HARMONY GROVE VILLAGE SOUTH

APPENDIX M-1

CEQA PRELIMINARY HYDROLOGY/ DRAINAGE STUDY

to the

DRAFT ENVIRONMENTAL IMPACT REPORT

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PDS2015-TM-5600; PDS2015-REZ-15-003
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Prepared for:
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CEQA PRELIMINARY
HYDROLOGY / DRAINAGE STUDY
HARMONY GROVE VILLAGE SOUTH

County of San Diego, CA

April 11, 2017
PDS2015-TM-5600, PDS2015-SP-15-002,
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DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OR WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

Debby Reece, RCE 56148 Date

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1. INTRODUCTION

This drainage report has been prepared in support of a Tentative Map submittal for the Harmony Grove Village South (HGVS) project. The project is located in the County of San Diego southeast of the Harmony Grove Specific Plan Area. The site is approximately 111 acres in size and located west of Interstate 15 and south of State Route 78 (SR 78). Figure 1 shows the vicinity map for the project.

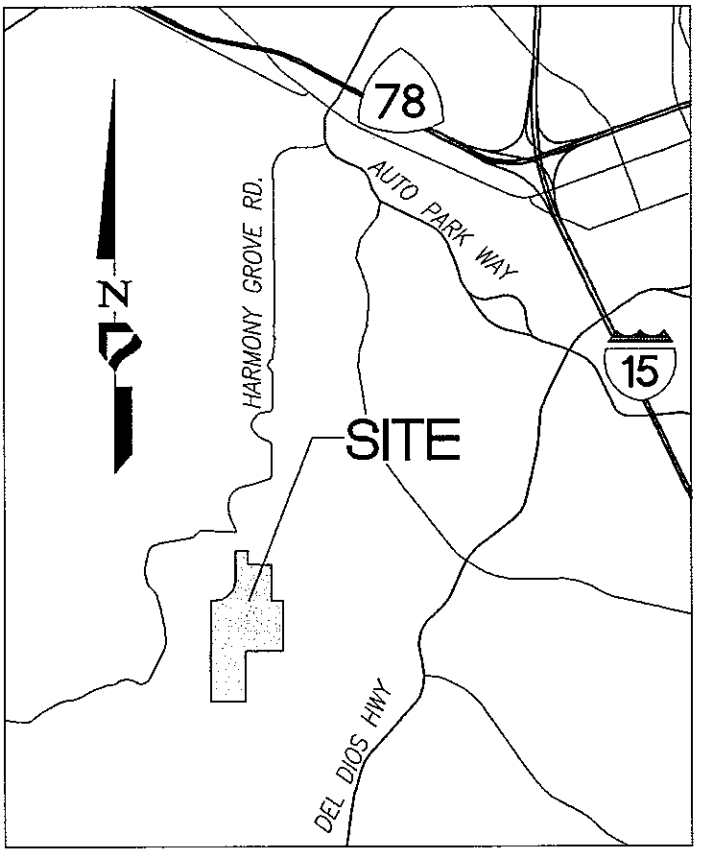


Figure 1: Project Vicinity Map

The purpose of this report is to determine hydrologic impact, if any, to the existing storm drain facilities or natural drainage, and provide peak 100-year discharge values for existing and proposed conditions, and to provide the required analysis for an environmental CEQA-level analysis of potential development impacts and mitigations with respect to drainage.

The drainage analyses presented herein reflect a Tentative Map level-of-effort, which include peak 100-year storm event hydrologic analyses using relative street and lot grades. Hydraulic analyses for detention basins, inlets, pipe inverts and HGL's will be provided during final engineering, although some preliminary calculations are included herein for TM purposes. *Therefore, the purpose of this report submittal is to acquire from the County: 1) concept approval of the proposed storm drain layout and detention basin sizing, 2) approval of the methodology used in the evaluation of the project storm drain system hydrology, and 3) identification of critical path drainage issues that need to be addressed during final engineering.*

The project will meet State NPDES construction and municipal stormwater permit requirements. The construction phase BMPs associated with the project will be addressed in the Grading and Erosion Control Plans and the SWPPP. The post-construction BMPs for the project are currently being developed in conjunction with the Preliminary Storm Water Quality Management Plan (SWQMP) for HGVS project. The final post-construction BMP design will be provided during final engineering.

The project is within FEMA FIRM Panel Nos. 06073C1057G and 06073C1059G, effective date May 16, 2012. The northern portion of the site is within Zone AE of the Special Flood Hazard Area (SFHA) that is subject to inundation by the 1% annual chance flood. Zone AE is defined as areas with "base flood elevations determined". The northern portion is also within Zone X, which is defined by "areas of 0.2% annual chance flood". In addition, the northern portion of the site is within the floodway areas in Zone AE. The floodway is the channel of a stream plus any adjacent areas that must be kept free of encroachment so that the 1% annual flood chance can be carried without substantial increases in flood heights. Refer to Exhibit A in Appendix 6 for the FEMA Floodplain Map.

2. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS

The following sections provide descriptions of the existing and proposed drainage patterns and improvements for the project.

The project lies in the southern portion of a large circular shaped valley surrounded by prominent peaks and steep hillsides. Escondido Creek bisects the valley, and HGVS lies south of the creek.

Under existing conditions, the project area consists of undeveloped land. The north central and southwestern portions of the site are relatively flat, covered in Non-Native Grasslands. Steep slopes occur in the northeastern corner, the southeastern region, the southern tip of the site, and a couple of isolated areas in the central western portion of the site. Diegan Coastal Sage Scrub, Coastal Sage Chaparral Scrub, Mafic Southern Mixed Chaparral, and Granitic Southern Mixed Chaparral, cover the steeper areas of the site. The southern-most portion of the site (preserved as open space) has significant biological habitat including a small area of Coast Live Oak and jurisdictional drainages that flow down from the peaks and exit the site along the western boundary.

The site is bounded by Country Club Drive and existing single-family residential lots on the west, Escondido Creek and open space to the north, and mainly open space to the east and south. There are three existing residences on the east side of the project boundary whose main access is through the property. There appears to be no existing storm drain facilities within the project site area. Existing drainage is divided into four drainage areas, depicted as Systems 100, 200, 300, and 400 on Exhibit B, Existing Condition Hydrology Map, included in Appendix 6. The first, System 100 is located at the northeast corner of the property, originates offsite and drains to Escondido Creek to the north. The second drainage area, System 200, comprises the majority of the site, originates offsite on the east side of the property, drains through the main valley of the project, runs northerly along the east side of Country Club Drive, and flows into Escondido Creek. Systems 300 and 400 are relatively smaller systems that are located in the southwestern corner of the site, originate from the south (on and offsite) and drain west to a defined drainage along the western project boundary. This defined drainage traverses the existing residential properties west of Cordrey Drive and ultimately flows into Escondido Creek downstream and west of the Country Club Drive crossing.

The project proposes a maximum of 453 units. HGVS provides for a variety of single-family and multi-family housing types. These have been designed to preserve and reflect the rural character and architectural heritage of Harmony Grove. For example, structures are planned within the context of the land, with grading thoughtfully designed to fit into the existing landform. In addition, multi-family homes respect the predominant single-family character of Harmony Grove by being designed to appear as a single farmhouse or repurposed agricultural building. A

commercial/civic area; consisting of a homeowner's association clubhouse-type building will provide a public gathering place/destination for the residents. It may accommodate such uses as food/beverage services, limited overnight accommodations, a gym, an event lawn, an equestrian hitching post, electric vehicle charging stations, and possibly a pool. HGVS also reserves space for wastewater treatment uses that may be needed in support of the project. A natural drainage that used to flow through the central portion of the site, which has since been disturbed by prior agricultural operations, has been incorporated into the site plan and would be recreated as a naturalized open space area with a meandering swale, trails, and adjacent community gardens. This vegetated swale will carry surface drainage from adjacent slopes and units along its alignment and convey it to a proposed storm drain system.

The onsite drainage improvements consist of public and private streets, gutters, and curb inlets that tie into underground storm drain systems. As the project grading has been designed to fit into the existing landform, the proposed drainage areas mimic the existing condition and consist of five drainage systems, Systems 100, 200, 300, 400, and 500. Refer to Exhibit C, Proposed Condition Hydrology Map, included in Appendix 6. The ultimate discharge points of these five systems, in relation to the project boundary, are effectively the same as the existing condition: north to Escondido Creek, and west to the defined drainage along the western project boundary.

In order to mitigate for drainage impacts associated with development, the project will construct two combination detention/hydromodification basins with an additional harvest/reuse storage volume component. One basin is located at the northern tip of the site, adjacent to the Wastewater Land Use Area. This basin discharges directly to Escondido Creek via an underground storm drain. The second basin, located along the western boundary just south of Country Club Drive, drains to the defined drainage at the southwest corner of the project's grading limits. As mentioned, these basins will mitigate for both peak flow attenuation and hydromodification management impacts. Both storm drain outlet locations discharge to unimproved channels, therefore, energy dissipation will be provided to minimize erosion potential. The Best Management Practices are discussed in the project's SWQMP, under separate cover.

3. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

This section of the report summarizes the drainage criteria that were used in the hydrologic analysis and key elements of the methodology. Also included is a description of the computer model used in the computations.

3.1 Hydrology Criteria

The drainage basins were delineated using available topography and the preliminary proposed grading layout for the project. Table 1 summarizes the key hydrology assumptions and criteria used for the hydrologic modeling.

Table 1: Hydrology Criteria

Existing and Proposed Hydrology:	100-year storm frequency
Soil Type:	Hydrologic Soil Group A, C, and D per USDA web soil survey. See Exhibit C.
Land Use / Runoff Coefficients:	Based on criteria presented in the 2003 County of San Diego Hydrology Manual,
Rainfall intensity:	Based on intensity duration frequency relationships presented in the 2003 County of San Diego Hydrology Manual.

For subareas with multiple land use zoning and/or soil types, a composite runoff coefficient (C) was calculated for the drainage area. Refer to Appendix 2 for weighted runoff coefficient calculations. For the existing condition analysis, the existing condition runoff coefficients were calculated based on the percentage of soil types within the project. A majority of the onsite area contains type C soils.

3.2 Hydrologic Methodology

The Modified Rational Method was used to determine the 100-year peak discharge flows for the design of the storm drain improvements. The goal of the project hydrology analysis was to:

- Determine existing and design peak 100-year flows for the sizing of the onsite storm drain system gutters, curb inlets, catch basins, and pipes that convey flow to the discharge locations. From an analytical perspective, the project hydrology was prepared using relative lot and street grades.

- Verify that the project does not adversely impact the existing storm drain improvements or natural drainage. A comparative analysis was performed between the existing peak 100-year discharge and project peak 100-year discharge at various locations. For results of the analysis see Exhibits B and C for existing and proposed conditions hydrology maps, and Appendices 3 and 4 for existing and proposed condition Rational Method computer output.

3.3 Description of Hydrologic Modeling Software

The Modified Rational Method was used to determine the 100-year storm flow for the design of the storm system. The AES Rational Method Program was used to perform the hydrologic calculations. This section provides a brief explanation of the computational procedure used in the computer model.

The AES Modified Rational Method Hydrology Program is a computer-aided design program where the user develops a node link model of the watershed. Developing independent node link models for each interior watershed and linking these sub-models together at confluence points creates the node link model. The intensity-duration-frequency relationships are applied to each of the drainage areas in the model to get the peak flow rates at each point of interest.

4. HYDROLOGY RESULTS

In general, the project hydrology results presented herein were used to 1) verify that the project does not adversely impact the existing storm drain system or natural drainage, and 2) verify that the proposed detention volumes are adequate to control post-project peak flows.

Storm runoff from the project will be collected and conveyed to several locations. In order to compare the existing and proposed drainage conditions, two comparison outfall locations have

been established (north and south drainage areas). Table 2 summarizes the Rational Method hydrology results for the project outfalls for the existing and proposed conditions.

Table 2: Hydrology Results

		EXISTING CONDITIONS		PROPOSED CONDITIONS	
Comparison	System	Q_{100}	Contrib. Area	Q_{100}	Contrib. Area
		(cfs)	(acres)	(cfs)	(acres)
Northern Outfalls	100	28.0	18.6	27.4	17.4
	200	116.4	81.9	215.6 (undetained), 101.3 (detained)	81.2
	500	-	-	9.6	1.6
	Subtotal=	144.4	100.5	251.5 undetained, **138.3** detained	100.2
Southern Outfalls	300	26.3	15.7	58.2 (undetained), 25.1 (detained)	14.1
	400	131.6	76.1	132.6	76.8
	Subtotal=	157.9	91.8	190.8 undetained, **157.7** detained	90.9
	Total=	**302.3**	**192.1**	442.3 undetained, **296.0** detained	**190.9**

Table 2 compares the existing and proposed peak flow rates for each outfall with and without detention taken into account.

The results of the hydrology analysis indicate that flows for the proposed condition Basins 200 and 300 will increase above existing conditions. Therefore, detention is provided to detain post-project peak flows to less than pre-project flows. Systems 100 and 400 are less than or approximately equal for both existing and proposed conditions, respectively.

Proposed System 200 (without detention) will increase runoff by approximately 100 cfs. However, detention for 100-year flow attenuation is provided in the North basin, as shown in Table 2. Proposed System 300 is detained in the South basin. Therefore, the combined flows for the Northern Outfalls and the combined flows for the Southern Outfalls are both less than existing conditions with the detention provided. The outfall location of the proposed North Basin is directly into Escondido Creek, therefore flows from the project shall be designed to release at non-erosive velocities via the detention basin and energy dissipation.

The runoff from Proposed System 300 outfalls into a defined drainage along the western project boundary. This defined drainage traverses the existing residential properties west of Cordrey Drive and ultimately flows into Escondido Creek downstream and west of the Country Club

Drive crossing. Proposed System 300 will be detained by the South basin to match pre-development conditions. Appropriate energy dissipation measures will be used at the outlet for erosion control.

4.1 Water Quality Considerations

The lower portion of the North Basin and the South Basin will include the design capture volume, which will be diverted to a harvest and reuse system in combination with the reclaimed water wet weather storage system proposed with the onsite waste water treatment plant. This volume was modeled with a low-flow orifice restriction in order to model the effects of the stage-storage-discharge curve for the 100-year detention routing. The water quality volume was taken into account for the 100-year detention routing by setting the initial water surface elevation of the 100-year detention routing model run set equal to the corresponding BMP design capture volume (per Section 6.2.7 of the County of San Diego Hydraulic Design Manual). Refer to the Preliminary Storm Water Quality Management Plan for further information regarding the post-construction BMPs selected for this project.

The basins will be maintained by the HOA, and sediment and debris collected in the basins and in any of the pretreatment BMPs will be maintained via a vactor truck procedure. Both the pre-treatment BMPs and the underground basins will have strategically placed access holes in order to facilitate maintenance. The basins will be inspected regularly to inspect for sedimentation.

The Harmony Grove Village South project is in a unique position to pursue this reuse opportunity since it is found within the Rincon Water District. The Rincon Water District possesses an existing recycled water system and has a very large winter user at a power generation plant. This condition is unlike the typical County condition where the majority of the rain occurs in the winter when there is minimal-to-no recycled water use. Since guidelines for this reuse program presently do not exist, the project is unable to achieve the documentation and agreements necessary to ensure this use at the tentative tract map stage. However, it is important that the project preserves the right to confirm this use at the final map stage.

In the unlikely event the project is unable to gain approval for stormwater use in the recycled system, the project will construct a stormwater BMP system in accordance with the BMP Design Manual as an alternative to the reuse system. The final BMP system will be designed during final engineering, but for the entitlement, the drainage design for the project is designed to accommodate a stormwater reuse system.

4.2 Hydromodification Analysis

The basins will also address hydromodification requirements in addition to peak flow attenuation requirements. For more information regarding how the project complies with the final hydromodification requirements, refer to the Preliminary Hydromodification Management Study, prepared by Project Design Consultants. The stated purpose of the final hydromodification requirements is "...to manage increases in runoff discharge rates and durations from all Priority Development Projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force" (County Final HMP, page ES-1). Flow duration control is the most common form of hydromodification management.

5. HYDRAULIC CRITERIA, METHODOLOGY, AND RESULTS

Hydraulic calculations for pipes, inlets, and ditches will be performed during final engineering. Offsite and north of the project, a new bridge crossing for Country Club Drive over Escondido Creek is proposed. Refer to the project Preliminary Flood Study, prepared by Chang Consultants for the results of the study.

The preliminary 100-year detention calculations were performed with Bentley's PondPack software. The preliminary detention calculations are included for CEQA purposes only and will be updated during final engineering to reflect the final design. The basins were modeled as underground vaults with complex outlet structures to accommodate the various hydromodification and detention requirements. From the Rational Method results for Systems 200 and 300, the proposed condition peak inflow hydrographs were generated with Rick Engineering Rational Method Hydrograph Generator. This program develops a synthetic

hydrograph per the 2003 County Hydrology Manual using the results of the Rational Method output. The inflow hydrograph for each system was then entered into Bentley's PondPack software and the detention routing was performed with the preliminary design of the detention basin and the proposed outlet structure. The 100-year hydrograph was routed through the basin to demonstrate that the post-development peak flow rate will be less than the pre-development peak flow rate and that the detention facility will not overtop during the 100-year peak event. The riser for each basin was designed to ensure that riser size, rim elevation, and orifice placement worked in conjunction to properly mitigate the increase flow rate. The preliminary hydrograph routing calculations are included in Appendix 5. Also included in Appendix 5 are preliminary hydraulic calculations for a portion of the proposed storm drains. These calculations will be updated during final engineering.

The preliminary calculations show that the outlet structure is not controlled by the tailwater elevation, because the bottom of the North basin set a lot higher than the corresponding water surface elevation in Escondido Creek. Refer to Appendix 5 for further detail.

6. ENVIRONMENTAL IMPACTS

This section summarizes the following questions for CEQA purposes.

Would the project:

1. **Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?**

   The project's drainage patterns mimic the existing conditions, so no substantial impacts will exist. The project does not propose to substantially alter the adjacent Escondido Creek. Development of the project will not result in substantial erosion or siltation on- or off-site.

2. **Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?**

   Existing drainage patterns will be maintained. The project will not increase the rate or amount of surface runoff compared to the pre-project rates flow rates in the receiving streams.

3. **Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems?**

The proposed runoff from the project will not tie-in with any existing downstream storm drain pipe systems in Country Club Drive. The runoff will outlet directly into Escondido Creek. It is anticipated that the proposed bridge for Country Club Drive over Escondido Creek will be sized appropriately to convey the peak 100-year flow in Escondido Creek. Therefore, the project will not contribute runoff water which would substantially change the existing condition to exceed the capacity of existing or planned storm water drainage systems.

4. **Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, including County Floodplain Maps? For example; research the foregoing and provide same (to indicate applicability or not) in the study.**

No. The hydraulic modeling of Escondido Creek shows that the proposed residential development area is well above the creek flood elevation.

