78130
4.30	0.78384
4.35	0.78638
4.40	0.78891
4.45	0.79145
4.50	0.79399
4.55	0.79652
4.60	0.79906
4.65	0.80160
4.70	0.80413
4.75	0.80667
4.80	0.80921
4.85	0.81174

4.80	0.80921
4.85	0.81174
4.90	0.81428
4.95	0.81682
5.00	0.81935
5.05	0.82196
5.10	0.82456
5.15	0.82716
5.20	0.82977
5.25	0.83237
5.30	0.83497
5.35	0.83758
5.40	0.84018
5.45	0.84278
5.50	0.84539
5.55	0.84799
5.60	0.85059
5.65	0.85320
5.70	0.85580
5.75	0.85840
5.80	0.86101
5.85	0.86361
5.90	0.86621
5.95	0.86882
6.00	0.87142

Elevation-Discharge Function

Elevation (FT)	Discharge (CFS)
0.00	0.80300
0.05	0.80400
0.10	0.80500
0.15	0.80600
0.20	0.80700
0.25	0.80800
0.30	0.80900
0.35	0.81000
0.40	0.81100
0.45	0.81200
0.50	0.81300
0.55	0.81400
0.60	0.81500
0.65	0.81600
0.70	0.81700
0.75	0.81800
0.80	0.81900
0.85	0.82000
0.90	0.82100
0.95	0.82200
1.00	0.82300
1.05	0.82515
1.10	0.82945
1.15	0.83179
1.20	0.83362
1.25	0.83519
1.30	0.83657
1.35	0.83783
1.40	0.83898
1.45	0.84006
1.50	0.84108
1.55	0.84204
1.60	0.84295
1.65	0.84382
1.70	0.84466
1.75	0.84547
1.80	0.84625
1.85	0.84700
1.90	0.84774
1.95	0.84845
2.00	0.84914
2.05	0.85311
2.10	0.86263
2.15	0.87588
2.20	0.88821
2.25	0.89595
2.30	0.90266
2.35	0.90869
2.40	0.91422

Elevation (FT)	Discharge (CFS)
2.40	0.91422
2.45	0.91935
2.50	0.92418
2.55	0.92875
2.60	0.93309
2.65	0.93725
2.70	0.94125
2.75	0.94510
2.80	0.94881
2.85	0.95241
2.90	0.95591
2.95	0.95931
3.00	0.96261
3.05	0.96999
3.10	0.98474
3.15	1.00557
3.20	1.03095
3.25	1.05920
3.30	1.08145
3.35	1.09774
3.40	1.11256
3.45	1.12627
3.50	1.13913
3.55	1.15128
3.60	1.16284
3.65	1.17390
3.70	1.18453
3.75	1.19478
3.80	1.20469
3.85	1.21430
3.90	1.22363
3.95	1.23270
4.00	1.24155
4.05	1.62249
4.10	2.31166
4.15	3.20144
4.20	4.25341
4.25	5.44539
4.30	6.76242
4.35	8.19350
4.40	9.73012
4.45	11.36543
4.50	13.09377
4.55	14.91036
4.60	16.81106
4.65	18.79231
4.70	20.85094
4.75	22.98411
4.80	25.18932

4.80	25.18932
4.85	27.46426
4.90	29.80686
4.95	32.21521
5.00	34.68755
5.05	37.22226
5.10	39.81784
5.15	42.47290
5.20	45.18611
5.25	47.95627
5.30	50.78221
5.35	53.66287
5.40	56.59720
5.45	59.58425
5.50	62.62311
5.55	65.71289
5.60	68.02977
5.65	71.21897
5.70	74.45673
5.75	77.74233
5.80	81.07509
5.85	84.45434
5.90	87.87946
5.95	91.34983
6.00	94.86487

Project: Sunbow Detention Simulation Run: Run 1

Reservoir: BASIN-1

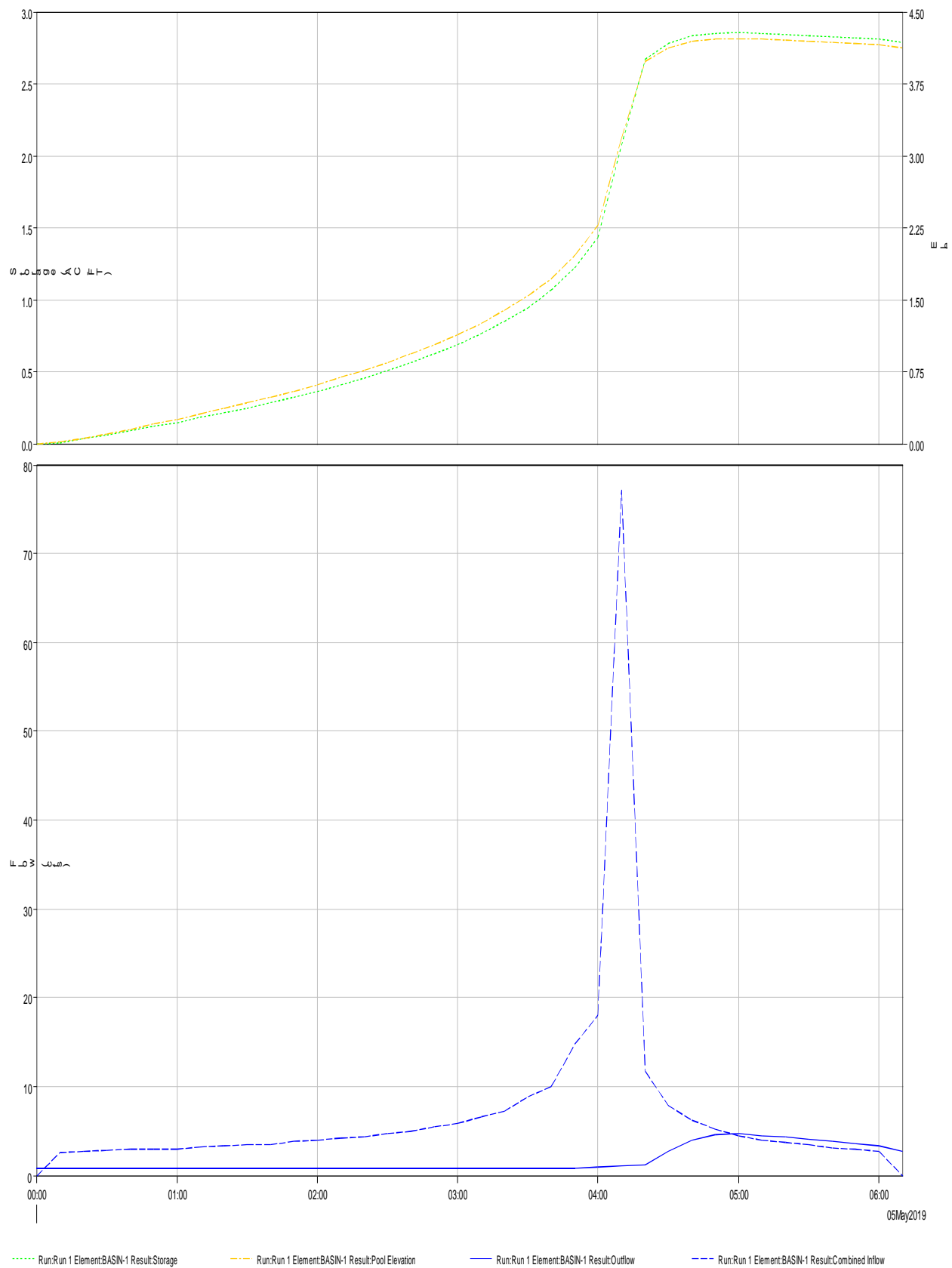
Start of Run:	05May2019, 00:00	Basin Model:	Basin 1
End of Run:	05May2019, 06:10	Meteorologic Model:	Met 1
Compute Time:	16Jun2020, 13:51:06	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow:	77.1 (CFS)	Date/Time of Peak Inflow:	05May2019, 04:10
Peak Discharge:	4.7 (CFS)	Date/Time of Peak Discharge:	05May2019, 05:00
Inflow Volume:	0.20 (IN)	Peak Storage:	2.9 (AC-FT)
Discharge Volume:	0.05 (IN)	Peak Elevation:	4.2 (FT)

Reservoir "BASIN-1" Results for Run "Run 1"



Project: Sunbow Detention Simulation Run: Run 1
Reservoir: BASIN-1

Start of Run: 05May2019, 00:00 Basin Model: Basin 1
End of Run: 05May2019, 06:10 Meteorologic Model: Met 1
Compute Time: 16Jun2020, 13:51:06 Control Specifications: Control 1

Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	00:00	0.0	0.0	0.0	0.8
05May2019	00:10	2.6	0.0	0.0	0.8
05May2019	00:20	2.7	0.0	0.1	0.8
05May2019	00:30	2.8	0.1	0.1	0.8
05May2019	00:40	2.9	0.1	0.1	0.8
05May2019	00:50	3.0	0.1	0.2	0.8
05May2019	01:00	3.0	0.1	0.3	0.8
05May2019	01:10	3.2	0.2	0.3	0.8
05May2019	01:20	3.3	0.2	0.4	0.8
05May2019	01:30	3.4	0.2	0.4	0.8
05May2019	01:40	3.5	0.3	0.5	0.8
05May2019	01:50	3.8	0.3	0.5	0.8
05May2019	02:00	3.9	0.4	0.6	0.8
05May2019	02:10	4.2	0.4	0.7	0.8
05May2019	02:20	4.3	0.5	0.8	0.8
05May2019	02:30	4.7	0.5	0.8	0.8
05May2019	02:40	4.9	0.6	0.9	0.8
05May2019	02:50	5.5	0.6	1.0	0.8
05May2019	03:00	5.8	0.7	1.1	0.8
05May2019	03:10	6.6	0.8	1.3	0.8
05May2019	03:20	7.2	0.8	1.4	0.8
05May2019	03:30	8.8	0.9	1.5	0.8
05May2019	03:40	10.0	1.1	1.7	0.8
05May2019	03:50	14.7	1.2	2.0	0.8
05May2019	04:00	18.0	1.4	2.3	0.9

Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	04:10	77.1	2.1	3.2	1.0
05May2019	04:20	11.8	2.7	4.0	1.2
05May2019	04:30	7.9	2.8	4.1	2.7
05May2019	04:40	6.2	2.8	4.2	4.0
05May2019	04:50	5.2	2.9	4.2	4.5
05May2019	05:00	4.5	2.9	4.2	4.7
05May2019	05:10	4.0	2.9	4.2	4.5
05May2019	05:20	3.7	2.8	4.2	4.3
05May2019	05:30	3.4	2.8	4.2	4.0
05May2019	05:40	3.1	2.8	4.2	3.8
05May2019	05:50	2.9	2.8	4.2	3.5
05May2019	06:00	2.7	2.8	4.2	3.3
05May2019	06:10	0.0	2.8	4.1	2.8