5. **Place within a 100-year flood hazard area structures which would impede or redirect flood flows?**

The northern portion of the project site, south of Escondido Creek, is currently partially within the 100-year flood hazard area. A HGVS Escondido Creek Floodplain Study has been conducted to ensure that the pads will not significantly impede flood flows. In addition, the pads will be raised out of the flood hazard area.

6. **Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam on-site or off site?**

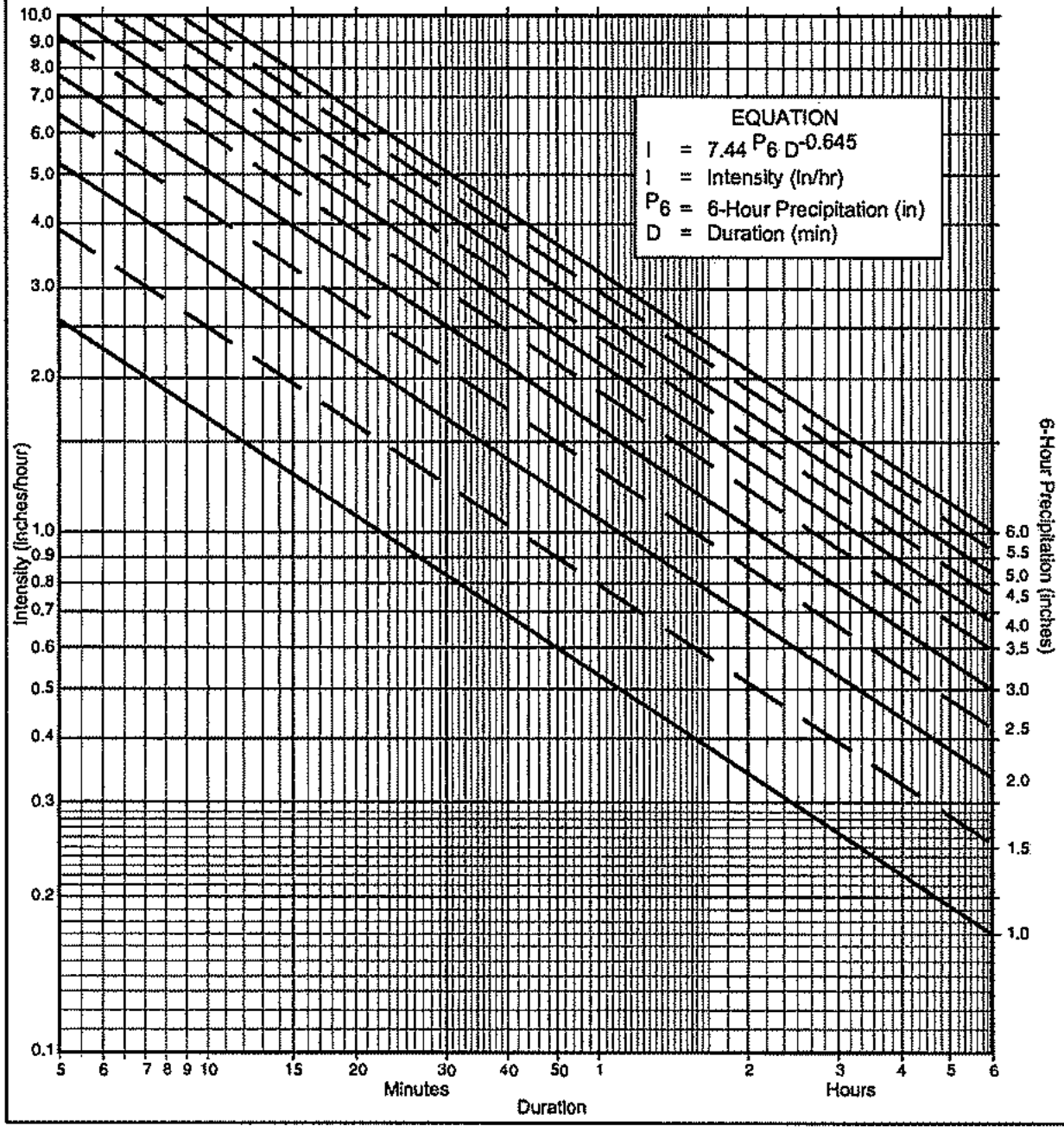
There are no dams or levees within or near the project site.

7. CONCLUSION

This drainage report has been prepared in support of the preliminary design of the storm drain improvements for the tentative map for the Harmony Grove Village South project. The purpose of this report is to provide peak discharges for use in designing the private and public storm drain systems for the project and to address the CEQA drainage issues. The hydrology results indicate that the peak flow from the developed site do not exceed the capacity of existing storm water drainage systems, and will be mitigated with the proposed detention basins to ensure post-project flow rates do not exceed pre-project flow rates. Therefore, the storm drain system will be sufficient to satisfy County criteria in the post-development condition.

APPENDIX 1

Isopluvials - Intensity-Duration Chart - Runoff Coefficients – NRCS Hydrologic Soil Groups



Directions for Application:

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

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

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

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

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

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 3.3 in., P_{24} = 5.7, $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 3.3 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

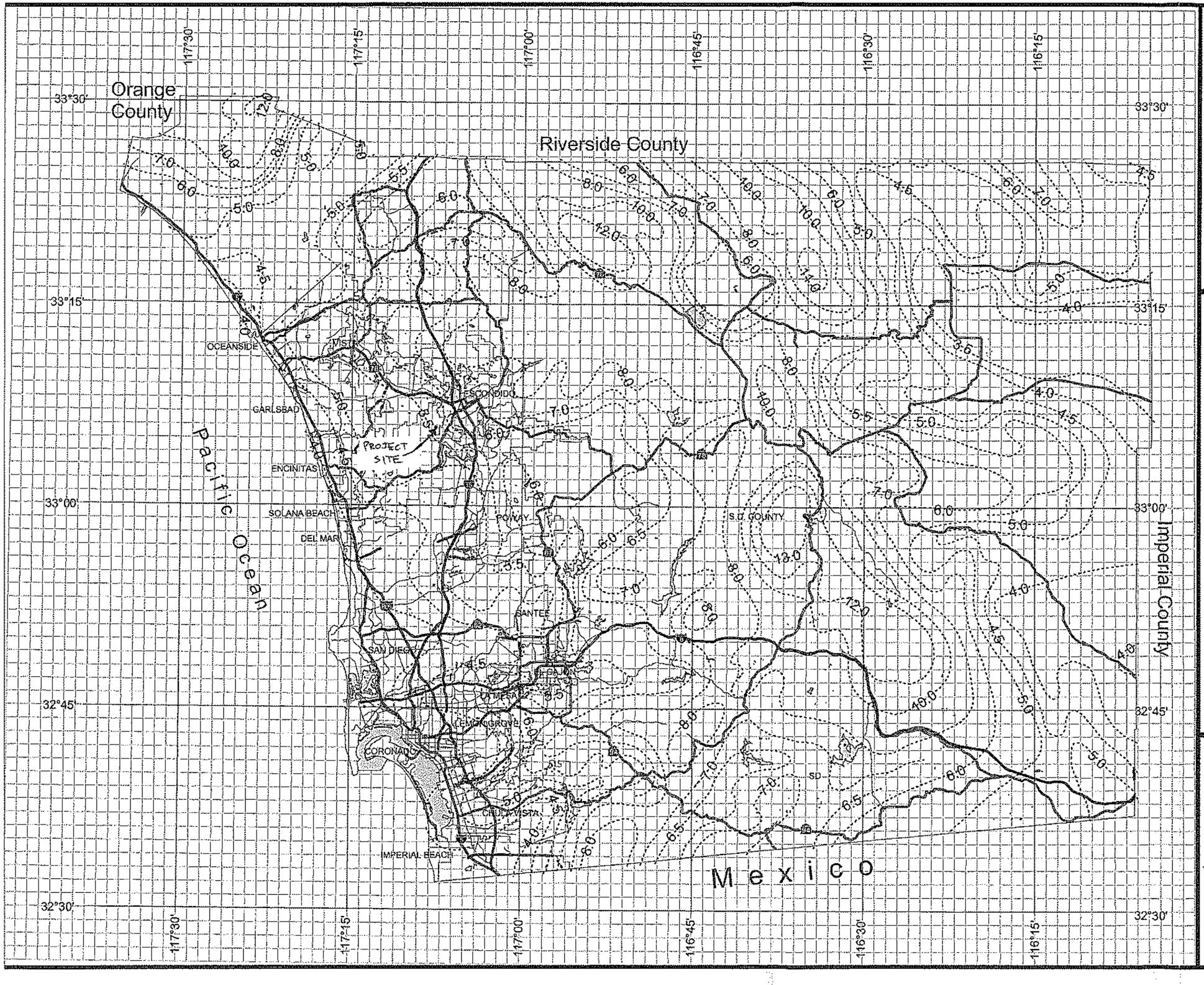
FIGURE 3-1

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

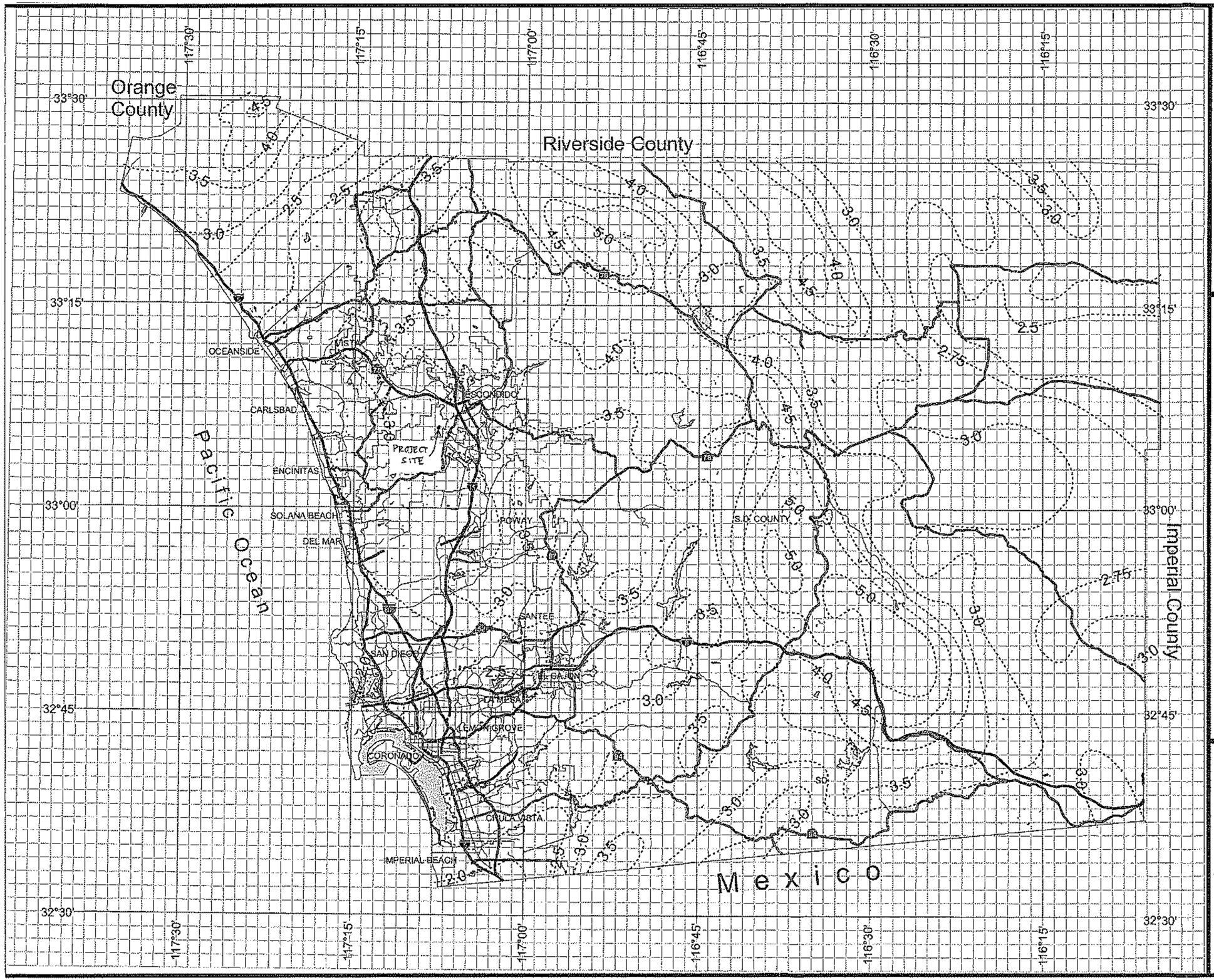
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles

Map Scale: 1:8,940 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 8, Sep 17, 2014

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

Date(s) aerial images were photographed: May 3, 2010—Jun 19, 2010

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CIE2	Cieneba coarse sandy loam, 15 to 30 percent slopes, ero ded	D	3.7	0.9%
CnG2	Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent s lopes, eroded	D	130.2	30.6%
EsE2	Escondido very fine sandy loam, 15 to 30 percent slopes , eroded	C	12.3	2.9%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	C	7.2	1.7%
HrC	Huerhuero loam, 2 to 9 percent slopes	D	5.2	1.2%
LpD2	Las Posas fine sandy loam, 9 to 15 percent slopes, erod ed	C	18.1	4.3%
LpE2	Las Posas fine sandy loam, 15 to 30 percent slopes, ero ded	C	41.8	9.8%
LrG	Las Posas stony fine sandy loam, 30 to 65 percent slope s	C	147.3	34.6%
StG	Steep gullied land		13.5	3.2%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	17.2	4.0%
WmB	Wyman loam, 2 to 5 percent slopes	C	15.5	3.6%
WmC	Wyman loam, 5 to 9 percent slopes	C	13.7	3.2%
Totals for Area of Interest			**425.6**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

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

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

APPENDIX 2

Weighted Runoff Coefficient Calculations for Subareas with Multiple Land uses and/or Soil Types

Summary Calculations to Determine Existing Condition Composite Runoff Coefficients for Individual Subareas

EXISTING CONDITIONS & OFFSITE CONDITIONS

Node 201

Total acreage= 0.85

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Med Density Resid, 7.5du/ac or less	0.53	0.00	0.16	0.16	0.48	0.51	0.54	0.57	0.25	0.00	0.09	0.09	
													0.51

Node 210-202

Total acreage= 31.90

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Low Density Resid, 1du/ac or less	0	0.00	25.62	6.28	0.2	0.25	0.3	0.35	0.00	0.00	7.69	2.20	
													0.31

Node 212-210

Total acreage= 10.40

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Low Density Resid, 1du/ac or less	0	0.00	9.33	1.07	0.2	0.25	0.3	0.35	0.00	0.00	2.80	0.37	
													0.31

Node 214-212

Total acreage= 0.48

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	0.2	0.28	0.2	0.25	0.3	0.35	0.00	0.00	0.06	0.10	
													0.33

Node 302-300

Total acreage= 15.40

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	14.17	1.23	0.2	0.25	0.3	0.35	0.00	0.00	4.25	0.43	
													0.30

Node 304-302

Total acreage= 0.33

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	0.3	0.03	0.2	0.25	0.3	0.35	0.00	0.00	0.09	0.01	
													0.30

Node 458-462

Total acreage= 34.50

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	6.01	28.49	0.2	0.25	0.3	0.35	0.00	0.00	1.80	9.97	
													0.34

Node 462-400

Total acreage= 0.95

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	0.79	0.16	0.2	0.25	0.3	0.35	0.00	0.00	0.24	0.06	
													0.31

Summary Calculations to Determine Existing Condition Composite Runoff Coefficients for Individual Subareas

EXISTING CONDITIONS & OFFSITE CONDITIONS

Node 464-468

Total acreage= 6.88

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	0.28	6.6	0.2	0.25	0.3	0.35	0.00	0.00	0.08	2.31	
													0.35

Node 468-462

Total acreage= 3.85

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	2.86	0.99	0.2	0.25	0.3	0.35	0.00	0.00	0.86	0.35	
													0.31

Node 470-468

Total acreage= 25.90

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	0.71	25.19	0.2	0.25	0.3	0.35	0.00	0.00	0.21	8.82	
													0.35

Summary Calculations to Determine Existing Condition Composite Runoff Coefficients for Individual Subareas

PROPOSED CONDITION & OFFSITE CONDITIONS

Node 204.6-202.6

Total acreage= 3.41

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	0.34	3.07	0.2	0.25	0.3	0.35	0.00	0.00	0.10	1.07	
													0.35

Node 262.4-260.4

Total acreage= 12.60

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	11.49	1.11	0.2	0.25	0.3	0.35	0.00	0.00	3.45	0.39	
													0.30

Node 264.4-262.4

Total acreage= 0.48

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	0.2	0.28	0.2	0.25	0.3	0.35	0.00	0.00	0.06	0.10	
													0.33

Node 268.4-266.4

Total acreage= 2.31

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	1.58	0.73	0.2	0.25	0.3	0.35	0.00	0.00	0.47	0.26	
													0.32

Node 288.4-286.4

Total acreage= 1.65

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	0.21	1.44	0.2	0.25	0.3	0.35	0.00	0.00	0.06	0.50	
													0.34

Node 324-322

Total acreage= 0.87

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Residential, 24.0 DU/A	0	0	0.85	0.02	0.66	0.67	0.69	0.71	0.00	0.00	0.59	0.01	
													0.69

Node 325-324

Total acreage= 0.34

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Residential, 24.0 DU/A	0	0	0.11	0.23	0.66	0.67	0.69	0.71	0.00	0.00	0.08	0.16	
													0.70

Node 328-326

Total acreage= 5.59

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Residential, 24.0 DU/A	0	0	5.09	0.5	0.66	0.67	0.69	0.71	0.00	0.00	3.51	0.36	
													0.69

Node 338-336

Total acreage= 0.31

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Residential, 24.0 DU/A	0	0	0.27	0.04	0.66	0.67	0.69	0.71	0.00	0.00	0.19	0.03	
													0.69

Node 346-344

Total acreage= 1.10

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Residential, 24.0 DU/A	0	0	0.03	1.07	0.66	0.67	0.69	0.71	0.00	0.00	0.02	0.76	
													0.71

Summary Calculations to Determine Existing Condition Composite Runoff Coefficients for Individual Subareas

PROPOSED CONDITION & OFFSITE CONDITIONS

Node 348-346

Total acreage= 0.19

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Residential, 14.5 DU/A	0	0	0.1	0.09	0.55	0.58	0.6	0.63	0.00	0.00	0.06	0.06	
													0.61

Node 354-352

Total acreage= 0.08

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
General Industrial	0	0	0.06	0.02	0.87	0.87	0.87	0.87	0.00	0.00	0.05	0.02	
													0.87