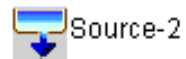


HEC-HMS

Project : Sunbow Detention

Basin Model : Basin 1

Jan 20 12:02:27 PST 2020



Source-2



BASIN-2

RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 1/20/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 15 MIN.
6 HOUR RAINFALL 2.4 INCHES
BASIN AREA 37 ACRES
RUNOFF COEFFICIENT 0.637
PEAK DISCHARGE 75.88 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 15	DISCHARGE (CFS) = 3.4
TIME (MIN) = 30	DISCHARGE (CFS) = 3.5
TIME (MIN) = 45	DISCHARGE (CFS) = 3.7
TIME (MIN) = 60	DISCHARGE (CFS) = 3.8
TIME (MIN) = 75	DISCHARGE (CFS) = 4.1
TIME (MIN) = 90	DISCHARGE (CFS) = 4.3
TIME (MIN) = 105	DISCHARGE (CFS) = 4.6
TIME (MIN) = 120	DISCHARGE (CFS) = 4.9
TIME (MIN) = 135	DISCHARGE (CFS) = 5.4
TIME (MIN) = 150	DISCHARGE (CFS) = 5.7
TIME (MIN) = 165	DISCHARGE (CFS) = 6.6
TIME (MIN) = 180	DISCHARGE (CFS) = 7.1
TIME (MIN) = 195	DISCHARGE (CFS) = 8.7
TIME (MIN) = 210	DISCHARGE (CFS) = 9.9
TIME (MIN) = 225	DISCHARGE (CFS) = 14.5
TIME (MIN) = 240	DISCHARGE (CFS) = 18
TIME (MIN) = 255	DISCHARGE (CFS) = 75.88
TIME (MIN) = 270	DISCHARGE (CFS) = 11.7
TIME (MIN) = 285	DISCHARGE (CFS) = 7.8
TIME (MIN) = 300	DISCHARGE (CFS) = 6.1
TIME (MIN) = 315	DISCHARGE (CFS) = 5.1
TIME (MIN) = 330	DISCHARGE (CFS) = 4.4
TIME (MIN) = 345	DISCHARGE (CFS) = 4
TIME (MIN) = 360	DISCHARGE (CFS) = 3.6
TIME (MIN) = 375	DISCHARGE (CFS) = 0

Basin 2 (East Basin)
Elevation-Area & Elevation-Discharge Function

Elevation-Area Function

Elevation (FT)	Area (AC)
0.00	0.68655
0.05	0.68930
0.10	0.69206
0.15	0.69481
0.20	0.69757
0.25	0.70032
0.30	0.70308
0.35	0.70583
0.40	0.70859
0.45	0.71134
0.50	0.71410
0.55	0.71686
0.60	0.71961
0.65	0.72237
0.70	0.72512
0.75	0.72788
0.80	0.73063
0.85	0.73339
0.90	0.73614
0.95	0.73890
1.00	0.73905
1.05	0.74174
1.10	0.74443
1.15	0.74712
1.20	0.74981
1.25	0.75250
1.30	0.75519
1.35	0.75788
1.40	0.76057
1.45	0.76326
1.50	0.76596
1.55	0.76865
1.60	0.77134
1.65	0.77403
1.70	0.77672
1.75	0.77941
1.80	0.78210
1.85	0.78479
1.90	0.78748
1.95	0.79017
2.00	0.79286
2.05	0.79562
2.10	0.79837
2.15	0.80112
2.20	0.80388
2.25	0.80663
2.30	0.80939
2.35	0.81214
2.40	0.81490
2.45	0.81765

Elevation (FT)	Area (AC)
2.40	0.81490
2.45	0.81765
2.50	0.82041
2.55	0.82316
2.60	0.82592
2.65	0.82867
2.70	0.83143
2.75	0.83418
2.80	0.83694
2.85	0.83969
2.90	0.84245
2.95	0.84520
3.00	0.84796
3.05	0.85078
3.10	0.85360
3.15	0.85642
3.20	0.85924
3.25	0.86206
3.30	0.86488
3.35	0.86770
3.40	0.87052
3.45	0.87334
3.50	0.87616
3.55	0.87898
3.60	0.88180
3.65	0.88462
3.70	0.88744
3.75	0.89026
3.80	0.89308
3.85	0.89590
3.90	0.89872
3.95	0.90154
4.00	0.90436
4.05	0.90725
4.10	0.91013
4.15	0.91302
4.20	0.91590
4.25	0.91879
4.30	0.92168
4.35	0.92456
4.40	0.92745
4.45	0.93033
4.50	0.93322
4.55	0.93610
4.60	0.93899
4.65	0.94188
4.70	0.94476
4.75	0.94765
4.80	0.95053
4.85	0.95342

4.80	0.95053
4.85	0.95342
4.90	0.95630
4.95	0.95919
5.00	0.96208
5.05	0.96503
5.10	0.96798
5.15	0.97093
5.20	0.97388
5.25	0.97683
5.30	0.97978
5.35	0.98272
5.40	0.98567
5.45	0.98862
5.50	0.99157
5.55	0.99452
5.60	0.99747
5.65	1.00040
5.70	1.00340
5.75	1.00630
5.80	1.00930
5.85	1.01220
5.90	1.01520
5.95	1.01810
6.00	1.02110

Elevation-Discharge Function

Elevation (FT)	Discharge (CFS)
0.00	1.8210
0.05	1.8220
0.10	1.8230
0.15	1.8240
0.20	1.8250
0.25	1.8260
0.30	1.8270
0.35	1.8280
0.40	1.8290
0.45	1.8300
0.50	1.8310
0.55	1.8331
0.60	1.8374
0.65	1.8398
0.70	1.8416
0.75	1.8432
0.80	1.8446
0.85	1.8458
0.90	1.8470
0.95	1.8481
1.00	1.8491
1.05	1.8533
1.10	1.8631
1.15	1.8766
1.20	1.8891
1.25	1.8971
1.30	1.9040
1.35	1.9102
1.40	1.9158
1.45	1.9211
1.50	1.9261
1.55	1.9308
1.60	1.9352
1.65	1.9395
1.70	1.9436
1.75	1.9475
1.80	1.9514
1.85	1.9551
1.90	1.9586
1.95	1.9621
2.00	1.9655
2.05	1.9688
2.10	1.9720
2.15	1.9752
2.20	1.9782
2.25	1.9813
2.30	1.9842
2.35	1.9871
2.40	1.9899

Elevation (FT)	Discharge (CFS)
2.40	1.9899
2.45	1.9927
2.50	1.9955
2.55	1.9982
2.60	2.0008
2.65	2.0034
2.70	2.0060
2.75	2.0086
2.80	2.0111
2.85	2.0135
2.90	2.0159
2.95	2.0183
3.00	2.0207
3.05	2.0272
3.10	2.0411
3.15	2.0612
3.20	2.0858
3.25	2.1133
3.30	2.1349
3.35	2.1505
3.40	2.1647
3.45	2.1778
3.50	2.1901
3.55	2.2017
3.60	2.2127
3.65	2.2233
3.70	2.2334
3.75	2.2432
3.80	2.2526
3.85	2.2618
3.90	2.2707
3.95	2.2794
4.00	2.2878
4.05	2.6684
4.10	3.3572
4.15	4.2466
4.20	5.2982
4.25	6.4898
4.30	7.8065
4.35	9.2373
4.40	10.7740
4.45	12.4090
4.50	14.1370
4.55	15.9530
4.60	17.8530
4.65	19.8340
4.70	21.8930
4.75	24.0260
4.80	26.2310

4.80	26.2310
4.85	28.5050
4.90	30.8480
4.95	33.2560
5.00	35.7280
5.05	38.2620
5.10	40.8580
5.15	43.5120
5.20	46.2250
5.25	48.9950
5.30	51.8210
5.35	54.7020
5.40	57.6360
5.45	60.6230
5.50	63.6610
5.55	66.7510
5.60	68.0600
5.65	71.2490
5.70	74.4860
5.75	77.7720
5.80	81.1040
5.85	84.4830
5.90	87.9080
5.95	91.3780
6.00	94.8930

Project: Sunbow Detention Simulation Run: Run 2
Reservoir: BASIN-2

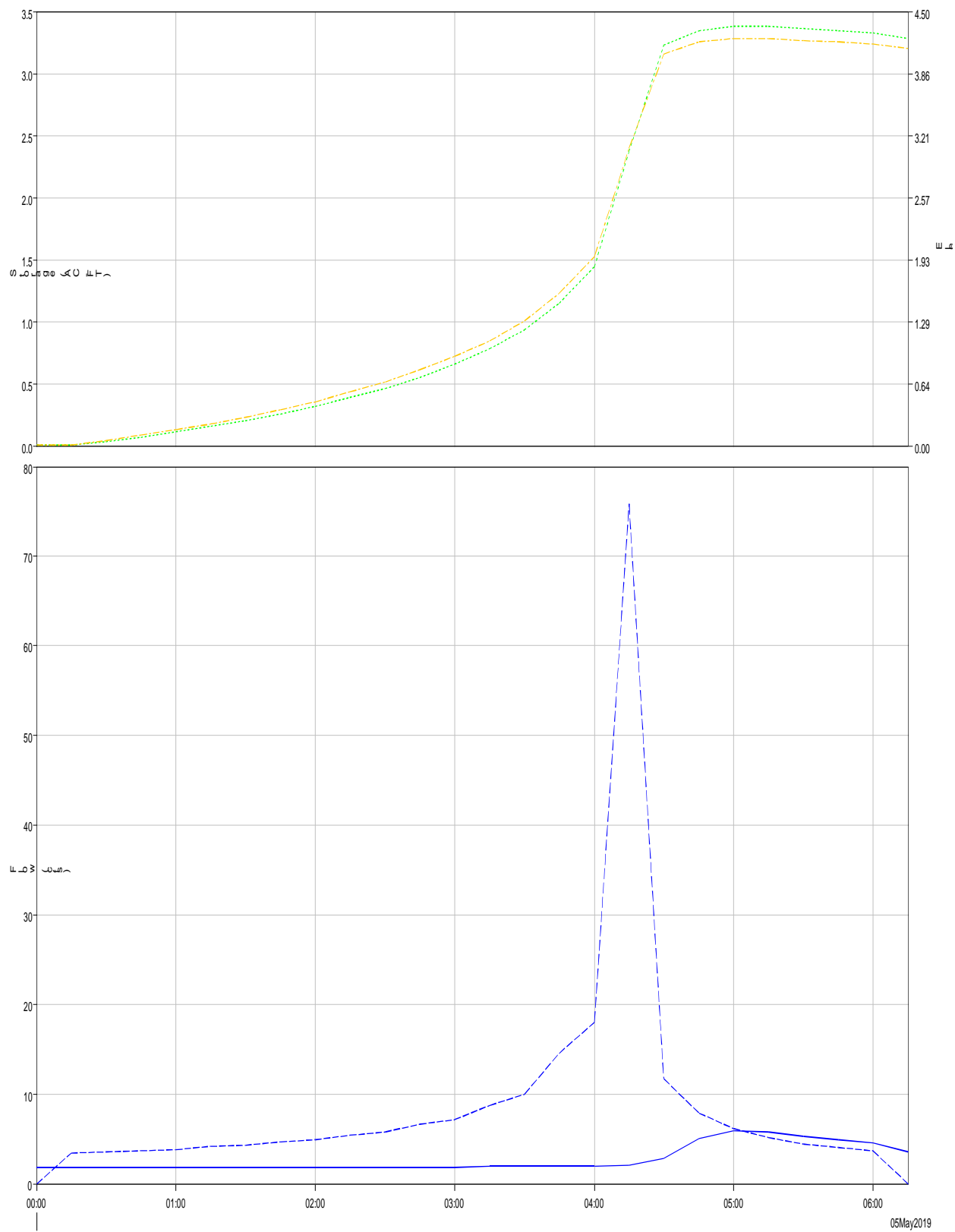
Start of Run: 05May2019, 00:00 Basin Model: Basin 2
End of Run: 05May2019, 06:15 Meteorologic Model: Met 1
Compute Time: 19Jun2020, 12:23:53 Control Specifications: Control 2