Node 458-462

Total acreage= 34.50

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	6.01	28.49	0.2	0.25	0.3	0.35	0.00	0.00	1.80	9.97	
													0.34

Node 462-400

Total acreage= 1.25

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0.00	1.03	0.22	0.2	0.25	0.3	0.35	0.00	0.00	0.31	0.08	
													0.31

Node 464-468

Total acreage= 5.97

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	0.09	5.88	0.2	0.25	0.3	0.35	0.00	0.00	0.03	2.06	
													0.35

Node 470-468

Total acreage= 25.90

Land Use / Land Cover	Soil A (acres)	Soil B (acres)	Soil C (acres)	Soil D (acres)	Soil A C	Soil B C	Soil C C	Soil D C	Soil A A*C	Soil B A*C	Soil C A*C	Soil D A*C	Composite Runoff Coef.
Undisturbed Natural Terrain	0	0	0.7	25.2	0.2	0.25	0.3	0.35	0.00	0.00	0.21	8.82	
													0.35

APPENDIX 3

100-year Existing Conditions Rational Method Computer Output

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                    2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
          Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
 * HARMONY GROVE                                                          *
 * JN 4095                                                                *
 * BASIN 100-EXISTING CONDITION-100-YEAR STORM EVENT                      *
 **************************************************************************

  FILE NAME: S100E100.DAT
  TIME/DATE OF STUDY: 15:06 11/10/2015
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO  STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)    SIDE / SIDE/ WAY    (FT)   (FT)  (FT)  (FT)    (n)
=== ===== ========= ================= ====== ===== ====== ===== =======
  1  30.0    20.0   0.018/0.018/0.020  0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  UPSTREAM ELEVATION(FEET) =   1020.00
  DOWNSTREAM ELEVATION(FEET) =    966.00
  ELEVATION DIFFERENCE(FEET) =     54.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  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) =  7.210
  SUBAREA RUNOFF(CFS) =      2.16
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =      2.16

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    966.00  DOWNSTREAM(FEET) =    708.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1445.00   CHANNEL SLOPE =  0.1785
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.317
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.97
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   4.03
  Tc(MIN.) =   10.72
  SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =   23.77
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       15.9         PEAK FLOW RATE(CFS) =      25.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOW VELOCITY(FEET/SEC.) =   7.34
  LONGEST FLOWPATH FROM NODE     106.00 TO NODE     102.00 =    1645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    100.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    708.00  DOWNSTREAM(FEET) =    670.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   390.00   CHANNEL SLOPE =  0.0974
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.008
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =   11.76
```

```
  SUBAREA AREA(ACRES) =     2.75      SUBAREA RUNOFF(CES) =    4.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       18.6        PEAK FLOW RATE(CFS) =      28.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   6.26
  LONGEST FLOWPATH FROM NODE    106.00 TO NODE    100.00 =    2035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OE SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  5.008
  NATURAL DESERT LANDSCAPING RUNOEE COEFFICIENT = .3000
  SOIL CLASSIEICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOEF(CFS) =    0.00
  TOTAL AREA(ACRES) =       18.6   TOTAL RUNOFE(CFS) =      28.02
  TC(MIN.) =   11.76
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       18.6  TC(MIN.) =     11.76
  PEAK FLOW RATE(CFS)   =      28.02
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
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           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
 * HARMONY GROVE                                                        *
 * BASIN 200                                                            *
 * EXISTING CONDITION - 100-YEAR STORM EVENT                            *
 ************************************************************************

  FILE NAME: S200E100.DAT
  TIME/DATE OF STUDY: 13:13 12/20/2016
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ====  ====  =======
  1   30.0     20.0    0.018/0.018/0.020    0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE     214.00 TO NODE     212.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
--------------------------------------------------------------------------
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  180.00
  UPSTREAM ELEVATION(FEET) =  828.50
  DOWNSTREAM ELEVATION(FEET) =  808.00
  ELEVATION DIFFERENCE(FEET) =  20.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =  6.434
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
       THE MAXIMUM OVERLAND FLOW LENGTH =  300.00
       (Reference: Table 3-1B of Hydrology Manual)
       THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.390
 SUBAREA RUNOFF(CFS) =      1.17
 TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      1.17

**************************************************************************
  FLOW PROCESS FROM NODE     212.00 TO NODE     210.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
--------------------------------------------------------------------------
  ELEVATION DATA: UPSTREAM(FEET) =    808.00  DOWNSTREAM(FEET) =    690.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   725.00   CHANNEL SLOPE =  0.1628
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.096
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =  0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.40
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   2.24
  Tc(MIN.) =   8.67
  SUBAREA AREA(ACRES) =   10.40       SUBAREA RUNOFF(CFS) =   19.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.311
  TOTAL AREA(ACRES) =      10.9         PEAK FLOW RATE(CFS) =      20.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   6.68
  LONGEST FLOWPATH FROM NODE    214.00 TO NODE    210.00 =    905.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     210.00 TO NODE     202.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
--------------------------------------------------------------------------
  ELEVATION DATA: UPSTREAM(FEET) =    690.00  DOWNSTREAM(FEET) =    638.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   990.00   CHANNEL SLOPE =  0.0525
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.102
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =  0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.99
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   2.76
  Tc(MIN.) =  11.43
  SUBAREA AREA(ACRES) =   31.90       SUBAREA RUNOFF(CFS) =   50.45
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.310
  TOTAL AREA(ACRES) =      42.8         PEAK FLOW RATE(CFS) =      67.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   6.73
  LONGEST FLOWPATH FROM NODE    214.00 TO NODE    202.00 =   1895.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     210.00 TO NODE     202.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.43
 RAINFALL INTENSITY(INCH/HR) =   5.10
 TOTAL STREAM AREA(ACRES) =    42.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     67.71

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
----------------------------------------------------------------------------
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   170.00
 UPSTREAM ELEVATION(FEET) =    888.00
 DOWNSTREAM ELEVATION(FEET) =    828.00
 ELEVATION DIFFERENCE(FEET) =     60.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
 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) =  7.210
 SUBAREA RUNOFF(CFS) =      0.71
 TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.71

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
----------------------------------------------------------------------------
 ELEVATION DATA: UPSTREAM(FEET) =    828.00  DOWNSTREAM(FEET) =    680.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00   CHANNEL SLOPE =  0.2426
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.881
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.05
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.09
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   2.48
 Tc(MIN.) =    9.17
 SUBAREA AREA(ACRES) =     3.73      SUBAREA RUNOFF(CFS) =     6.58
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =      4.1       PEAK FLOW RATE(CFS) =      7.16

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   5.07
 LONGEST FLOWPATH FROM NODE    208.00 TO NODE    204.00 =     780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
----------------------------------------------------------------------------
 ELEVATION DATA: UPSTREAM(FEET) =    680.00  DOWNSTREAM(FEET) =    638.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.0771
```



```
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.064
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.80
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   2.39
 Tc(MIN.) =   11.56
 SUBAREA AREA(ACRES) =     1.30      SUBAREA RUNOFF(CFS) =     1.97
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =      5.4       PEAK FLOW RATE(CFS) =      8.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.79
 LONGEST FLOWPATH FROM NODE    208.00 TO NODE    202.00 =    1325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    202.00 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
----------------------------------------------------------------------------
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.56
 RAINFALL INTENSITY(INCH/HR) =   5.06
 TOTAL STREAM AREA(ACRES) =     5.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.14

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        67.71      11.43        5.102         42.78
     2         8.14      11.56        5.064          5.36

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF        Tc       INTENSITY
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)
     1        75.76      11.43        5.102
     2        75.35      11.56        5.064

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      75.76   Tc(MIN.) =   11.43
 TOTAL AREA(ACRES) =      48.1
 LONGEST FLOWPATH FROM NODE    214.00 TO NODE    202.00 =    1895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    200.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
----------------------------------------------------------------------------
 ELEVATION DATA: UPSTREAM(FEET) =    638.00  DOWNSTREAM(FEET) =    578.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1525.00   CHANNEL SLOPE =  0.0446
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.284
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
```

```
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.14
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.15
 AVERAGE FLOW DEPTH(FEET) =   0.96   TRAVEL TIME(MIN.) =   3.55
 Tc(MIN.) =   14.98
 SUBAREA AREA(ACRES) =    32.90       SUBAREA RUNOFF(CFS) =   50.74
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.330
 TOTAL AREA(ACRES) =       81.0          PEAK FLOW RATE(CFS) =     114.49

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.02   FLOW VELOCITY(FEET/SEC.) =   7.44
 LONGEST FLOWPATH FROM NODE    214.00 TO NODE    200.00 =    3420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    200.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
----------------------------------------------------------------------------
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.284
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5100
 S.C.S. CURVE NUMBER (AMC II) =  76
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3316
 SUBAREA AREA(ACRES) =    0.85   SUBAREA RUNOFF(CFS) =     1.86
 TOTAL AREA(ACRES) =       81.9   TOTAL RUNOFF(CFS) =     116.35
 TC(MIN.) =   14.98

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    200.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
----------------------------------------------------------------------------
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.284
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3316
 SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOFF(CFS) =     0.00
 TOTAL AREA(ACRES) =       81.9   TOTAL RUNOFF(CFS) =     116.35
 TC(MIN.) =   14.98
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       81.9  TC(MIN.) =     14.98
 PEAK FLOW RATE(CFS)   =     116.35
============================================================================

 END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* HARMONY GROVE                                                           *
* JN 4095.01                                                              *
* BASIN 300 - EXISTING CONDITION - 100-YEAR STORM EVENT                   *
 **************************************************************************

  FILE NAME: S300E100.DAT
  TIME/DATE OF STUDY: 08:18 01/21/2015
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  ===================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE     304.00 TO NODE     302.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  UPSTREAM ELEVATION(FEET) =   812.00
  DOWNSTREAM ELEVATION(FEET) =   757.00
  ELEVATION DIFFERENCE(FEET) =    55.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   6.684
  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 Ic CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.71

**************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     300.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   757.00  DOWNSTREAM(FEET) =   606.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1090.00   CHANNEL SLOPE =  0.1385
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.562
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     13.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.49
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   3.31
  Tc(MIN.) =   10.00
  SUBAREA AREA(ACRES) =   15.40      SUBAREA RUNOFF(CFS) =   25.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =      15.7       PEAK FLOW RATE(CFS) =     26.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   6.81
  LONGEST FLOWPATH FROM NODE    304.00 TO NODE    300.00 =   1350.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     300.00 TO NODE     300.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.562
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOFF(CFS) =    0.00
  TOTAL AREA(ACRES) =      15.7   TOTAL RUNOFF(CFS) =     26.25
  TC(MIN.) =   10.00
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      15.7  TC(MIN.) =     10.00
  PEAK FLOW RATE(CFS)   =     26.25
==========================================================================
```

```
================================================================================
  END OF RATIONAL METHOD ANALYSIS

```

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

          RATIONAL METHOD HYOROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN OTEGO COUNTY FLOOD CONTROL DTSTRTCT
                        2003,198S,T98T HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
           Ver. T9.0 Release Date: 06/0T/20T2  License TD TS09

                        Analysis prepared by:




 ************************** DESCRTPTTON OF STUDY **************************
* HARMONY GROVE                                                           *
* 3N 409S.0T                                                              *
* BASTN 400 - EXTSTTNG CONDTTTON - T00-YEAR STORM EVENT                   *
 *************************************************************************

  FTLE NAME: S400E100.DAT
  TIME/DATE OF STUOY: 09:36 0T/2T/20TS
-------------------------------------------------------------------------
  USER SPECTFTEO HYOROLOGY AND HYDRAULIC MOOEL INFORMATTON:
-------------------------------------------------------------------------
  2003 SAN OTEGO MANUAL CRTTERTA

  USER SPECIFTED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATTON PRECTPTTATTON (INCHES) =   3.300
  SPECIFIED MINTMUM PIPE SIZE(TNCH) =  T8.00
  SPECTFTED PERCENT OF GRADTENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DTEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATTONAL METHOO
  NOTE: USE MOOIFIEO RATTONAL METHOO PROCEOURES FOR CONFLUENCE ANALYSTS
  *USER-OEFTNEO STREET-SECTIONS FOR COUPLED PTPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRTES:  MANNTNG
     WIOTH  CROSSFALL  TN-  / OUT-/PARK-  HEIGHT  WTOTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIOE / STOE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  =======  =====  =====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.03T3 0.T67 0.0TS0

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

**************************************************************************
  FLOW PROCESS FROM NODE    472.00 TO NODE    470.00 IS COOE =  2T
--------------------------------------------------------------------------
  >>>>>RATTONAL METHOO TNITTAL SUBAREA ANALYSTS<<<<<
==========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFTCIENT = .3S00
  SOIL CLASSTFTCATION TS "D"
  S.C.S. CURVE NUMBER (AMC IT) =  88
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  UPSTREAM ELEVATTON(FEET) =    983.00
  OOWNSTREAM ELEVATTON(FEET) =    875.00
  ELEVATTON DTFFERENCE(FEET) =    108.00
  SUBAREA OVERLAND TTME OF FLOW(MTN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH TS GREATER THAN
           THE MAXTMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-T8 of Hydrology Manual)
           THE MAXTMUM OVERLAND FLOW LENGTH IS USEO IN Tc CALCULATION!
   T00 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.S16
  SUBAREA RUNOFF(CFS) =      3.42
  TOTAL AREA(ACRES) =      T.30   TOTAL RUNOFF(CFS) =      3.42

**************************************************************************
  FLOW PROCESS FROM NODE    470.00 TO NODE    468.00 TS CODE =  ST
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOTDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTTME THRU SUBAREA (EXTSTTNG ELEMENT)<<<<<
==========================================================================
  ELEVATTON OATA: UPSTREAM(FEET) =    875.00  OOWNSTREAM(FEET) =    652.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  T480.00   CHANNEL SLOPE =  0.1507
  CHANNEL BASE(FEET) =   T0.00   "Z" FACTOR =   S.000
  MANNTNG'S FACTOR = 0.03S   MAXTMUM OEPTH(FEET) =   1.00
   T00 YEAR RATNFALL TNTENSTTY(TNCH/HOUR) =  S.694
  *USER SPECTFTEO(SUBAREA):
  NATURAL OESERT LANOSCAPTNG RUNOFF COEFFTCIENT = .3S00
  S.C.S. CURVE NUMBER (AMC TT) =  88
  TRAVEL TIME COMPUTED USTNG ESTTMATEO FLOW(CFS) =     29.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.3T
  AVERAGE FLOW OEPTH(FEET) =   0.3S   TRAVEL TTME(MTN.) =   3.37
  Tc(MTN.) =    9.64
  SUBAREA AREA(ACRES) =    2S.90       SUBAREA RUNOFF(CFS) =   S1.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.3S0
  TOTAL AREA(ACRES) =      27.2        PEAK FLOW RATE(CFS) =     S4.20

  END OF SUBAREA CHANNEL FLOW HYDRAULTCS:
  OEPTH(FEET) =  0.49   FLOW VELOCTTY(FEET/SEC.) =   8.99
  LONGEST FLOWPATH FROM NOOE    472.00 TO NODE    468.00 =    T700.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NOOE    470.00 TO NODE    468.00 TS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE TNOEPENOENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR TNOEPENOENT STREAM  T ARE:
  TTME OF CONCENTRATTON(MTN.) =    9.64
  RAINFALL INTENSITY(INCH/HR) =   S.69
  TOTAL STREAM AREA(ACRES) =    27.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     S4.20

**************************************************************************
  FLOW PROCESS FROM NODE    466.00 TO NOOE    464.00 TS CODE =  2T
--------------------------------------------------------------------------
  >>>>>RATTONAL METHOO TNITTAL SUBAREA ANALYSTS<<<<<
==========================================================================
  NATURAL DESERT LANDSCAPTNG RUNOFF COEFFTCTENT = .3S00
```

```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
 UPSTREAM ELEVATION(FEET) =    995.00
 DOWNSTREAM ELEVATION(FEET) =    875.00
 ELEVATION DIFFERENCE(FEET) =    120.00
 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) =  7.516
 SUBAREA RUNOFF(CFS) =      2.42
 TOTAL AREA(ACRES) =      0.92   TOTAL RUNOFF(CFS) =      2.42

****************************************************************************
 FLOW PROCESS FROM NODE    464.00 TO NODE    468.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    875.00  DOWNSTREAM(FEET) =    652.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.2973
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.284
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
 AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   2.00
 Tc(MIN.) =    8.27
 SUBAREA AREA(ACRES) =     6.88       SUBAREA RUNOFF(CFS) =   15.13
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       7.8         PEAK FLOW RATE(CFS) =      17.16

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   7.67
 LONGEST FLOWPATH FROM NODE    466.00 TO NODE    468.00 =     950.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    464.00 TO NODE    468.00 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.) =    8.27
 RAINFALL INTENSITY(INCH/HR) =   6.28
 TOTAL STREAM AREA(ACRES) =     7.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.16

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



```
      1       54.20     9.64        5.694         27.20
      2       17.16     8.27        6.284          7.80

 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      63.67     8.27        6.284
      2      69.75     9.64        5.694

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      69.75   Tc(MIN.) =    9.64
 TOTAL AREA(ACRES) =      35.0
 LONGEST FLOWPATH FROM NODE    472.00 TO NODE    468.00 =    1700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    468.00 TO NODE    462.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    652.00  DOWNSTREAM(FEET) =    618.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   480.00   CHANNEL SLOPE =  0.0708
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.327
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3100
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      72.93
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.63
 AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   1.05
 Tc(MIN.) =   10.69
 SUBAREA AREA(ACRES) =     3.85       SUBAREA RUNOFF(CFS) =    6.36
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.345
 TOTAL AREA(ACRES) =      38.8         PEAK FLOW RATE(CFS) =      71.61

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   7.59
 LONGEST FLOWPATH FROM NODE    472.00 TO NODE    462.00 =    2180.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    468.00 TO NODE    462.00 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.) =   10.69
 RAINFALL INTENSITY(INCH/HR) =   5.33
 TOTAL STREAM AREA(ACRES) =    38.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.61

****************************************************************************
 FLOW PROCESS FROM NODE    460.00 TO NODE    458.00 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) =   180.00
  UPSTREAM ELEVATION(FEET) =   1324.00
  DOWNSTREAM ELEVATION(FEET) =   1200.00
  ELEVATION DIFFERENCE(FEET) =    124.00
  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) =  7.516
  SUBAREA RUNOFF(CFS) =      4.76
  TOTAL AREA(ACRES) =      1.81   TOTAL RUNOFF(CFS) =      4.76

****************************************************************************
  FLOW PROCESS FROM NODE    458.00 TO NODE    462.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1200.00  DOWNSTREAM(FEET) =    618.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2720.00   CHANNEL SLOPE =  0.2140
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.099
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.77
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   5.17
  Tc(MIN.) =   11.43
  SUBAREA AREA(ACRES) =    34.50       SUBAREA RUNOFF(CFS) =   59.82
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.340
  TOTAL AREA(ACRES) =      36.3         PEAK FLOW RATE(CFS) =      63.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =  10.65
  LONGEST FLOWPATH FROM NODE    460.00 TO NODE    462.00 =    2900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    458.00 TO NODE    462.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.43
  RAINFALL INTENSITY(INCH/HR) =   5.10
  TOTAL STREAM AREA(ACRES) =    36.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     63.05
```



```
  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        71.61     10.69        5.327        38.85
      2        63.05     11.43        5.099        36.31

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF        Tc      INTENSITY
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
      1       130.54     10.69        5.327
      2       131.60     11.43        5.099

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.60   Tc(MIN.) =   11.43
  TOTAL AREA(ACRES) =      75.2
  LONGEST FLOWPATH FROM NODE    460.00 TO NODE    462.00 =    2900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    462.00 TO NODE    400.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    606.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   170.00   CHANNEL SLOPE =  0.0706
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.012
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     132.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.14
  AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =   11.74
  SUBAREA AREA(ACRES) =     0.95       SUBAREA RUNOFF(CFS) =    1.48
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.343
  TOTAL AREA(ACRES) =      76.1         PEAK FLOW RATE(CFS) =     131.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   9.11
  LONGEST FLOWPATH FROM NODE    460.00 TO NODE    400.00 =    3070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    400.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.012
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3429
```

```
  SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOFF(CFS) =    0.00
  TOTAL AREA(ACRES) =      76.1   TOTAL RUNOFF(CFS) =    131.60
  TC(MIN.) =   11.74
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      76.1  TC(MIN.) =     11.74
  PEAK FLOW RATE(CFS)   =     131.60
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* HARMONY GROVE VILLAGE SOUTH                                             *
* JN 4095                                                                 *
* BASIN 500 - PROPOSED CONDITION - 100-YEAR STORM EVENT                   *
 *************************************************************************

  FILE NAME: S500P100.DAT
  TIME/DATE OF STUDY: 10:58 11/11/2015
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ==========  ================  =======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.40 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  0.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*****************************************************************************
  FLOW PROCESS FROM NODE    506.00 TO NODE    504.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =   589.00
  DOWNSTREAM ELEVATION(FEET) =   586.00
  ELEVATION DIFFERENCE(FEET) =     3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   2.568
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     0.38
  TOTAL AREA(ACRES) =     0.05   TOTAL RUNOFF(CFS) =     0.38

*****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    502.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  574.00
  STREET LENGTH(FEET) =  740.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     2.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =   0.80
  STREET FLOW TRAVEL TIME(MIN.) =  4.76   Tc(MIN.) =   7.33
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.795
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =   0.57     SUBAREA RUNOFF(CFS) =   3.37
  TOTAL AREA(ACRES) =      0.6     PEAK FLOW RATE(CFS) =     3.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    506.00 TO NODE    502.00 =    840.00 FEET.

*****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    502.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OE STREAMS =  2
  CONELUENCE VALUES USED EOR INDEPENDENT STREAM  1 ARE:
  TIME OE CONCENTRATION(MIN.) =    7.33
  RAINEALL INTENSITY(INCH/HR) =   6.80
  TOTAL STREAM AREA(ACRES) =     0.62
  PEAK ELOW RATE(CES) AT CONELUENCE =      3.67

****************************************************************************
  ELOW PROCE55 EROM NOOE    514.00 TO NOOE    512.00 IS COOE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL 5U8AREA ANALY5IS<<<<<
============================================================================
  5TREET5 & ROAD5 (CURB5/5TORM DRAINS) RUNOEE COEEEICIENT = .8700
  SOIL CLA55IFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA ELOW-LENGTH(EEET) =   100.00
  UP5TREAM ELEVATION(FEET) =    589.00
  DOWN5TREAM ELEVATION(FEET) =    586.00
  ELEVATION OIEEERENCE(EEET) =      3.00
  5UBAREA OVERLAND TIME OE ELOW(MIN.) =    2.568
  WARNING: INITIAL 5U8AREA ELOW PATH LENGTH I5 GREATER THAN
           THE MAXIMUM OVERLAND ELOW LENGTH =    80.00
           (Reference: Table 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH I5 U5ED IN Tc CALCULATION!
   100 YEAR RAINEALL INTEN5ITY(INCH/HOUR) =  8.695
  NOTE: RAINEALL INTEN5ITY I5 8A5ED ON Tc = 5-MINUTE.
  5UBAREA RUNOFF(CF5) =      0.45
  TOTAL AREA(ACRE5) =      0.06   TOTAL RUNOEE(CF5) =      0.45

****************************************************************************
  FLOW PROCE55 FROM NOOE    512.00 TO NOOE    510.00 I5 CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE 5TREET ELOW TRAVEL TIME THRU 5UBAREA<<<<<
  >>>>>(5TREET TABLE 5ECTION #  1 U5ED)<<<<<
============================================================================
  UP5TREAM ELEVATION(FEET) =  586.00  DOWN5TREAM ELEVATION(EEET) =  574.00
  5TREET LENGTH(EEET) =   740.00   CUR8 HEIGHT(INCHE5) =  6.0
  5TREET HALEWIDTH(EEET) = 30.00

  DI5TANCE EROM CROWN TO CRO55EALL GRADEBREAK(FEET) =  20.00
  IN5IDE 5TREET CRO55FALL(DECIMAL) =  0.018
  OUT5IDE 5TREET CRO55FALL(DECIMAL) =  0.018

  5PECIFIED NUMBER OE HALE5TREET5 CARRYING RUNOFF =  1
  5TREET PARKWAY CRO55FALL(DECIMAL) =  0.020
  Manning's ERICTION EACTOR for 5treetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Elow Section =   0.0200

    **TRAVEL TIME COMPUTED U5ING E5TIMATED ELOW(CE5) =       2.72
    5TREETELOW MODEL RE5ULT5 U5ING E5TIMATED FLOW:
    5TREET ELOW DEPTH(EEET) =  0.33
    HALE5TREET ELOOD WIDTH(EEET) =    9.47
    AVERAGE FLOW VELOCITY(EEET/5EC.) =    2.74
    PRODUCT OF DEPTH&VELOCITY(ET*ET/5EC.) =    0.91
  5TREET ELOW TRAVEL TIME(MIN.) =   4.51   Tc(MIN.) =    7.07
   100 YEAR RAINFALL INTEN5ITY(INCH/HOUR) =  6.951
```



```
  5TREET5 & ROAD5 (CURB5/5TORM DRAINS) RUNOFF COEFFICIENT = .8700
  5OIL CLA55IFICATION I5 "C"
  5.C.5. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOEE COEEFICIENT =  0.870
  5UBAREA AREA(ACRE5) =    0.74      5UBAREA RUNOEE(CE5) =    4.47
  TOTAL AREA(ACRE5) =       0.8        PEAK FLOW RATE(CE5) =       4.84

  END OF 5U8AREA 5TREET ELOW HYORAULICS:
  DEPTH(EEET) = 0.38   HALE5TREET ELOOD WIDTH(EEET) =  12.38
  ELOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY(FT*ET/SEC.) =   1.19
  LONGE5T ELOWPATH EROM NOOE    514.00 TO NOOE    510.00 =     840.00 FEET.

****************************************************************************
  FLOW PROCE55 FROM NOOE    510.00 TO NODE    502.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU 5UBAREA<<<<<
  >>>>>U5ING COMPUTER-E5TIMATED PIPE5IZE (NON-PRE55URE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UP5TREAM(EEET) =   570.00  DOWN5TREAM(FEET) =   569.40
  ELOW LENGTH(FEET) =    61.50   MANNING'5 N =  0.013
  E5TIMATED PIPE DIAMETER(INCH) INCREA5ED TO 18.000
  DEPTH OF ELOW IN  18.0 INCH PIPE I5   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  E5TIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OE PIPES =   1
  PIPE-ELOW(CE5) =       4.84
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.26
  LONGE5T ELOWPATH FROM NODE    514.00 TO NODE    502.00 =     901.50 EEET.

****************************************************************************
  ELOW PROCE55 FROM NOOE    512.00 TO NODE    510.00 I5 CODE =   1
----------------------------------------------------------------------------
  >>>>>DE5IGNATE INDEPENDENT 5TREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOU5 CONELUENCED 5TREAM VALUE5<<<<<
============================================================================
  TOTAL NUMBER OE 5TREAM5 =  2
  CONELUENCE VALUES U5ED EOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.26
  RAINEALL INTEN5ITY(INCH/HR) =   6.84
  TOTAL 5TREAM AREA(ACRE5) =     0.80
  PEAK FLOW RATE(CFS) AT CONELUENCE =      4.84

  ** CONFLUENCE DATA **
  5TREAM      RUNOFF       Tc      INTEN5ITY      AREA
  NUMBER       (CE5)     (MIN.)   (INCH/HOUR)    (ACRE)
     1          3.67      7.33        6.795         0.62
     2          4.84      7.26        6.836         0.80

  RAINEALL INTEN5ITY AND TIME OE CONCENTRATION RATIO
  CONELUENCE FORMULA U5ED FOR  2 STREAM5.

  ** PEAK FLOW RATE TABLE **
  5TREAM      RUNOEE       Tc      INTEN5ITY
  NUMBER       (CE5)     (MIN.)   (INCH/HOUR)
     1          8.47      7.26        6.836
     2          8.47      7.33        6.795

  COMPUTED CONELUENCE E5TIMATE5 ARE AS EOLLOW5:
```

```
 PEAK FLOW RATE(CFS) =       8.47   Tc(MIN.) =    7.33
 TOTAL AREA(ACRES) =        1.4
 LONGEST FLOWPATH FROM NODE    S14.00 TO NODE    S10.00 =     901.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    S02.00 TO NODE    S00.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USTNG COMPUTER-ESTTMATED PTPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATTON DATA: UPSTREAM(FEET) =   S69.40  DOWNSTREAM(FEET) =   S66.00
 FLOW LENGTH(FEET) =    20.00   MANNTNG'S N =  0.013
 ESTIMATED PTPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 TNCH PIPE TS   S.S INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.31
 ESTTMATED PTPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.47
 PIPE TRAVEL TIME(MTN.) =   0.02    Tc(MIN.) =    7.35
 LONGEST FLOWPATH FROM NODE    S14.00 TO NODE    S00.00 =     921.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    S00.00 TO NODE    S00.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSTTY(INCH/HOUR) =  6.785
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOTL CLASSIFICATION TS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOFF(CFS) =    0.00
 TOTAL AREA(ACRES) =       1.4   TOTAL RUNOFF(CFS) =      8.47
 TC(MIN.) =    7.35
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.4  TC(MIN.) =      7.35
 PEAK FLOW RATE(CFS)   =       8.47
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 4

100-year Proposed Conditions Rational Method Computer Output

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                     Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* HARMONY GROVE                                                           *
* JN 4095                                                                 *
* SUBSIN 100-PROPOSED CONDITION-100-YEAR STORM EVENT                      *
 ************************************************************************

  FILE NAME: S100P100.DAT
  TIME/DATE OF STUDY: 15:13 11/10/2015
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========== ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE     108.00 TO NODE     106.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  UPSTREAM ELEVATION(FEET) =   1020.00
  DOWNSTREAM ELEVATION(FEET) =    966.00
  ELEVATION DIFFERENCE(FEET) =     54.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  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) =  7.210
  SUBAREA RUNOFF(CFS) =      2.16
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =      2.16

************************************************************************
  FLOW PROCESS FROM NODE     106.00 TO NODE     104.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    966.00  DOWNSTREAM(FEET) =    720.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1400.00   CHANNEL SLOPE =  0.1757
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.356
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.97
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   3.91
  Tc(MIN.) =   10.60
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   23.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =      15.8         PEAK FLOW RATE(CFS) =     25.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOW VELOCITY(FEET/SEC.) =   7.35
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    104.00 =    1600.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     104.00 TO NODE     102.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   720.00  DOWNSTREAM(FEET) =   682.00
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     25.39
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    102.00 =    1850.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     102.00 TO NODE     100.00 IS CODE =  51
------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    682.00  DOWNSTREAM(FEET) =    390.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   125.00   CHANNEL SLOPE =  2.3360
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.260
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.78
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.12
  Tc(MIN.) =   10.90
  SUBAREA AREA(ACRES) =     1.58       SUBAREA RUNOFF(CFS) =    2.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       17.4         PEAK FLOW RATE(CFS) =      27.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =  17.28
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    100.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.260
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOFF(CFS) =    0.00
  TOTAL AREA(ACRES) =       17.4   TOTAL RUNOFF(CFS) =      27.43
  TC(MIN.) =   10.90
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       17.4  TC(MIN.) =     10.90
  PEAK FLOW RATE(CFS)   =      27.43
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYOROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN OIEGO COUNTY FLOOD CONTROL OISTRICT
                       2003,198S,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Oate: 06/01/2012  License IO 1S09

                       Analysis prepared by:




 ************************** OESCRIPTION OF STUOY *************************
* HARMONY GROVE                                                          *
* JN 409S                                                                *
* BASIN 200 - PROPOSEO CONDITION - 100-YR STORM EVENT                    *
 ************************************************************************

  FILE NAME: S200P100.OAT
  TIME/OATE OF STUDY: 09:1S 11/11/201S
----------------------------------------------------------------------------
  USER SPECIFIEO HYOROLOGY ANO HYORAULIC MOOEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN OIEGO MANUAL CRITERIA

  USER SPECIFIEO STORM EVENT(YEAR) = 100.00
  6-HOUR OURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIEO MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIEO PERCENT OF GRAOIENTS(OECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN OIEGO HYOROLOGY MANUAL "C"-VALUES USEO FOR RATIONAL METHOO
  NOTE: USE MOOIFIEO RATIONAL METHOO PROCEOURES FOR CONFLUENCE ANALYSIS
  *USER-OEFINEO STREET-SECTIONS FOR COUPLED PIPEFLOW ANO STREETFLOW MOOEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIOTH  CROSSFALL  IN-  / OUT-/PARK-   HEIGHT  WIOTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIOE / SIOE/ WAY     (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.S0    2.00 0.0313 0.167 0.01S0

  GLOBAL STREET FLOW-OEPTH CONSTRAINTS:
    1. Relative Flow-Oepth =  0.40 FEET
       as (Maximum Allowable Street Flow Oepth) - (Top-of-Curb)
    2. (Oepth)*(Velocity) Constraint =  0.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NOOE    286.00 TO NOOE    284.00 IS COOE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOO INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIOENTIAL (14.S OU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  120.00
  UPSTREAM ELEVATION(FEET) =   697.00
  OOWNSTREAM ELEVATION(FEET) =   696.00
  ELEVATION OIFFERENCE(FEET) =     1.00
  SUBAREA OVERLANO TIME OF FLOW(MIN.) =   7.408
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLANO FLOW LENGTH =   60.00
           (Reference: Table 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLANO FLOW LENGTH IS USEO IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.747
  SUBAREA RUNOFF(CFS) =     0.85
  TOTAL AREA(ACRES) =     0.21   TOTAL RUNOFF(CFS) =     0.8S

****************************************************************************
  FLOW PROCESS FROM NOOE    284.00 TO NOOE    282.00 IS COOE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USEO)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  696.00  OOWNSTREAM ELEVATION(FEET) =  690.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIOTH(FEET) = 30.00

  OISTANCE FROM CROWN TO CROSSFALL GRAOEBREAK(FEET) =  20.00
  INSIOE STREET CROSSFALL(OECIMAL) =  0.018
  OUTSIOE STREET CROSSFALL(OECIMAL) =  0.018

  SPECIFIEO NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(OECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTEO USING ESTIMATEO FLOW(CFS) =       2.28
    STREETFLOW MOOEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW OEPTH(FEET) =  0.29
    HALFSTREET FLOOO WIOTH(FEET) =    7.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PROOUCT OF OEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    8.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.2S8
  RESIOENTIAL (14.S OU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.8S
  TOTAL AREA(ACRES) =       1.0       PEAK FLOW RATE(CFS) =       3.64

  ENO OF SUBAREA STREET FLOW HYORAULICS:
  OEPTH(FEET) = 0.33   HALFSTREET FLOOO WIOTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  3.78   OEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NOOE    286.00 TO NOOE    282.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NOOE    282.00 TO NOOE    280.00 IS COOE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATEO PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   687.00  DOWNSTREAM(FEET) =   686.00
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.64
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    280.00 =     315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   686.00  DOWNSTREAM(FEET) =   673.00
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.64
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    266.00 =     665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   5.94
  TOTAL STREAM AREA(ACRES) =     0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.64

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    270.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    697.50
  DOWNSTREAM ELEVATION(FEET) =    696.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.695
  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) =  7.203
```



```
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    268.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  696.00  DOWNSTREAM ELEVATION(FEET) =  677.00
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    8.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.116
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    4.11
  TOTAL AREA(ACRES) =       1.3       PEAK FLOW RATE(CFS) =       4.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE    272.00 TO NODE    268.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    268.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   674.00  DOWNSTREAM(FEET) =   673.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.66
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.66
  LONGEST FLOWPATH FROM NODE    272.00 TO NODE    266.00 =     580.00 FEET.
```

```
**************************************************************************
 FLOW PROCESS FROM NODE    268.00 TO NODE    266.00 IS CODE =  1
--------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.66
 RAINFALL INTENSITY(INCH/HR) =   6.10
 TOTAL STREAM AREA(ACRES) =     1.27
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.66

**************************************************************************
 FLOW PROCESS FROM NODE    278.00 TO NODE    276.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
 UPSTREAM ELEVATION(FEET) =    688.00
 DOWNSTREAM ELEVATION(FEET) =    687.00
 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) =  6.614
 SUBAREA RUNOFF(CFS) =      1.03
 TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      1.03

**************************************************************************
 FLOW PROCESS FROM NODE    276.00 TO NODE    274.00 IS CODE =  62
--------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
 UPSTREAM ELEVATION(FEET) =  687.00  DOWNSTREAM ELEVATION(FEET) =  677.00
 STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =    9.91
```



```
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    9.07
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.920
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    6.15
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.77
 FLOW VELOCITY(FEET/SEC.) =  4.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE    278.00 TO NODE    274.00 =     480.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    274.00 TO NODE    266.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   674.00  DOWNSTREAM(FEET) =   673.00
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 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.) =  18.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.07
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    9.08
 LONGEST FLOWPATH FROM NODE    278.00 TO NODE    266.00 =     485.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    274.00 TO NODE    266.00 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.) =    9.08
 RAINFALL INTENSITY(INCH/HR) =   5.92
 TOTAL STREAM AREA(ACRES) =     1.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.07

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1          3.64      9.03        5.939         0.97
    2          4.66      8.66        6.100         1.27
    3          7.07      9.08        5.918         1.99