Volume Units: IN

Computed Results

Peak Inflow:	75.9 (CFS)	Date/Time of Peak Inflow:	05May2019, 04:15
Peak Discharge:	5.8 (CFS)	Date/Time of Peak Discharge:	05May2019, 05:00
Inflow Volume:	0.25 (IN)	Peak Storage:	3.4 (AC-FT)
Discharge Volume:	0.08 (IN)	Peak Elevation:	4.2 (FT)

Reservoir "BASIN-2" Results for Run "Run 2"



Run:Run 2 Element:Basin-2 Result:Storage Run:Run 2 Element:Basin-2 Result:Pool Elevation Run:Run 2 Element:Basin-2 Result:Outflow Run:Run 2 Element:Basin-2 Result:Combined Inflow

Project: Sunbow Detention Simulation Run: Run 2
Reservoir: BASIN-2

Start of Run: 05May2019, 00:00 Basin Model: Basin 2
End of Run: 05May2019, 06:15 Meteorologic Model: Met 1
Compute Time: 19Jun2020, 12:23:53 Control Specifications: Control 2

Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	00:00	0.0	0.0	0.0	1.8
05May2019	00:15	3.4	0.0	0.0	1.8
05May2019	00:30	3.5	0.0	0.1	1.8
05May2019	00:45	3.7	0.1	0.1	1.8
05May2019	01:00	3.8	0.1	0.2	1.8
05May2019	01:15	4.1	0.2	0.2	1.8
05May2019	01:30	4.3	0.2	0.3	1.8
05May2019	01:45	4.6	0.3	0.4	1.8
05May2019	02:00	4.9	0.3	0.5	1.8
05May2019	02:15	5.4	0.4	0.6	1.8
05May2019	02:30	5.7	0.5	0.7	1.8
05May2019	02:45	6.6	0.6	0.8	1.8
05May2019	03:00	7.1	0.7	0.9	1.8
05May2019	03:15	8.7	0.8	1.1	1.9
05May2019	03:30	9.9	0.9	1.3	1.9
05May2019	03:45	14.5	1.1	1.6	1.9
05May2019	04:00	18.0	1.4	2.0	2.0
05May2019	04:15	75.9	2.4	3.1	2.0
05May2019	04:30	11.7	3.2	4.1	2.7
05May2019	04:45	7.8	3.3	4.2	5.0
05May2019	05:00	6.1	3.4	4.2	5.8
05May2019	05:15	5.1	3.4	4.2	5.7
05May2019	05:30	4.4	3.4	4.2	5.3
05May2019	05:45	4.0	3.3	4.2	4.9
05May2019	06:00	3.6	3.3	4.2	4.5

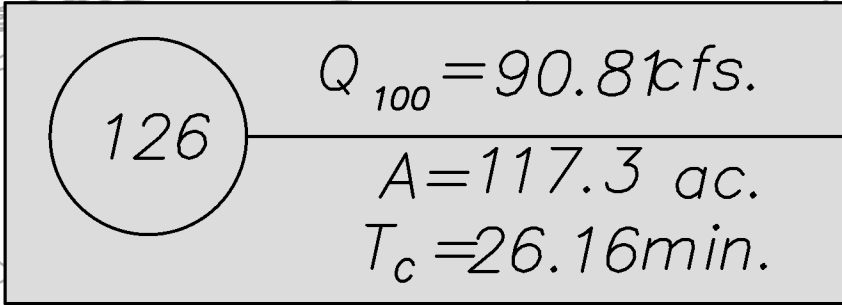
Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	06:15	0.0	3.3	4.1	3.5

CHAPTER 6

HYDROLOGY MAPS

Drainage Study for
Sunbow II, Phase 3

EXISTING CONDITION HYDROLOGY MAPS


$$\begin{aligned} Q_{100} &= 90.8 \text{ kfs.} \\ A &= 117.3 \text{ ac.} \\ T_c &= 26.16 \text{ min.} \end{aligned}$$
$$A=117.3 \text{ ac.}$$
$$T_c=26.16 \text{ min.}$$
$$T_c = 26.16 \text{ min.}$$

PROJECT BOUNDARY

DRAINAGE BOUNDARY

INITIAL SUBAREA

FLOW DIRECTION

NODE #/ELEVATION

ACREAGE

FLOW LENGTH

PROJECT BOUNDARY
DRAINAGE BOUNDARY
INITIAL SUBAREA
FLOW DIRECTION

NODE #/ELEVATION
 ACREAGE
 FLOW LENGTH

PREPARED BY:

 **HUNSAKER
& ASSOCIATES**
SAN DIEGO, INC.

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(658)558-4500 • FX(658)558-1414

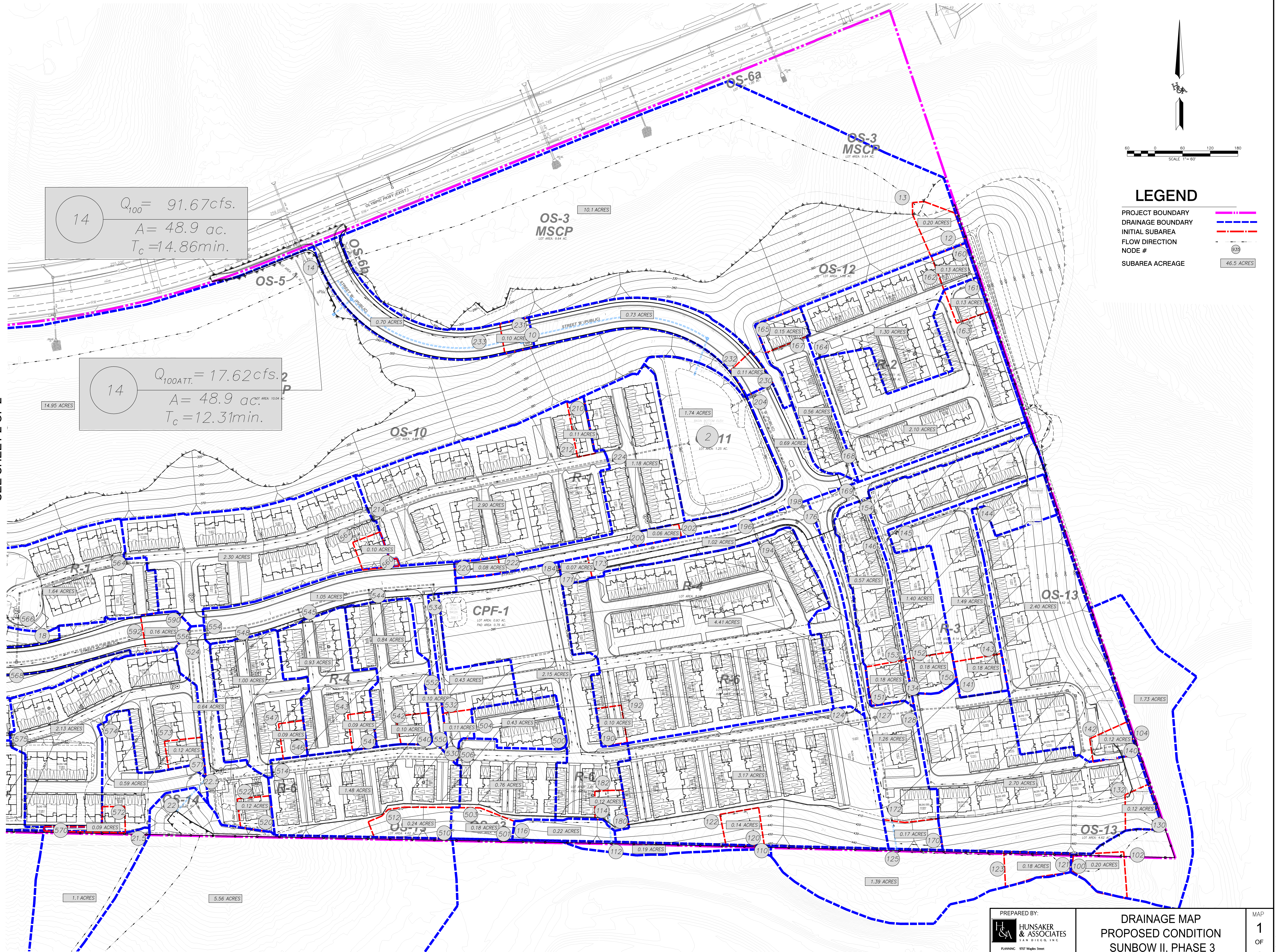
DRAINAGE MAP
EXISTING CONDITION
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