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

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

```
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1        14.90      8.66        6.100
    2        15.21      9.03        5.939
    3        15.22      9.08        5.918

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.22   Tc(MIN.) =    9.08
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE    286.00 TO NODE    266.00 =     665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    266.00 TO NODE    252.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   673.00  DOWNSTREAM(FEET) =   657.00
 FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.10
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.22
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    9.52
 LONGEST FLOWPATH FROM NODE    286.00 TO NODE    252.00 =    1015.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    266.00 TO NODE    252.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.52
 RAINFALL INTENSITY(INCH/HR) =   5.74
 TOTAL STREAM AREA(ACRES) =     4.23
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.22

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    256.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    677.00
 DOWNSTREAM ELEVATION(FEET) =    675.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.389
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.423
 SUBAREA RUNOFF(CFS) =      0.89
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.89
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    256.00 TO NODE    254.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  675.00  DOWNSTREAM ELEVATION(FEET) =  661.00
 STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.09
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =    7.39
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.757
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    2.76
 TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.57

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.97
 FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
 LONGEST FLOWPATH FROM NODE    258.00 TO NODE    254.00 =     360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    252.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   658.00  DOWNSTREAM(FEET) =   657.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.57
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.43
 LONGEST FLOWPATH FROM NODE    258.00 TO NODE    252.00 =     380.00 FEET.

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

```
 FLOW PROCESS FROM NODE     254.00 TO NODE     252.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =     7.43
 RAINFALL INTENSITY(INCH/HR) =   6.74
 TOTAL STREAM AREA(ACRES) =      0.88
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.57

****************************************************************************
 FLOW PROCESS FROM NODE     264.00 TO NODE     262.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
 UPSTREAM ELEVATION(FEET) =    675.00
 DOWNSTREAM ELEVATION(FEET) =    674.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.717
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    53.75
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.572
 SUBAREA RUNOFF(CFS) =      1.06
 TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.06

****************************************************************************
 FLOW PROCESS FROM NODE     262.00 TO NODE     260.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  674.00  DOWNSTREAM ELEVATION(FEET) =  661.00
 STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.24
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =    9.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.27
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.42
```



```
 STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    9.01
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.949
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.78      SUBAREA RUNOFF(CFS) =    6.35
 TOTAL AREA(ACRES) =       2.0       PEAK FLOW RATE(CFS) =       7.32

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.23
 FLOW VELOCITY(FEET/SEC.) =  4.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    260.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     260.00 TO NODE     252.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   658.00  DOWNSTREAM(FEET) =   657.00
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.62
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.32
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    9.01
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    252.00 =     495.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     260.00 TO NODE     252.00 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.) =    9.01
 RAINFALL INTENSITY(INCH/HR) =   5.95
 TOTAL STREAM AREA(ACRES) =      2.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.32

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         15.22      9.52        5.738         4.23
    2          3.57      7.43        6.735         0.88
    3          7.32      9.01        5.947         2.05

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
    1         22.57      7.43        6.735
```

```
     2       25.15     9.01       5.947
     3       25.32     9.52       5.738

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.32   Tc(MIN.) =    9.52
  TOTAL AREA(ACRES) =        7.2
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    252.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   657.00  DOWNSTREAM(FEET) =   639.00
  FLOW LENGTH(FEET) =   336.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.32
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    238.00 =    1351.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   5.60
  TOTAL STREAM AREA(ACRES) =     7.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.32

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  UPSTREAM ELEVATION(FEET) =    655.00
  DOWNSTREAM ELEVATION(FEET) =    654.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.756
  WARNING:  INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
            THE MAXIMUM OVERLAND FLOW LENGTH =    53.18
            (Reference: Table 3-18 of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.551
  SUBAREA RUNOFF(CFS) =      1.81
  TOTAL AREA(ACRES) =      0.46   TOTAL RUNOFF(CFS) =      1.81

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



```
  FLOW PROCESS FROM NODE    242.00 TO NODE    240.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  654.00  DOWNSTREAM ELEVATION(FEET) =  643.00
  STREET LENGTH(FEET) =   180.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    6.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   0.48   Tc(MIN.) =    8.23
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.303
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    2.95
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       4.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.53
  FLOW VELOCITY(FEET/SEC.) =  5.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    240.00 =     315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   640.00  DOWNSTREAM(FEET) =   639.00
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.69
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE    244.00 TO NODE    238.00 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    238.00 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.) = 8.24
 RAINFALL INTENSITY(INCH/HR) = 6.30
 TOTAL STREAM AREA(ACRES) = 1.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.69

 ** CONFLUENCE DATA **
 STREAM    RUNOFF      Tc      INTENSITY     AREA
 NUMBER    (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1      25.32      9.88       5.604        7.16
    2       4.69      8.24       6.300        1.24

 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      27.21      8.24       6.300
    2      29.49      9.88       5.604

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 29.49  Tc(MIN.) = 9.88
 TOTAL AREA(ACRES) = 8.4
 LONGEST FLOWPATH FROM NODE 286.00 TO NODE 238.00 = 1351.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE 240.00 TO NODE 238.00 IS CODE = 10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE 240.00 TO NODE 238.00 IS CODE = 13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE 250.00 TO NODE 248.00 IS CODE = 21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 76
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 140.00
 UPSTREAM ELEVATION(FEET) = 716.00
 DOWNSTREAM ELEVATION(FEET) = 660.00
 ELEVATION DIFFERENCE(FEET) = 56.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.183
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH = 100.00
```



```
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.582
 SUBAREA RUNOFF(CFS) = 0.38
 TOTAL AREA(ACRES) = 0.14  TOTAL RUNOFF(CFS) = 0.38

****************************************************************************
 FLOW PROCESS FROM NODE 248.00 TO NODE 246.00 IS CODE = 62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION # 1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 660.00  DOWNSTREAM ELEVATION(FEET) = 643.00
 STREET LENGTH(FEET) = 290.00  CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.71
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) = 0.25
  HALFSTREET FLOOD WIDTH(FEET) = 4.66
  AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.41
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
 STREET FLOW TRAVEL TIME(MIN.) = 1.10  Tc(MIN.) = 7.28
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.824
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.747
 SUBAREA AREA(ACRES) = 0.44  SUBAREA RUNOFF(CFS) = 2.61
 TOTAL AREA(ACRES) = 0.6  PEAK FLOW RATE(CFS) = 2.96

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29  HALFSTREET FLOOD WIDTH(FEET) = 7.03
 FLOW VELOCITY(FEET/SEC.) = 4.65  DEPTH*VELOCITY(FT*FT/SEC.) = 1.34
 LONGEST FLOWPATH FROM NODE 250.00 TO NODE 246.00 = 430.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE 248.00 TO NODE 246.00 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.) = 7.28
 RAINFALL INTENSITY(INCH/HR) = 6.82
 TOTAL STREAM AREA(ACRES) = 0.58
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.96
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    247.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
 UPSTREAM ELEVATION(FEET) =    640.00
 DOWNSTREAM ELEVATION(FEET) =    639.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.709
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    52.22
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.022
 SUBAREA RUNOFF(CFS) =      0.14
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
 FLOW PROCESS FROM NODE    247.00 TO NODE    246.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    639.00  DOWNSTREAM(FEET) =    638.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.0031
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.385
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.55
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   9.88
 Tc(MIN.) =   21.59
 SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    0.97
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       1.07

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   0.64
 LONGEST FLOWPATH FROM NODE    249.00 TO NODE    246.00 =     505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    247.00 TO NODE    246.00 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.) =   21.59
 RAINFALL INTENSITY(INCH/HR) =   3.38
```



```
 TOTAL STREAM AREA(ACRES) =     0.88
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.07

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1          2.96     7.28        6.824          0.58
    2          1.07    21.59        3.385          0.88

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
    1          3.32     7.28        6.824
    2          2.54    21.59        3.385

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.32   Tc(MIN.) =    7.28
 TOTAL AREA(ACRES) =        1.5
 LONGEST FLOWPATH FROM NODE    249.00 TO NODE    246.00 =     505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    246.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   634.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.32
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.32
 LONGEST FLOWPATH FROM NODE    249.00 TO NODE    238.00 =     525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    246.00 TO NODE    238.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1          3.32     7.32        6.802          1.46
 LONGEST FLOWPATH FROM NODE    249.00 TO NODE    238.00 =     525.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         29.49     9.88        5.604          8.40
 LONGEST FLOWPATH FROM NODE    286.00 TO NODE    238.00 =    1351.00 FEET.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF        Tc       TNTENSTTY
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
    1        25.16        7.32         6.802
    2        32.22        9.88         5.604

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.22   Tc(MIN.) =    9.88
 TOTAL AREA(ACRES) =        9.9

****************************************************************************
 FLOW PROCESS FROM NODE     246.00 TO NODE     238.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     238.00 TO NODE     232.00 TS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   633.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.22
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE    286.00 TO NODE    232.00 =    1431.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     238.00 TO NODE     232.00 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.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   5.55
 TOTAL STREAM AREA(ACRES) =     9.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.22

****************************************************************************
 FLOW PROCESS FROM NODE     236.00 TO NODE     234.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
 UPSTREAM ELEVATION(FEET) =    646.50
 DOWNSTREAM ELEVATION(FEET) =    644.00
 ELEVATION DIFFERENCE(FEET) =      2.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.575
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
          THE MAXIMUM OVERLAND FLOW LENGTH =    79.41
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE     235.00 TO NODE     234.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.4050
 SUBAREA AREA(ACRES) =    0.62   SUBAREA RUNOFF(CFS) =    1.94
 TOTAL AREA(ACRES) =       0.7   TOTAL RUNOFF(CFS) =      2.39
 TC(MIN.) =    2.58

****************************************************************************
 FLOW PROCESS FROM NODE     234.00 TO NODE     232.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   641.00  DOWNSTREAM(FEET) =   633.00
 FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
 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.) =   7.68
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.39
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    3.00
 LONGEST FLOWPATH FROM NODE    236.00 TO NODE    232.00 =     280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     234.00 TO NODE     232.00 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.) =    3.00
 RAINFALL INTENSITY(INCH/HR) =   8.69
 TOTAL STREAM AREA(ACRES) =     0.68
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.39

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
    1         32.22      10.02         5.553          9.86
    2          2.39       3.00         8.695          0.68
```

```
 RATNFALL TNTENSTTY ANO TTME OF CONCENTRATTON RATTO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       12.04     3.00       8.695
     2       33.75    10.02       5.553

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      33.7S   Tc(MTN.) =   10.02
 TOTAL AREA(ACRES) =       10.S
 LONGEST FLOWPATH FROM NODE    286.00 TO NOOE    232.00 =    1431.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NOOE    232.00 TO NODE    218.00 TS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USTNG COMPUTER-ESTTMATEO PTPESTZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   633.00  OOWNSTREAM(FEET) =   609.00
 FLOW LENGTH(FEET) =   560.00   MANNTNG'S N =  0.013
 OEPTH OF FLOW TN  24.0 INCH PTPE IS  1S.6 INCHES
 PTPE-FLOW VELOCTTY(FEET/SEC.) =  1S.56
 ESTIMATED PIPE DIAMETER(TNCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      33.7S
 PIPE TRAVEL TTME(MTN.) =   0.60    Tc(MIN.) =   10.62
 LONGEST FLOWPATH FROM NODE    286.00 TO NOOE    218.00 =    1991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    232.00 TO NOOE    218.00 TS COOE =   1
----------------------------------------------------------------------------
 >>>>>DESTGNATE TNDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR TNDEPENDENT STREAM  1 ARE:
 TTME OF CONCENTRATTON(MTN.) =   10.62
 RATNFALL INTENSITY(INCH/HR) =   S.3S
 TOTAL STREAM AREA(ACRES) =    10.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.7S

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    228.00 IS COOE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITTAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRATNS) RUNOFF COEFFTCTENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 TNITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    646.50
 DOWNSTREAM ELEVATTON(FEET) =    642.00
 ELEVATTON OTFFERENCE(FEET) =      4.S0
 SUBAREA OVERLAND TTME OF FLOW(MTN.) =    2.346
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH TS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    87.50
```



```
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED TN Tc CALCULATION!
  100 YEAR RAINFALL INTENSTTY(TNCH/HOUR) =  8.695
 NOTE: RATNFALL TNTENSITY IS 8ASEO ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.91
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.91

****************************************************************************
 FLOW PROCESS FROM NODE    228.00 TO NODE    226.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USEO)<<<<<
============================================================================
 UPSTREAM ELEVATTON(FEET) =  642.00  DOWNSTREAM ELEVATION(FEET) =  613.00
 STREET LENGTH(FEET) =   600.00   CURB HETGHT(INCHES) =  6.0
 STREET HALFWIOTH(FEET) = 30.00

 DTSTANCE FROM CROWN TO CROSSFALL GRAOEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECTMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECTMAL)  =  0.018

 SPECIFIEO NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(OECTMAL)  =  0.020
 Manning's FRTCTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
 Manning's FRICTTON FACTOR for 8ack-of-Walk Flow Section =   0.0200

   **TRAVEL TTME COMPUTEO USTNG ESTTMATED FLOW(CFS) =       2.95
   STREETFLOW MODEL RESULTS USING ESTTMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WTDTH(FEET) =    7.41
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
   PRODUCT OF OEPTH&VELOCITY(FT*FT/SEC.) =    1.27
 STREET FLOW TRAVEL TTME(MIN.) =   2.32   Tc(MIN.) =    4.66
  100 YEAR RAINFALL INTENSTTY(INCH/HOUR) =  8.69S
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = S-MTNUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOTL CLASSIFTCATTON TS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFTCTENT =  0.870
 SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    4.08
 TOTAL AREA(ACRES) =       0.7        PEAK FLOW RATE(CFS) =       4.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIOTH(FEET) =   9.78
 FLOW VELOCITY(FEET/SEC.) =  4.76   DEPTH*VELOCTTY(FT*FT/SEC.) =   1.61
 LONGEST FLOWPATH FROM NOOE    230.00 TO NOOE    226.00 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    226.00 TO NODE    218.00 TS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PTPE-FLOW TRAVEL TTME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTTMATED PTPESTZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATTON DATA: UPSTREAM(FEET) =   610.00  OOWNSTREAM(FEET) =   609.00
 FLOW LENGTH(FEET) =    20.00   MANNTNG'S N =  0.013
 ESTTMATED PTPE OTAMETER(TNCH) INCREASED TO 18.000
 DEPTH OF FLOW TN  18.0 INCH PIPE IS   5.8 TNCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.99
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.70
 LONGEST FLOWPATH FROM NODE    230.00 TO NODE    218.00 =     720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    226.00 TO NODE    218.00 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.) =    4.70
 RAINFALL INTENSITY(INCH/HR) =   8.69
 TOTAL STREAM AREA(ACRES) =     0.66
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.99

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    646.50
 DOWNSTREAM ELEVATION(FEET) =    642.00
 ELEVATION DIFFERENCE(FEET) =      4.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.297
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    220.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  642.00  DOWNSTREAM ELEVATION(FEET) =  613.00
 STREET LENGTH(FEET) =   530.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.19
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```



```
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    5.91
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
 STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =    4.33
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    2.87
 TOTAL AREA(ACRES) =       0.5        PEAK FLOW RATE(CFS) =       3.63

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.03
 FLOW VELOCITY(FEET/SEC.) =  4.72   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
 LONGEST FLOWPATH FROM NODE    224.00 TO NODE    220.00 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   609.00
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.17
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.63
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    4.34
 LONGEST FLOWPATH FROM NODE    224.00 TO NODE    218.00 =     625.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    218.00 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.) =    4.34
 RAINFALL INTENSITY(INCH/HR) =   8.69
 TOTAL STREAM AREA(ACRES) =     0.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.63

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY      AREA
 NUMBER       (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
     1        33.75     10.62        5.349         10.54
     2         4.99      4.70        8.695          0.66
     3         3.63      4.34        8.695          0.48

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

```
 ** PEAK ELOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        29.01     4.34       8.695
    2        29.39     4.70       8.695
    3        39.06    10.62       5.349

 COMPUTED CONELUENCE ESTIMATES ARE AS EOLLOWS:
 PEAK FLOW RATE(CFS) =      39.06   Tc(MIN.) =   10.62
 TOTAL AREA(ACRES) =       11.7
 LONGEST FLOWPATH EROM NOOE    286.00 TO NOOE    218.00 =    1991.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NOOE    216.00 IS COOE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
 ELEVATION OATA: UPSTREAM(EEET) =   609.00  OOWNSTREAM(FEET) =   606.00
 ELOW LENGTH(EEET) =    65.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
 PIPE-FLOW VELOCITY(EEET/SEC.) =  16.46
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-ELOW(CES) =      39.06
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.69
 LONGEST FLOWPATH EROM NOOE    286.00 TO NOOE    216.00 =    2056.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NOOE    218.00 TO NODE    216.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 ELOW PROCESS EROM NODE    218.00 TO NODE    216.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 ELOW PROCESS EROM NODE    216.60 TO NODE    214.60 IS COOE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIEICATION IS "O"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA ELOW-LENGTH(EEET) =   150.00
 UPSTREAM ELEVATION(FEET) =    876.00
 DOWNSTREAM ELEVATION(FEET) =    816.00
 ELEVATION DIFFERENCE(FEET) =     60.00
 SUBAREA OVERLAND TIME OE ELOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA ELOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND ELOW LENGTH =   100.00
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```



```
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  7.516
 SUBAREA RUNOFF(CFS) =      0.24
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOEF(CFS) =      0.24

****************************************************************************
 FLOW PROCESS FROM NOOE    214.60 TO NODE    212.60 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIOAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SU8AREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    816.00  DOWNSTREAM(EEET) =    746.00
 CHANNEL LENGTH THRU SU8AREA(FEET) =   270.00   CHANNEL SLOPE =  0.2593
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM OEPTH(EEET) =   1.00
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  6.271
 NATURAL DESERT LANOSCAPING RUNOFE COEFFICIENT = .3500
 SOIL CLASSIEICATION IS "O"
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATED ELOW(CFS) =       0.80
 TRAVEL TIME THRU SUBAREA 8ASED ON VELOCITY(EEET/SEC.) =   2.21
 AVERAGE FLOW OEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.03
 Tc(MIN.) =    8.38
 SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOEE(CES) =    1.10
 AREA-AVERAGE RUNOEE COEEFICIENT =  0.350
 TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.29

 ENO OE SUBAREA CHANNEL ELOW HYORAULICS:
 DEPTH(FEET) =  0.05   FLOW VELOCITY(EEET/SEC.) =   2.60
 LONGEST ELOWPATH EROM NODE    216.60 TO NOOE    212.60 =     420.00 EEET.