MAP
1
OF
1
W.O. 2167-0151

Drainage Study for
Sunbow II, Phase 3

PROPOSED CONDITION HYDROLOGY MAPS

SEE SHEET 2 OF 2



LEGEND

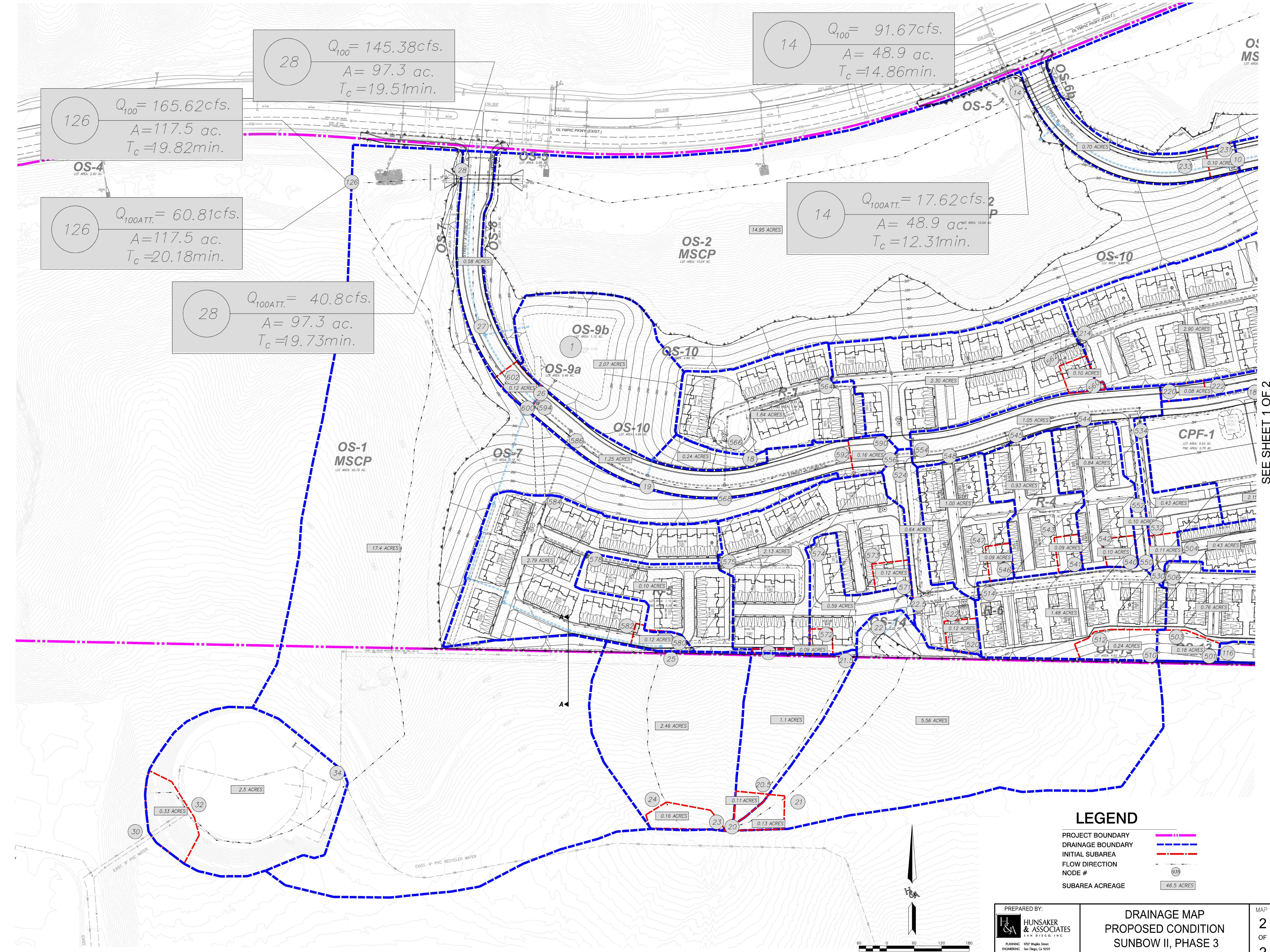
- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- NODE #
- SUBAREA ACREAGE

PREPARED BY:
HUNSAKER & ASSOCIATES
SAN DIEGO, CA
PLANNING: 907 Maple Street
ENGINEERING: San Diego, CA 92101
SURVEYING: PH080558-4500 PH080558-5414

DRAINAGE MAP
PROPOSED CONDITION
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

MAP
1
OF
2
K.O. 2167-1051

R:\1561\Map\DR\1561\ACAD\1561\BFD-PR-13\updated\office grading.dwg[2021-10-22]



126 $Q_{100} = 165.62\text{cfs.}$
 $A = 117.5\text{ ac.}$
 $T_c = 19.82\text{min.}$

126 $Q_{100\text{ATT.}} = 60.81\text{cfs.}$
 $A = 117.5\text{ ac.}$
 $T_c = 20.18\text{min.}$

28 $Q_{100} = 145.38\text{cfs.}$
 $A = 97.3\text{ ac.}$
 $T_c = 19.51\text{min.}$

28 $Q_{100\text{ATT.}} = 40.8\text{cfs.}$
 $A = 97.3\text{ ac.}$
 $T_c = 19.73\text{min.}$

14 $Q_{100} = 91.67\text{cfs.}$
 $A = 48.9\text{ ac.}$
 $T_c = 14.86\text{min.}$

14 $Q_{100\text{ATT.}} = 17.62\text{cfs.}$
 $A = 48.9\text{ ac.}$
 $T_c = 12.31\text{min.}$