****************************************************************************
 ELOW PROCESS EROM NOOE    212.60 TO NODE    210.60 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL ELOW<<<<<
 >>>>>TRAVELTIME THRU SU8AREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    746.00  DOWNSTREAM(FEET) =    722.00
 CHANNEL LENGTH THRU SUBAREA(EEET) =   120.00   CHANNEL SLOPE =  0.2000
 CHANNEL 8ASE(EEET) =    1.00   "Z" FACTOR =   1.000
 MANNING'S EACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  6.194
 RESIDENTIAL (1. DU/AC OR LESS) RUNOEE COEFEICIENT = .4100
 SOIL CLASSIEICATION IS "O"
 S.C.S. CURVE NUMBER (AMC II) =  82
 TRAVEL TIME COMPUTED USING ESTIMATED ELOW(CES) =       2.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(EEET/SEC.) =  12.51
 AVERAGE ELOW DEPTH(EEET) =   0.19   TRAVEL TIME(MIN.) =   0.16
 Tc(MIN.) =    8.46
 SUBAREA AREA(ACRES) =     1.18       SUBAREA RUNOFE(CES) =    3.00
 AREA-AVERAGE RUNOFE COEEFICIENT =  0.390
 TOTAL AREA(ACRES) =        1.8         PEAK ELOW RATE(CES) =       4.28

 END OE SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(EEET) =  0.24   ELOW VELOCITY(EEET/SEC.) =  14.28
 LONGEST ELOWPATH EROM NODE    216.60 TO NODE    210.60 =     540.00 EEET.

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

```
 FLOW PROCESS FROM NODE    210.60 TO NODE    292.40 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   722.00  DOWNSTREAM(FEET) =   708.00
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
 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.) =  10.30
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.28
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.93
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    292.40 =    830.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    292.40 TO NODE    210.60 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.) =    8.93
 RAINFALL INTENSITY(INCH/HR) =   5.98
 TOTAL STREAM AREA(ACRES) =     1.77
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.28

****************************************************************************
 FLOW PROCESS FROM NODE    298.40 TO NODE    296.40 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    744.00
 DOWNSTREAM ELEVATION(FEET) =    718.00
 ELEVATION DIFFERENCE(FEET) =     26.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.178
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      1.25
 TOTAL AREA(ACRES) =     0.24   TOTAL RUNOFF(CFS) =     1.25

****************************************************************************
 FLOW PROCESS FROM NODE    296.40 TO NODE    294.40 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) =  718.00  DOWNSTREAM ELEVATION(FEET) =  709.00
 STREET LENGTH(FEET) =   170.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```



```
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.21
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.30
  HALFSTREET FLOOD WIDTH(FEET) =    7.59
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.53
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
 STREET FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =    4.80
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    3.91
 TOTAL AREA(ACRES) =      1.0       PEAK FLOW RATE(CFS) =      5.16

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.72
 FLOW VELOCITY(FEET/SEC.) =  4.98   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE    298.40 TO NODE    294.40 =    270.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    294.40 TO NODE    292.40 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   706.00  DOWNSTREAM(FEET) =   708.00
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.83
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.16
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    4.81
 LONGEST FLOWPATH FROM NODE    298.40 TO NODE    292.40 =    275.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    294.40 TO NODE    292.40 IS CODE =   1
----------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
======================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.81
 RAINFALL INTENSITY(INCH/HR) =   8.69
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.16
```

```
** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY      AREA
NUMBER      (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
   1         4.28       8.93        5.982         1.77
   2         5.16       4.81        8.695         0.99

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER      (CFS)      (MIN.)   (INCH/HOUR)
   1         7.47       4.81        8.695
   2         7.83       8.93        5.982

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       7.83   Tc(MIN.) =    8.93
TOTAL AREA(ACRES) =        2.8
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    292.40 =     830.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    294.40 TO NODE    292.40 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    294.40 TO NODE    292.40 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    206.60 TO NODE    204.60 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) =    994.50
 DOWNSTREAM ELEVATION(FEET) =    956.00
 ELEVATION DIFFERENCE(FEET) =     38.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.516
 SUBAREA RUNOFF(CFS) =      0.47
 TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
 FLOW PROCESS FROM NODE    204.60 TO NODE    202.60 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```



```
 ELEVATION DATA: UPSTREAM(FEET) =    956.00  DOWNSTREAM(FEET) =    726.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   570.00   CHANNEL SLOPE =  0.4035
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.353
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.29
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.09
 AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.87
 Tc(MIN.) =    8.13
 SUBAREA AREA(ACRES) =     3.41       SUBAREA RUNOFF(CFS) =    7.58
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =        3.6         PEAK FLOW RATE(CFS) =       7.98

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   6.32
 LONGEST FLOWPATH FROM NODE    206.60 TO NODE    202.60 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.60 TO NODE    200.60 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   726.00  DOWNSTREAM(FEET) =   706.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  33.80
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.98
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.14
 LONGEST FLOWPATH FROM NODE    206.60 TO NODE    200.60 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.60 TO NODE    200.60 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.) =    8.14
 RAINFALL INTENSITY(INCH/HR) =   6.35
 TOTAL STREAM AREA(ACRES) =     3.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.98

****************************************************************************
 FLOW PROCESS FROM NODE    208.80 TO NODE    208.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
 UPSTREAM ELEVATION(FEET) =    758.00
 DOWNSTREAM ELEVATION(FEET) =    718.00
 ELEVATION DIFFERENCE(FEET) =     40.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.178
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.73
 TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
 FLOW PROCESS FROM NODE    208.60 TO NODE    200.60 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  718.00  DOWNSTREAM ELEVATION(FEET) =  709.00
 STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 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) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    4.59
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.09
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
 STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    4.89
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.67
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.40

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.41
 FLOW VELOCITY(FEET/SEC.) =  4.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE    208.80 TO NODE    200.60 =     275.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.60 TO NODE    200.60 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.) =    4.89
 RAINFALL INTENSITY(INCH/HR) =   8.69
 TOTAL STREAM AREA(ACRES) =     0.46
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.40

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         7.98     8.14        6.348          3.59
     2         2.40     4.89        8.695          0.46

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         7.19     4.89        8.695
     2         9.73     8.14        6.348

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.73   Tc(MIN.) =    8.14
 TOTAL AREA(ACRES) =        4.1
 LONGEST FLOWPATH FROM NODE    206.60 TO NODE    200.60 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.60 TO NODE    292.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   706.00  DOWNSTREAM(FEET) =   705.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.18
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.73
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.17
 LONGEST FLOWPATH FROM NODE    206.60 TO NODE    292.40 =     710.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.60 TO NODE    292.40 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         9.73     8.17        6.334          4.05
 LONGEST FLOWPATH FROM NODE    206.60 TO NODE    292.40 =     710.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
    1        7.83     8.93        S.982        2.76
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    292.40 =     830.00 EEET.

 ** PEAK ELOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       16.90       8.17        6.334
    2       17.02       8.93        S.982

 COMPUTEO CONFLUENCE ESTIMATES ARE AS EOLLOWS:
 PEAK FLOW RATE(CFS) =      17.02   Tc(MIN.) =    8.93
 TOTAL AREA(ACRES) =        6.8

****************************************************************************
 ELOW PROCESS FROM NODE    200.60 TO NODE    292.40 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    292.40 TO NODE    284.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATEO PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(EEET) =   70S.00  DOWNSTREAM(EEET) =   692.00
 ELOW LENGTH(EEET) =   23S.00   MANNING'S N =  0.013
 OEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
 PIPE-FLOW VELOCITY(EEET/SEC.) =  14.46
 ESTIMATEO PIPE OIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.02
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    9.20
 LONGEST ELOWPATH FROM NODE    216.60 TO NODE    284.40 =    106S.00 EEET.

****************************************************************************
 FLOW PROCESS EROM NODE    292.40 TO NODE    284.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>OESIGNATE INOEPENOENT STREAM FOR CONELUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONELUENCE VALUES USEO EOR INOEPENOENT STREAM  1 ARE:
 TIME OE CONCENTRATION(MIN.) =    9.20
 RAINFALL INTENSITY(INCH/HR) =   S.87
 TOTAL STREAM AREA(ACRES) =     6.81
 PEAK ELOW RATE(CES) AT CONELUENCE =     17.02

****************************************************************************
 ELOW PROCESS EROM NOOE    290.40 TO NOOE    288.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIEICATION IS "O"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA ELOW-LENGTH(FEET) =   162.00
 UPSTREAM ELEVATION(FEET) =    958.00
 OOWNSTREAM ELEVATION(FEET) =    894.00
```



```
 ELEVATION OIFEERENCE(EEET) =     64.00
 SUBAREA OVERLAND TIME OF ELOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND ELOW LENGTH =   100.00
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND ELOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.S16
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 ELOW PROCESS FROM NODE    288.40 TO NODE    286.40 IS CODE =  S1
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL ELOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(EEET) =    894.00  OOWNSTREAM(FEET) =    728.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.39S2
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   S.000
 MANNING'S FACTOR = 0.03S   MAXIMUM OEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.383
 *USER SPECIFIEO(SUBAREA):
 NATURAL OESERT LANDSCAPING RUNOFE COEEEICIENT = .3400
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATEO ELOW(CFS) =       2.01
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.87
 AVERAGE FLOW DEPTH(EEET) =   0.0S   TRAVEL TIME(MIN.) =   1.81
 Tc(MIN.) =    8.07
 SUBAREA AREA(ACRES) =     1.6S       SUBAREA RUNOFF(CFS) =    3.S8
 AREA-AVERAGE RUNOEF COEFEICIENT =  0.340
 TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CES) =       3.76

 ENO OF SUBAREA CHANNEL FLOW HYDRAULICS:
 OEPTH(FEET) =  0.08   ELOW VELOCITY(FEET/SEC.) =   4.S7
 LONGEST FLOWPATH FROM NOOE    290.40 TO NODE    286.40 =     S82.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NODE    286.40 TO NOOE    284.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
 ELEVATION OATA: UPSTREAM(FEET) =   728.00  OOWNSTREAM(FEET) =   692.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATEO PIPE DIAMETER(INCH) INCREASEO TO 18.000
 OEPTH OF FLOW IN  18.0 INCH PIPE IS   2.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.40
 ESTIMATEO PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-ELOW(CFS) =       3.76
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.14
 LONGEST ELOWPATH FROM NOOE    290.40 TO NOOE    284.40 =     662.00 FEET.

****************************************************************************
 ELOW PROCESS EROM NOOE    286.40 TO NOOE    284.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INOEPENOENT 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.) =    8.14
  RAINFALL INTENSITY(INCH/HR) =   6.35
  TOTAL STREAM AREA(ACRES) =     1.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.76

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1        17.02      9.20         5.868          6.81
      2         3.76      8.14         6.350          1.73

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF        Tc       INTENSITY
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)
      1        18.82      8.14         6.350
      2        20.50      9.20         5.868

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.50   Tc(MIN.) =    9.20
  TOTAL AREA(ACRES) =        8.5
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    284.40 =    1065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    284.40 TO NODE    270.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   692.00  DOWNSTREAM(FEET) =   686.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.50
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    270.40 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    284.40 TO NODE    270.40 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.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   5.81
  TOTAL STREAM AREA(ACRES) =     8.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.50

****************************************************************************
  FLOW PROCESS FROM NODE    276.40 TO NODE    274.40 IS CODE =  21
```



```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    725.00
  DOWNSTREAM ELEVATION(FEET) =    722.50
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.114
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.637
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      1.01

****************************************************************************
  FLOW PROCESS FROM NODE    274.40 TO NODE    272.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  722.50  DOWNSTREAM ELEVATION(FEET) =  691.00
  STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =    7.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.763
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    2.77      SUBAREA RUNOFF(CFS) =   11.24
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =      12.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
  FLOW VELOCITY(FEET/SEC.) =  6.75   DEPTH*VELOCITY(FT*FT/SEC.) =   2.71
  LONGEST FLOWPATH FROM NODE    276.40 TO NODE    272.40 =     550.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    272.40 TO NODE    270.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   689.00  DOWNSTREAM(FEET) =   686.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.13
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.40
  LONGEST FLOWPATH FROM NODE    276.40 TO NODE    270.40 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.40 TO NODE    270.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.40
  RAINFALL INTENSITY(INCH/HR) =   6.75
  TOTAL STREAM AREA(ACRES) =     2.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.13

****************************************************************************
  FLOW PROCESS FROM NODE    282.40 TO NODE    280.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    725.00
  DOWNSTREAM ELEVATION(FEET) =    722.50
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.642
  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) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    280.40 TO NODE    278.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```



```
  UPSTREAM ELEVATION(FEET) =  722.50  DOWNSTREAM ELEVATION(FEET) =  691.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =    3.87
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.611
  SUBAREA AREA(ACRES) =    1.86      SUBAREA RUNOFF(CFS) =    9.70
  TOTAL AREA(ACRES) =       1.9       PEAK FLOW RATE(CFS) =      10.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.38
  FLOW VELOCITY(FEET/SEC.) =  6.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.53
  LONGEST FLOWPATH FROM NODE    282.40 TO NODE    278.40 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    278.40 TO NODE    270.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   689.00  DOWNSTREAM(FEET) =   686.00
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.31
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    3.87
  LONGEST FLOWPATH FROM NODE    282.40 TO NODE    270.40 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    278.40 TO NODE    270.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
```

```
 CONELUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OE CONCENTRATION(MIN.) =     3.87
 RAINFALL INTENSITY(INCH/HR) =    8.69
 TOTAL STREAM AREA(ACRES) =      1.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.31

 ** CONELUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CES)      (MIN.)   (INCH/HOUR)     (ACRE)
    1         20.50      9.34         5.811          8.54
    2         12.13      7.40         6.753          2.99
    3         10.31      3.87         8.695          1.94

 RAINFALL INTENSITY AND TIME OE CONCENTRATION RATIO
 CONELUENCE EORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNDFE        Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         30.35      3.87         8.695
    2         37.78      7.40         6.753
    3         37.83      9.34         5.811

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK ELOW RATE(CES) =       37.83   Tc(MIN.) =     9.34
 TOTAL AREA(ACRES) =        13.5
 LONGEST FLOWPATH FROM NOOE     216.60 TO NOOE     270.40 =     1185.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NODE     270.40 TO NOOE     244.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU 5UBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    6B6.00  DOWN5TREAM(EEET) =    673.00
 ELOW LENGTH(FEET) =    370.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
 PIPE-FLOW VELOCITY(EEET/SEC.) =  14.56
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPE5 =   1
 PIPE-FLOW(CF5) =       37.83
 PIPE TRAVEL TIME(MIN.) =    0.42    Tc(MIN.) =     9.76
 LONGEST FLOWPATH FROM NODE     216.60 TO NODE     244.40 =     1555.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     270.40 TO NODE     244.40 IS COOE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 ELOW PROCESS FROM NODE     270.40 TO NODE     244.40 IS COOE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-5TREAM MEMORY<<<<<
============================================================================

****************************************************************************
 ELOW PROCESS EROM NODE     266.80 TO NODE     266.60 IS CODE =  21
```



```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALY5IS<<<<<
============================================================================
 NATURAL DESERT LANO5CAPING RUNOEF COEFFICIENT = .3S00
 SOIL CLASSIEICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  BB
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
 UP5TREAM ELEVATION(FEET) =    786.00
 OOWN5TREAM ELEVATION(EEET) =    750.00
 ELEVATION DIFFERENCE(EEET) =     36.00
 5UBAREA OVERLANO TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL 5UBAREA ELOW 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 U5ED IN Tc CALCULATION!
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  7.516
 SUBAREA RUNOFE(CF5) =      0.24
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CF5) =      0.24

****************************************************************************
 FLOW PROCESS FROM NOOE     266.60 TO NOOE     266.40 I5 CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIOAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU 5UBAREA (EXI5TING ELEMENT)<<<<<
============================================================================
 ELEVATION OATA: UPSTREAM(EEET) =    750.00  DOWNSTREAM(FEET) =    704.00
 CHANNEL LENGTH THRU SUBAREA(EEET) =   320.00   CHANNEL SLOPE =  0.1437
 CHANNEL BASE(EEET) =   10.00   "Z" EACTOR =   5.000
 MANNING'5 EACTOR = 0.035   MAXIMUM DEPTH(EEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.064
 *USER SPECIFIED(SUBAREA):
 NATURAL OE5ERT LANDSCAPING RUNOEE COEFFICIENT = .3200
 5.C.5. CURVE NUMBER (AMC II) =  BB
 TRAVEL TIME COMPUTEO U5ING ESTIMATEO FLOW(CF5) =       1.07
 TRAVEL TIME THRU 5UBAREA BA5EO ON VELOCITY(EEET/5EC.) =   2.16
 AVERAGE FLOW DEPTH(EEET) =   0.05   TRAVEL TIME(MIN.) =   2.47
 Tc(MIN.) =    8.74
 SUBAREA AREA(ACRE5) =     0.85       5UBAREA RUNOFE(CE5) =    1.65
 AREA-AVERAGE RUNDFE COEEFICIENT =  0.323
 TOTAL AREA(ACRE5) =        0.9         PEAK FLOW RATE(CES) =       1.84

 END OF SUBAREA CHANNEL ELOW HYDRAULIC5:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.71
 LONGEST FLOWPATH FROM NODE     266.80 TO NOOE     266.40 =     470.00 EEET.

****************************************************************************
 ELOW PROCESS FROM NOOE     266.40 TO NODE     259.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(EEET) =   704.00  DOWNSTREAM(FEET) =   676.00
 ELOW LENGTH(EEET) =   225.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.8 INCHES
 PIPE-FLOW VELOCITY(EEET/SEC.) =  10.52
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OE PIPES =   1
```

```
 PIPE-FLOW(CFS) =        1.84
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.10
 LONGEST FLOWPATH FROM NODE    266.80 TO NODE    259.40 =     695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    266.40 TO NODE    259.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.10
 RAINFALL INTENSITY(INCH/HR) =   5.91
 TOTAL STREAM AREA(ACRES) =     0.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.84

****************************************************************************
 FLOW PROCESS FROM NODE    264.40 TO NODE    262.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3300
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   170.00
 UPSTREAM ELEVATION(FEET) =    828.00
 DOWNSTREAM ELEVATION(FEET) =    808.00
 ELEVATION DIFFERENCE(FEET) =     20.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.434
 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) =  7.390
 SUBAREA RUNOFF(CFS) =      1.17
 TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      1.17

****************************************************************************
 FLOW PROCESS FROM NODE    262.40 TO NODE    260.40 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    808.00  DOWNSTREAM(FEET) =    678.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.1831
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.201
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =  88
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.89
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   2.01
 Tc(MIN.) =    8.44
 SUBAREA AREA(ACRES) =    12.60       SUBAREA RUNOFF(CFS) =   23.44
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.301
```



```
 TOTAL AREA(ACRES) =      13.1         PEAK FLOW RATE(CFS) =      24.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   7.28
 LONGEST FLOWPATH FROM NODE    264.40 TO NODE    260.40 =     880.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    260.40 TO NODE    259.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   678.00  DOWNSTREAM(FEET) =   676.00
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.54
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      24.42
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.50
 LONGEST FLOWPATH FROM NODE    264.40 TO NODE    259.40 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    260.40 TO NODE    259.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.50
 RAINFALL INTENSITY(INCH/HR) =   6.18
 TOTAL STREAM AREA(ACRES) =    13.08
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.42

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1          1.84      9.10         5.910         0.94
    2         24.42      8.50         6.177        13.08

 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         26.14      8.50         6.177
    2         25.21      9.10         5.910

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      26.14   Tc(MIN.) =    8.50
 TOTAL AREA(ACRES) =      14.0
 LONGEST FLOWPATH FROM NODE    264.40 TO NODE    259.40 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    259.40 TO NODE    246.40 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   676.00  DOWNSTREAM(FEET) =   674.00
FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.35
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      26.14
PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.90
LONGEST FLOWPATH FROM NODE    264.40 TO NODE    246.40 =    1125.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    259.40 TO NODE    246.40 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.) =    8.90
RAINFALL INTENSITY(INCH/HR) =   6.00
TOTAL STREAM AREA(ACRES) =    14.02
PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.14

****************************************************************************
FLOW PROCESS FROM NODE    258.40 TO NODE    256.40 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  86
INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
UPSTREAM ELEVATION(FEET) =    714.00
DOWNSTREAM ELEVATION(FEET) =    685.10
ELEVATION DIFFERENCE(FEET) =     28.90
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) =  8.695
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.94
TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

****************************************************************************
FLOW PROCESS FROM NODE    256.40 TO NODE    254.40 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  685.10  DOWNSTREAM ELEVATION(FEET) =  678.00
STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```



```
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.34
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.35
  HALFSTREET FLOOD WIDTH(FEET) =   10.43
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.73
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
STREET FLOW TRAVEL TIME(MIN.) =   1.16   Tc(MIN.) =    5.34
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.333
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  86
AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
SUBAREA AREA(ACRES) =    1.36      SUBAREA RUNOFF(CFS) =    6.80
TOTAL AREA(ACRES) =       1.5        PEAK FLOW RATE(CFS) =       7.70

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.55
FLOW VELOCITY(FEET/SEC.) =  4.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
LONGEST FLOWPATH FROM NODE    258.40 TO NODE    254.40 =     380.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    254.40 TO NODE    246.40 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   675.00  DOWNSTREAM(FEET) =   674.00
FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.70
PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.37
LONGEST FLOWPATH FROM NODE    258.40 TO NODE    246.40 =     400.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    254.40 TO NODE    246.40 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.) =    5.37
RAINFALL INTENSITY(INCH/HR) =   8.30
TOTAL STREAM AREA(ACRES) =     1.54
PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.70

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

```
 FLOW PROCESS EROM NODE    2S2.40 TO NOOE    2S0.40 IS COOE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.S OU/AC OR LESS) RUNOFE COEFEICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(EEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    683.00
 DOWNSTREAM ELEVATION(FEET) =    682.30
 ELEVATION OIEEERENCE(FEET) =      0.70
 SUBAREA OVERLAND TIME OE FLOW(MIN.) =    7.364
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    61.2S
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  6.773
 SUBAREA RUNOEE(CFS) =      0.61
 TOTAL AREA(ACRES) =      0.1S   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
 FLOW PROCESS FROM NODE    2S0.40 TO NODE    248.40 IS COOE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(EEET) =  682.30  OOWNSTREAM ELEVATION(FEET) =  678.00
 STREET LENGTH(EEET) =   1SS.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALEWIOTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(EEET) =  20.00
 INSIOE STREET CROSSEALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(OECIMAL) =  0.018

 SPECIEIED NUMBER OE HALFSTREETS CARRYING RUNOEE =  1
 STREET PARKWAY CROSSEALL(DECIMAL) =  0.020
 Manning's ERICTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
 Manning's FRICTION EACTOR for Back-of-Walk Elow Section =   0.0200

   **TRAVEL TIME COMPUTEO USING ESTIMATED FLOW(CES) =       1.84
   STREETELOW MOOEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW OEPTH(FEET) =  0.28
   HALFSTREET FLOOO WIOTH(FEET) =    6.S9
   AVERAGE ELOW VELOCITY(EEET/SEC.) =    3.17
   PROOUCT OE OEPTH&VELOCITY(ET*FT/SEC.) =    0.89
 STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.18
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.330
 RESIDENTIAL (14.S OU/AC OR LESS) RUNOFE COEEEICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEEEICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.65      SUBAREA RUNOFF(CES) =    2.47
 TOTAL AREA(ACRES) =       0.8       PEAK ELOW RATE(CES) =       3.04

 END OF SUBAREA STREET ELOW HYORAULICS:
 OEPTH(EEET) = 0.32   HALFSTREET ELOOO WIDTH(EEET) =   8.72
 ELOW VELOCITY(EEET/SEC.) =  3.48   OEPTH*VELOCITY(FT*FT/SEC.) =   1.11
```



```
 LONGEST FLOWPATH EROM NOOE    2S2.40 TO NOOE    248.40 =     23S.00 EEET.

****************************************************************************
 FLOW PROCESS EROM NOOE    248.40 TO NOOE    246.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   67S.00  DOWNSTREAM(FEET) =   674.00
 ELOW LENGTH(FEET) =     S.00   MANNING'S N =  0.013
 ESTIMATED PIPE OIAMETER(INCH) INCREASED TO 18.000
 OEPTH OF ELOW IN  18.0 INCH PIPE IS   3.2 INCHES
 PIPE-ELOW VELOCITY(FEET/SEC.) =  14.41
 ESTIMATED PIPE OIAMETER(INCH) =  18.00    NUMBER OE PIPES =   1
 PIPE-ELOW(CFS) =       3.04
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.19
 LONGEST ELOWPATH FROM NOOE    2S2.40 TO NOOE    246.40 =     240.00 FEET.

****************************************************************************
 ELOW PROCESS FROM NOOE    248.40 TO NODE    246.40 IS COOE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENOENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONELUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INOEPENOENT STREAM  3 ARE:
 TIME OE CONCENTRATION(MIN.) =    8.19
 RAINFALL INTENSITY(INCH/HR) =   6.33
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK ELOW RATE(CFS) AT CONELUENCE =      3.04

 ** CONFLUENCE OATA **
 STREAM     RUNOFE       Tc      INTENSITY      AREA
 NUMBER      (CES)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        26.14      8.90        S.996        14.02
    2         7.70      S.37        8.304         1.S4
    3         3.04      8.19        6.327         0.80

 RAINEALL INTENSITY AND TIME OE CONCENTRATION RATID
 CONFLUENCE EORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1        28.S7      S.37       8.304
    2        33.68      8.19       6.327
    3        34.S8      8.90       S.996

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK ELOW RATE(CFS) =      34.S8   Tc(MIN.) =    8.90
 TOTAL AREA(ACRES) =      16.4
 LONGEST FLOWPATH EROM NOOE    264.40 TO NOOE    246.40 =    1125.00 EEET.

****************************************************************************
 ELOW PROCESS EROM NODE    246.40 TO NOOE    244.40 IS COOE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   674.00  DOWNSTREAM(FEET) =   673.00
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.58
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.00
 LONGEST FLOWPATH FROM NODE    264.40 TO NODE    244.40 =    1190.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    246.40 TO NODE    244.40 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        34.58      9.00        5.952       16.36
 LONGEST FLOWPATH FROM NODE    264.40 TO NODE    244.40 =    1190.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY     AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1        37.83      9.76        5.647       13.47
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    244.40 =    1555.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      69.45       9.00        5.952
    2      70.64       9.76        5.647

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      70.64   Tc(MIN.) =    9.76
 TOTAL AREA(ACRES) =       29.8

****************************************************************************
 FLOW PROCESS FROM NODE    246.40 TO NODE    244.40 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    244.40 TO NODE    236.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   673.00  DOWNSTREAM(FEET) =   670.00
 FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.16
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      70.64
```



```
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.98
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    236.40 =    1730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    244.40 TO NODE    236.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.98
 RAINFALL INTENSITY(INCH/HR) =   5.57
 TOTAL STREAM AREA(ACRES) =    29.83
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     70.64

****************************************************************************
 FLOW PROCESS FROM NODE    242.40 TO NODE    240.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   155.00
 UPSTREAM ELEVATION(FEET) =    996.00
 DOWNSTREAM ELEVATION(FEET) =    922.00
 ELEVATION DIFFERENCE(FEET) =     74.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
 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) =  7.210
 SUBAREA RUNOFF(CFS) =      0.48
 TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
 FLOW PROCESS FROM NODE    240.40 TO NODE    238.40 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    922.00  DOWNSTREAM(FEET) =    691.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00   CHANNEL SLOPE =  0.3080
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.630
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.72
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.12
 Tc(MIN.) =    9.81
 SUBAREA AREA(ACRES) =     2.65       SUBAREA RUNOFF(CFS) =    4.48
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        2.9         PEAK FLOW RATE(CFS) =       4.85
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10  FLOW VELOCITY(FEET/SEC.) =  4.80
 LONGEST FLOWPATH FROM NODE    242.40 TO NODE    238.40 =    905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.40 TO NODE    236.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  691.00  DOWNSTREAM(FEET) =  670.00
 FLOW LENGTH(FEET) =  90.00  MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.46
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.85
 PIPE TRAVEL TIME(MIN.) =  0.09    Tc(MIN.) =    9.89
 LONGEST FLOWPATH FROM NODE    242.40 TO NODE    236.40 =    995.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.40 TO NODE    236.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.89
 RAINFALL INTENSITY(INCH/HR) =   5.60
 TOTAL STREAM AREA(ACRES) =     2.87
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.85

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       70.64     9.98        5.566         29.83
     2        4.85     9.89        5.599          2.87

 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       74.85     9.89        5.599
     2       75.46     9.98        5.566

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      75.46   Tc(MIN.) =    9.98
 TOTAL AREA(ACRES) =       32.7
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    236.40 =   1730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    236.40 TO NODE    228.40 IS CODE =  31
----------------------------------------------------------------------------
```



```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  670.00  DOWNSTREAM(FEET) =  669.00
 FLOW LENGTH(FEET) =  50.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      75.46
 PIPE TRAVEL TIME(MIN.) =  0.06    Tc(MIN.) =   10.04
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    228.40 =   1780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    236.40 TO NODE    228.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.04
 RAINFALL INTENSITY(INCH/HR) =   5.55
 TOTAL STREAM AREA(ACRES) =    32.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     75.46

****************************************************************************
 FLOW PROCESS FROM NODE    234.40 TO NODE    232.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    694.00
 DOWNSTREAM ELEVATION(FEET) =    688.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.953
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.37
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
 FLOW PROCESS FROM NODE    232.40 TO NODE    230.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  688.00  DOWNSTREAM ELEVATION(FEET) =  673.00
 STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    S.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   2.S8   Tc(MIN.) =    7.S4
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.674
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.832
  SUBAREA AREA(ACRES) =    0.43     SUBAREA RUNOFF(CFS) =    2.S0
  TOTAL AREA(ACRES) =       0.S       PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.16
  FLOW VELOCITY(FEET/SEC.) =  3.S2   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    234.40 TO NODE    230.40 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.40 TO NODE    228.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   670.00  DOWNSTREAM(FEET) =   669.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.S9
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.78
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.57
  LONGEST FLOWPATH FROM NODE    234.40 TO NODE    228.40 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.40 TO NODE    228.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.S7
  RAINFALL INTENSITY(INCH/HR) =   6.6S
  TOTAL STREAM AREA(ACRES) =     0.S0
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       7S.46    10.04        S.S4S         32.70
```



```
      2        2.78     7.S7        6.6S2          0.S0

  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       6S.69     7.S7        6.6S2
      2       77.78    10.04        S.S4S

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.78   Tc(MIN.) =   10.04
  TOTAL AREA(ACRES) =       33.2
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    228.40 =    1780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.40 TO NODE    214.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   669.00  DOWNSTREAM(FEET) =   662.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.S INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.04
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.78
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.22
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    214.40 =    1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.40 TO NODE    216.40 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    228.40 TO NODE    216.40 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.40 TO NODE    224.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  8S
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  UPSTREAM ELEVATION(FEET) =    734.00
  DOWNSTREAM ELEVATION(FEET) =    703.00
  ELEVATION DIFFERENCE(FEET) =     31.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```

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          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) =  7.210
SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    224.40 TO NODE    222.40 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    703.00  DOWNSTREAM(FEET) =    676.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.1080
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.915
 NATURAL OFFSRT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.73
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.40
 Tc(MIN.) =    9.09
 SUBAREA AREA(ACRES) =     0.54       SUBAREA RUNOFF(CFS) =    0.96
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.19

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.06
 LONGEST FLOWPATH FROM NODE    226.40 TO NODE    222.40 =     450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    222.40 TO NODE    216.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   676.00  DOWNSTREAM(FEET) =   663.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.19
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.11
 LONGEST FLOWPATH FROM NODE    226.40 TO NODE    216.40 =     470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    222.40 TO NODE    216.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.11
```



```
 RAINFALL INTENSITY(INCH/HR) =   5.91
 TOTAL STREAM AREA(ACRES) =     0.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.19

****************************************************************************
 FLOW PROCESS FROM NODE    220.40 TO NODE    218.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
 UPSTREAM ELEVATION(FEET) =    695.00
 DOWNSTREAM ELEVATION(FEET) =    688.00
 ELEVATION DIFFERENCE(FEET) =      7.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.782
 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) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    218.40 TO NODE    216.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  688.00  DOWNSTREAM ELEVATION(FEET) =  667.00
 STREET LENGTH(FEET) =   800.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.22
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.35
  HALFSTREET FLOOD WIDTH(FEET) =   10.43
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.62
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
 STREET FLOW TRAVEL TIME(MIN.) =    3.68   Tc(MIN.) =    8.46
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.192
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
```

```
 SUBAREA AREA(ACRES) =    2.01     SUBAREA RUNOFF(CFS) =    7.47
 TOTAL AREA(ACRES) =       2.1      PEAK FLOW RATE(CFS) =      7.76

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
 FLOW VELOCITY(FEET/SEC.) =  4.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
 LONGEST FLOWPATH FROM NODE    220.40 TO NODE    216.40 =     905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.40 TO NODE    216.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.46
 RAINFALL INTENSITY(INCH/HR) =   6.19
 TOTAL STREAM AREA(ACRES) =     2.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.76

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         1.19      9.11        5.906         0.67
    2         7.76      8.46        6.192         2.09

 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         8.87      8.46        6.192
    2         8.59      9.11        5.906

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.87   Tc(MIN.) =    8.46
 TOTAL AREA(ACRES) =        2.8
 LONGEST FLOWPATH FROM NODE    220.40 TO NODE    216.40 =     905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.40 TO NODE    214.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   663.00  DOWNSTREAM(FEET) =   662.00
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.87
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    8.47
 LONGEST FLOWPATH FROM NODE    220.40 TO NODE    214.40 =     910.00 FEET.
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    216.40 TO NODE    214.40 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         8.87      8.47        6.190         2.76
 LONGEST FLOWPATH FROM NODE    220.40 TO NODE    214.40 =     910.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        77.78     10.22        5.484        33.20
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    214.40 =    1970.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       73.32      8.47        6.190
    2       85.63     10.22        5.484

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      85.63   Tc(MIN.) =   10.22
 TOTAL AREA(ACRES) =       36.0

****************************************************************************
 FLOW PROCESS FROM NODE    216.40 TO NODE    214.40 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    214.40 TO NODE    276.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   662.00  DOWNSTREAM(FEET) =   661.00
 FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      85.63
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.28
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    276.20 =    2022.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    214.40 TO NODE    276.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.28
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.46
 TOTAL STREAM AREA(ACRES) =    35.96
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     85.63

****************************************************************************
 FLOW PROCESS FROM NODE    282.20 TO NODE    280.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
 UPSTREAM ELEVATION(FEET) =    669.00
 DOWNSTREAM ELEVATION(FEET) =    668.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.293
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    63.57
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.815
 SUBAREA RUNOFF(CFS) =      0.49
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
 FLOW PROCESS FROM NODE    280.20 TO NODE    278.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  668.00  DOWNSTREAM ELEVATION(FEET) =  665.50
 STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.26
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   11.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
 STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    9.06
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.926
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.55      SUBAREA RUNOFF(CFS) =    5.51
```



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 TOTAL AREA(ACRES) =       1.7       PEAK FLOW RATE(CFS) =      5.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
 FLOW VELOCITY(FEET/SEC.) =  2.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
 LONGEST FLOWPATH FROM NODE    282.20 TO NODE    278.20 =     355.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    278.20 TO NODE    276.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   663.00  DOWNSTREAM(FEET) =   661.00
 FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.94
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    9.61
 LONGEST FLOWPATH FROM NODE    282.20 TO NODE    276.20 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    278.20 TO NODE    276.20 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.61
 RAINFALL INTENSITY(INCH/HR) =   5.71
 TOTAL STREAM AREA(ACRES) =     1.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.94

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       85.63     10.28       5.462         35.96
    2        5.94      9.61       5.706          1.67

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       85.97      9.61       5.705
    2       91.32     10.28       5.462

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      91.32   Tc(MIN.) =   10.28
 TOTAL AREA(ACRES) =       37.6
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    276.20 =    2022.00 FEET.

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```
 FLOW PROCESS FROM NODE    278.20 TO NODE    276.20 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    278.20 TO NODE    276.20 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    212.40 TO NODE    210.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    724.00
 DOWNSTREAM ELEVATION(FEET) =    723.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.095
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    66.67
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.938
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    210.40 TO NODE    208.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  723.00  DOWNSTREAM ELEVATION(FEET) =  720.00
 STREET LENGTH(FEET) =   225.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.44
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =    9.41
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.48
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
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 STREET FLOW TRAVEL TIME(MIN.) =    1.51   Tc(MIN.) =    8.61
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.126
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    4.04
 TOTAL AREA(ACRES) =       1.2       PEAK FLOW RATE(CFS) =       4.41

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.38
 FLOW VELOCITY(FEET/SEC.) =  2.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    208.40 =     315.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.40 TO NODE    200.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   717.00  DOWNSTREAM(FEET) =   713.00
 FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.41
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    9.66
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    200.40 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.40 TO NODE    200.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.66
 RAINFALL INTENSITY(INCH/HR) =   5.68
 TOTAL STREAM AREA(ACRES) =     1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.41

****************************************************************************
 FLOW PROCESS FROM NODE    206.40 TO NODE    204.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
 UPSTREAM ELEVATION(FEET) =    724.00
 DOWNSTREAM ELEVATION(FEET) =    723.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.486
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    58.08
```

```
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.702
 SUBAREA RUNOFF(CFS) =      0.72
 TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.72

****************************************************************************
 FLOW PROCESS FROM NODE    204.40 TO NODE    202.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  723.00  DOWNSTREAM ELEVATION(FEET) =  721.00
 STREET LENGTH(FEET) =   70.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.02
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    3.91
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
 STREET FLOW TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =    7.86
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.492
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT =  .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.58
 TOTAL AREA(ACRES) =       0.3       PEAK FLOW RATE(CFS) =      1.29

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   5.03
 FLOW VELOCITY(FEET/SEC.) =  3.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
 LONGEST FLOWPATH FROM NODE    206.40 TO NODE    202.40 =     200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.40 TO NODE    200.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   717.00  DOWNSTREAM(FEET) =   713.00
 FLOW LENGTH(FEET) =    5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```