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- NODE #
- SUBAREA ACREAGE

PREPARED BY:
HUNSAKER & ASSOCIATES
PLANNING
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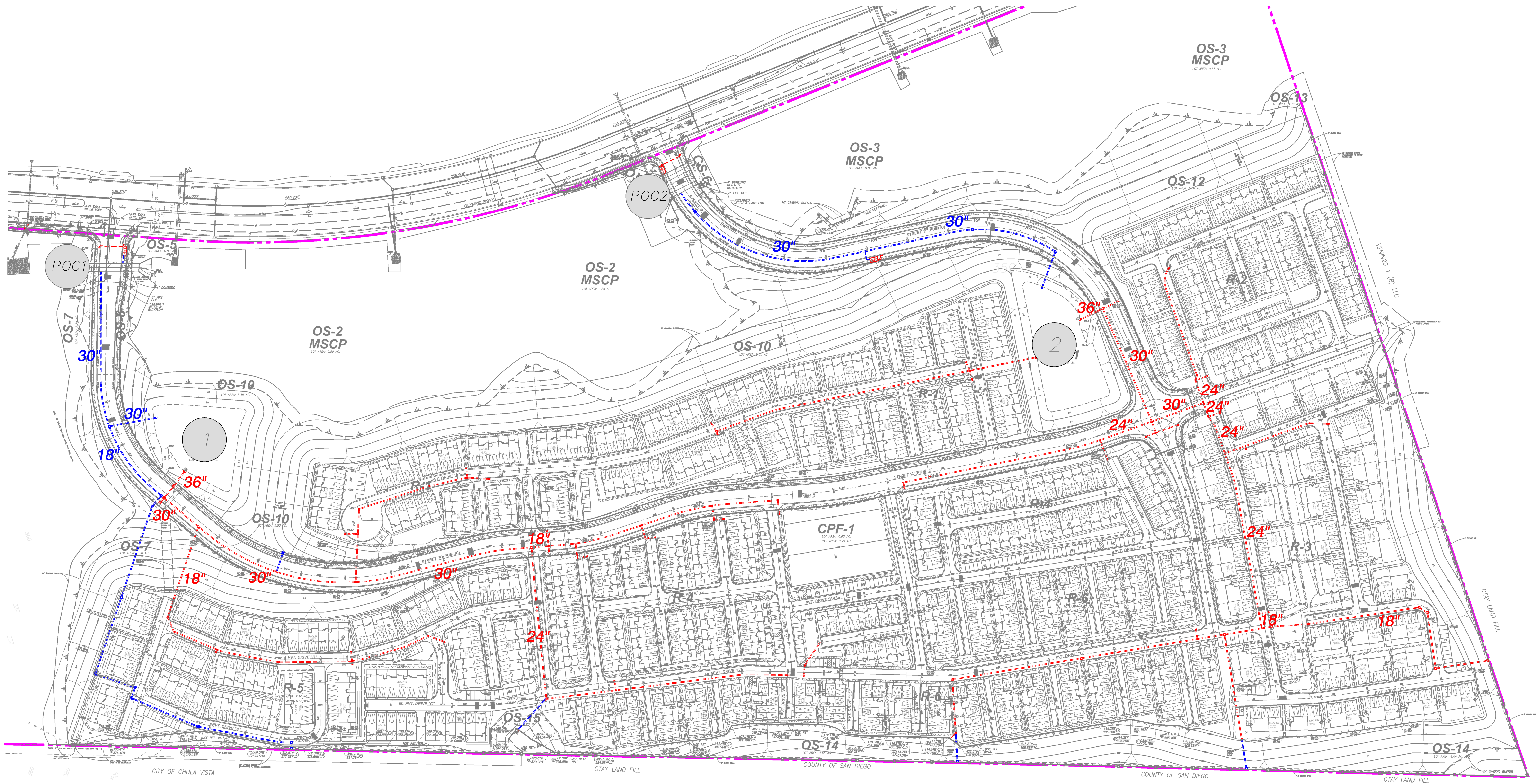
DRAINAGE MAP
PROPOSED CONDITION
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

MAP
2
OF
2

SEE SHEET 1 OF 2

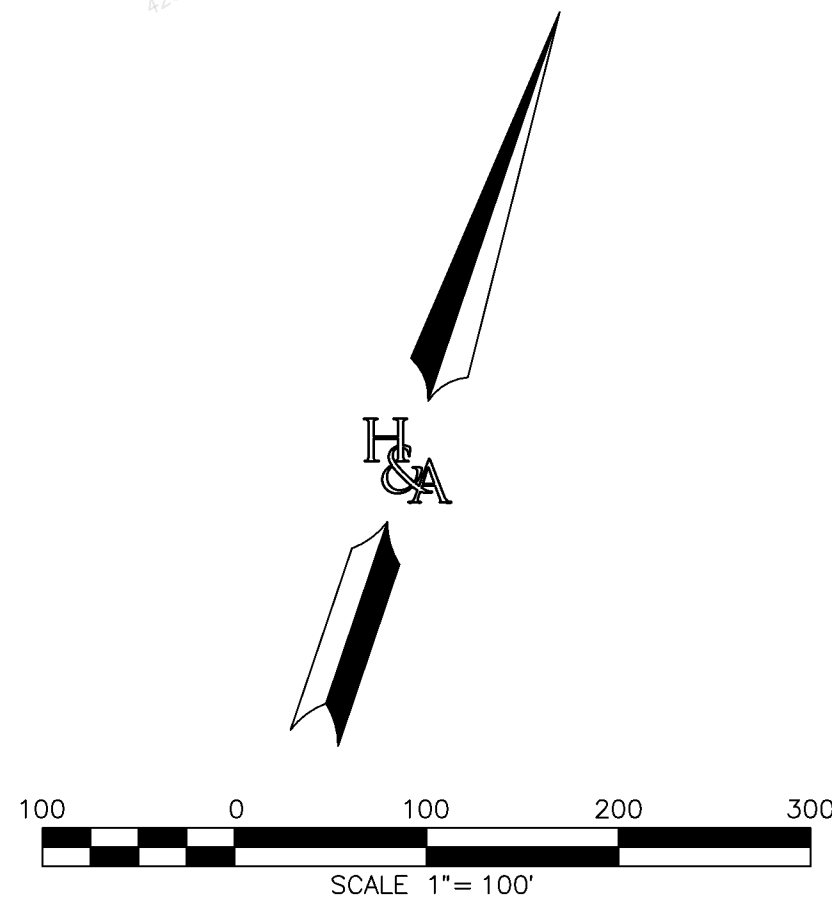
CHAPTER 7

Preliminary Pipe Sizing



LEGEND

- BYPASS STORMDRAIN
 - URBAN OR UNTREATED RUNOFF STORM DRAIN
 - WATER QUALITY HYDROMODIFICATION BASIN
- NOTE: PIPES 18" UNLESS OTHERWISE NOTED



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PROPOSED CONDITION
STORMDRAIN SIZING EXHIBIT
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

MAP
1
OF
1
W.C. 2167-0151