```
 PIPE-FLOW(CFS) =      1.29
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    7.87
 LONGEST FLOWPATH FROM NODE    206.40 TO NODE    200.40 =     205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.40 TO NODE    200.40 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.87
 RAINFALL INTENSITY(INCH/HR) =   6.49
 TOTAL STREAM AREA(ACRES) =     0.33
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.29

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.41      9.66        5.685         1.20
     2        1.29      7.87        6.490         0.33

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        4.88      7.87        6.490
     2        5.54      9.66        5.685

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.54   Tc(MIN.) =    9.66
 TOTAL AREA(ACRES) =       1.5
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    200.40 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.40 TO NODE    292.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   713.00  DOWNSTREAM(FEET) =   704.00
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.07
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.54
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    9.99
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    292.20 =     875.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.40 TO NODE    292.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
 TOTAL NUMBER OF STREAMS =  2
 CONELUENCE VALUES USED EOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.99
 RAINFALL INTENSITY(INCH/HR) =   S.S6
 TOTAL STREAM AREA(ACRES) =     1.S3
 PEAK FLOW RAIE(CES) AT CONELUENCE =      S.S4

****************************************************************************
 ELOW PROCESS EROM NOOE    298.20 IO NOOE    296.20 IS COOE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANOSCAPING RUNOEF COEFEICIENT = .3000
 SOIL CLASSIEICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  8S
 INITIAL SUBAREA ELOW-LENGTH(EEET) =   240.00
 UPSTREAM ELEVATION(FEET) =    804.00
 OOWNSTREAM ELEVATTON(FEET) =    778.00
 ELEVATTON DIEEERENCE(EEET) =     26.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND ELOW LENGTH =   100.00
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND ELOW LENGIH TS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
 SUBAREA RUNOEE(CES) =      0.61
 TOTAL AREA(ACRES) =      0.2B   TOTAL RUNOEF(CES) =      0.61

****************************************************************************
 ELOW PROCESS FROM NOOE    296.20 IO NODE    294.20 TS COOE =  S1
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIOAL CHANNEL ELOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTTNG ELEMENT)<<<<<
============================================================================
 ELEVATION OATA: UPSTREAM(EEEI) =    778.00  OOWNSIREAM(EEET) =    70B.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.22SB
 CHANNEL BASE(FEET) =   10.00   "Z" EACTOR =   S.000
 MANNING'S FACTOR = 0.03S   MAXTMUM DEPTH(EEET) =   1.00
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  6.117
 NATURAL DESERT LANOSCAPING RUNOFE COEEEICIENI = .3000
 SOTL CLASSIEICATION TS "C"
 S.C.S. CURVE NUMBER (AMC II) =  8S
 TRAVEL TIME COMPUTED USING ESTIMATED ELOW(CES) =       1.33
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.66
 AVERAGE ELOW DEPTH(EEET) =   0.0S   TRAVEL TIME(MIN.) =   1.94
 Tc(MIN.) =    8.63
 SUBAREA AREA(ACRES) =     0.7B       SUBAREA RUNOEF(CES) =    1.43
 AREA-AVERAGE RUNOEE COEEETCIENT =  0.300
 IOTAL AREA(ACRES) =        1.1         PEAK ELOW RATE(CES) =       1.9S

 END OF SUBAREA CHANNEL ELOW HYDRAULICS:
 DEPIH(EEET) =  0.06   FLOW VELOCITY(FEEI/SEC.) =   2.9S
 LONGESI FLOWPAIH FROM NOOE    298.20 TO NOOE    294.20 =     SS0.00 FEET.

****************************************************************************
 FLOW PROCESS EROM NODE    294.20 TO NODE    292.20 TS CODE =  31
```



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----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
 ELEVATION DAIA: UPSTREAM(EEEI) =   70B.00  OOWNSTREAM(EEET) =   704.00
 ELOW LENGTH(EEEI) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.6 INCHES
 PIPE-ELOW VELOCITY(FEET/SEC.) =  12.62
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-ELOW(CFS) =       1.9S
 PIPE TRAVEL IIME(MIN.) =   0.03    Tc(MIN.) =    8.6S
 LONGEST FLOWPATH EROM NODE    298.20 TO NODE    292.20 =     S70.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NODE    294.20 TO NODE    292.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT SIREAM EOR CONELUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONELUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OE STREAMS =  2
 CONELUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OE CONCENTRATION(MIN.) =    8.6S
 RAINEALL INTENSITY(INCH/HR) =   6.10
 TOTAL STREAM AREA(ACRES) =     1.06
 PEAK FLOW RAIE(CES) AT CONELUENCE =      1.9S

 ** CONFLUENCE DATA **
 STREAM      RUNOFE       Tc       INTENSIIY      AREA
 NUMBER       (CES)     (MIN.)   (INCH/HOUR)    (ACRE)
    1          S.S4      9.99        S.S63         1.S3
    2          1.9S      8.6S        6.10S         1.06

 RAINEALL INTENSITY AND TIME OE CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK ELOW RAIE TABLE **
 STREAM      RUNOEE       Tc       INIENSITY
 NUMBER       (CES)     (MIN.)   (INCH/HOUR)
    1          6.99      8.6S        6.10S
    2          7.31      9.99        S.S63

 COMPUTED CONFLUENCE ESTIMATES ARE AS EOLLOWS:
 PEAK FLOW RATE(CES) =       7.31   Tc(MIN.) =    9.99
 TOTAL AREA(ACRES) =       2.6
 LONGESI ELOWPAIH FROM NODE    212.40 TO NOOE    292.20 =     87S.00 EEET.

****************************************************************************
 ELOW PROCESS FROM NOOE    292.20 TO NOOE    284.20 IS COOE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(EEET) =   704.00  OOWNSTREAM(EEET) =   674.00
 ELOW LENGIH(EEET) =   1S0.00   MANNING'S N =  0.013
 ESTIMAIED PIPE OIAMETER(INCH) TNCREASEO TO 18.000
 DEPIH OF ELOW IN  18.0 INCH PIPE TS   4.9 INCHES
```

```
 PIPE-FLOW VELOCITY(EEET/SEC.) =  18.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.31
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.13
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    284.20 =    1025.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NODE    292.20 TO NODE    284.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.13
 RAINFALL INTENSITY(INCH/HR) =   5.52
 TOTAL STREAM AREA(ACRES) =     2.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.31

****************************************************************************
 FLOW PROCESS FROM NODE    290.20 TO NODE    288.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
 UPSTREAM ELEVATION(FEET) =    880.00
 DOWNSTREAM ELEVATION(FEET) =    826.00
 ELEVATION DIFFERENCE(FEET) =     54.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE    288.20 TO NODE    286.20 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    826.00  DOWNSTREAM(FEET) =    680.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.2433
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.980
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.49
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.45
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.25
 Tc(MIN.) =    8.93
```



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 SUBAREA AREA(ACRES) =     4.36       SUBAREA RUNOFF(CFS) =     7.82
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        4.6         PEAK FLOW RATE(CFS) =       8.29

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   5.45
 LONGEST FLOWPATH FROM NODE    290.20 TO NODE    286.20 =     750.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    286.20 TO NODE    284.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   680.00  DOWNSTREAM(FEET) =   674.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.28
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.29
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.95
 LONGEST FLOWPATH FROM NODE    290.20 TO NODE    284.20 =     770.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    286.20 TO NODE    284.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.95
 RAINFALL INTENSITY(INCH/HR) =   5.97
 TOTAL STREAM AREA(ACRES) =     4.62
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.29

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         7.31     10.13        5.515         2.59
    2         8.29      8.95        5.973         4.62

 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        15.04      8.95        5.973
    2        14.96     10.13        5.515

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.04   Tc(MIN.) =    8.95
 TOTAL AREA(ACRES) =        7.2
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    284.20 =    1025.00 FEET.
```

```
************************************************************************
 FLOW PROCESS FROM NODE    284.20 TO NODE    276.20 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   674.00  DOWNSTREAM(FEET) =   661.00
 FLOW LENGTH(FEET) =   155.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.04
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.10
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    276.20 =    1180.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    284.20 TO NODE    276.20 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         15.04      9.10        5.907         7.21
 LONGEST FLOWPATH FROM NODE    212.40 TO NODE    276.20 =    1180.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1         91.32     10.28        5.462        37.63
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    276.20 =    2022.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1        95.93      9.10        5.907
    2       105.22     10.28        5.462

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     105.22   Tc(MIN.) =   10.28
 TOTAL AREA(ACRES) =       44.8

************************************************************************
 FLOW PROCESS FROM NODE    284.20 TO NODE    276.20 IS CODE =  12
------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
========================================================================

************************************************************************
 FLOW PROCESS FROM NODE    276.20 TO NODE    262.20 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   661.00  DOWNSTREAM(FEET) =   655.00
```



```
 FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.30
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     105.22
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.34
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    262.20 =    2112.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    276.20 TO NODE    262.20 IS CODE =   1
------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   5.44
 TOTAL STREAM AREA(ACRES) =    44.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    105.22

************************************************************************
 FLOW PROCESS FROM NODE    274.20 TO NODE    272.20 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    669.00
 DOWNSTREAM ELEVATION(FEET) =    668.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.256
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    65.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.838
 SUBAREA RUNOFF(CFS) =      0.37
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.37

************************************************************************
 FLOW PROCESS FROM NODE    272.20 TO NODE    270.20 IS CODE =  62
------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
 UPSTREAM ELEVATION(FEET) =  668.00  DOWNSTREAM ELEVATION(FEET) =  659.00
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
 Manning's FRICIION FACIOR for Streetflow Section(curb-to-curb) =   0.0IS0
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESIIMATED FLOW(CFS) =       2.47
   SIREEIFLOW MOOEL RESULTS USING ESTIMATED FLOW:
   SIREEI FLOW OEPIH(FEEI) =  0.3I
   HALFSTREET FLOOO WIOTH(FEET) =    8.22
   AVERAGE FLOW VELOCITY(FEEI/SEC.) =    3.10
   PROOUCT OF OEPTH&VELOCITY(FT*FT/SEC.) =    0.96
 STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =    9.32
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.8I7
 RESIDENTIAL (I4.5 OU/AC OR LESS) RUNOFF COEFFICIENI = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENI =  0.600
 SUBAREA AREA(ACRES) =    I.20      SUBAREA RUNOFF(CFS) =    4.I9
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RAIE(CFS) =       4.S0

 END OF SUBAREA SIREET FLOW HYORAULICS:
 DEPIH(FEET) = 0.36   HALFSTREET FLOOD WIDIH(FEET) =  11.0S
 FLOW VELOCITY(FEET/SEC.) =  3.S0   DEPIH*VELOCIIY(FI*FI/SEC.) =   1.26
 LONGEST FLOWPATH FROM NOOE    274.20 IO NOOE    270.20 =     48S.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    270.20 IO NODE    262.20 IS CODE =  3I
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUIER-ESIIMAIED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVAIION DAIA: UPSIREAM(FEEI) =   6S6.00  DOWNSIREAM(FEEI) =   6SS.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.0I3
 ESIIMATEO PIPE DIAMEIER(INCH) INCREASED IO 18.000
 DEPIH OF FLOW IN  I8.0 INCH PIPE IS   S.S INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.88
 ESTIMATEO PIPE OIAMEIER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.S0
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.36
 LONGESI FLOWPAIH FROM NOOE    274.20 TO NODE    262.20 =     S0S.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    270.20 IO NODE    262.20 IS COOE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNAIE INOEPENOENI SIREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF SIREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENIRAIION(MIN.) =    9.36
 RAINFALL INIENSIIY(INCH/HR) =   5.80
 TOIAL STREAM AREA(ACRES) =     I.29
 PEAK FLOW RATE(CFS) AI CONFLUENCE =      4.S0

****************************************************************************
 FLOW PROCESS FROM NOOE    268.20 TO NODE    266.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INIIIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENIIAL (I4.S OU/AC OR LESS) RUNOFF COEFFICIENI = .6000
```



```
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGIH(FEET) =   I00.00
 UPSTREAM ELEVAIION(FEEI) =    722.S0
 OOWNSIREAM ELEVAIION(FEET) =    721.00
 ELEVAIION DIFFERENCE(FEEI) =      I.S0
 SUBAREA OVERLANO TIME OF FLOW(MIN.) =    6.69S
 WARNING: INIIIAL SUBAREA FLOW PAIH LENGTH IS GREAIER IHAN
          IHE MAXIMUM OVERLANO FLOW LENGTH =    72.S0
          (Reference: Table 3-18 of Hydrology Manual)
          IHE MAXIMUM OVERLAND FLOW LENGTH IS USEO IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSIIY(INCH/HOUR) =  7.203
 SUBAREA RUNOFF(CFS) =      0.99
 TOIAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.99

****************************************************************************
 FLOW PROCESS FROM NOOE    266.20 TO NOOE    264.20 IS COOE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREEI IABLE SECIION #  I USEO)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  72I.00  DOWNSIREAM ELEVAIION(FEET) =  6S9.00
 SIREEI LENGIH(FEET) =   640.00   CURB HEIGHI(INCHES) =  6.0
 SIREEI HALFWIDIH(FEEI) = 30.00

 DISTANCE FROM CROWN IO CROSSFALL GRAOEBREAK(FEET) =  20.00
 INSIDE SIREEI CROSSFALL(DECIMAL) =  0.0I8
 OUTSIDE STREEI CROSSFALL(DECIMAL)  =  0.0IB

 SPECIFIED NUMBER OF HALFSIREEIS CARRYING RUNOFF =  I
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICIION FACIOR for Streetflow Section(curb-to-curb) =   0.0IS0
 Manning's FRICIION FACIOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUIED USING ESIIMATEO FLOW(CFS) =       3.37
   SIREETFLOW MOOEL RESULIS USING ESIIMAIED FLOW:
   STREET FLOW OEPTH(FEET) =  0.28
   HALFSTREEI FLOOO WIOTH(FEEI) =    6.47
   AVERAGE FLOW VELOCIIY(FEEI/SEC.) =    S.94
   PRODUCI OF DEPIH&VELOCITY(FT*FT/SEC.) =    I.6S
 STREEI FLOW IRAVEL TIME(MIN.) =   I.80   Ic(MIN.) =    8.49
  I00 YEAR RAINFALL INIENSIIY(INCH/HOUR) =  6.179
 RESIOENIIAL (14.S OU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICAIION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENI =  0.600
 SUBAREA AREA(ACRES) =    I.28      SUBAREA RUNOFF(CFS) =    4.75
 IOIAL AREA(ACRES) =        I.S        PEAK FLOW RATE(CFS) =       S.60

 ENO OF SUBAREA STREET FLOW HYORAULICS:
 DEPIH(FEEI) = 0.32   HALFSTREET FLOOD WIOTH(FEET) =  8.66
 FLOW VELOCITY(FEET/SEC.) =  6.49   OEPTH*VELOCIIY(FI*FI/SEC.) =   2.06
 LONGEST FLOWPATH FROM NOOE    268.20 IO NOOE    264.20 =     740.00 FEEI.

****************************************************************************
 FLOW PROCESS FROM NOOE    264.20 TO NODE    262.20 IS CODE =  3I
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   656.00  DOWNSTREAM(FEET) =   655.00
FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  17.24
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       5.60
PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    8.50
LONGEST FLOWPATH FROM NODE    268.20 TO NODE    262.20 =     745.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    264.20 TO NODE    262.20 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.) =    8.50
RAINFALL INTENSITY(INCH/HR) =   6.18
TOTAL STREAM AREA(ACRES) =     1.51
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.60

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1      105.22    10.34        5.441         44.84
    2        4.50     9.36        5.803          1.29
    3        5.60     8.50        6.177          1.51

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       96.14     8.50        6.177
    2      104.98     9.36        5.803
    3      114.38    10.34        5.441

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     114.38   Tc(MIN.) =   10.34
TOTAL AREA(ACRES) =      47.6
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    262.20 =    2112.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    262.20 TO NODE    256.20 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   655.00  DOWNSTREAM(FEET) =   644.00
FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.9 INCHES
```



```
PIPE-FLOW VELOCITY(FEET/SEC.) =  22.04
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     114.38
PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.50
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    256.20 =    2322.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    262.20 TO NODE    256.20 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   10.50
RAINFALL INTENSITY(INCH/HR) =   5.39
TOTAL STREAM AREA(ACRES) =    47.64
PEAK FLOW RATE(CFS) AT CONFLUENCE =    114.38

****************************************************************************
FLOW PROCESS FROM NODE    262.20 TO NODE    260.20 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  86
INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
UPSTREAM ELEVATION(FEET) =    654.00
DOWNSTREAM ELEVATION(FEET) =    653.00
ELEVATION DIFFERENCE(FEET) =      1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.095
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    66.67
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.938
SUBAREA RUNOFF(CFS) =      0.46
TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
FLOW PROCESS FROM NODE    260.20 TO NODE    258.20 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  653.00  DOWNSTREAM ELEVATION(FEET) =  650.00
STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

```
   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.21
   SIREEIFLOW MODEL RESULIS USING ESIIMATED FLOW:
   SIREEI FLOW DEPIH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   10.90
   AVERAGE FLOW VELOCIIY(FEET/SEC.) =    2.56
   PRODUCT OF DEPIH&VELOCITY(FT*FI/SEC.) =    0.91
 STREET FLOW TRAVEL TIME(MIN.) =   1.56   Ic(MIN.) =    8.66
  100 YEAR RAINFALL INTENSIIY(INCH/HOUR) =  6.102
 RESIDENIIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENI = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENI =  0.600
 SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    5.49
 TOTAL AREA(ACRES) =       1.6       PEAK FLOW RATE(CFS) =       5.89

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPIH(FEET) = 0.42   HALFSTREEI FLOOD WIDTH(FEET) =  14.26
 FLOW VELOCIIY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
 LONGESI FLOWPAIH FROM NODE    262.20 IO NODE    258.20 =    330.00 FEEI.

****************************************************************************
 FLOW PROCESS FROM NODE    258.20 TO NODE    256.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW IRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DAIA: UPSIREAM(FEET) =   646.00  DOWNSTREAM(FEET) =   644.00
 FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
 ESIIMAIED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCIIY(FEET/SEC.) =   5.72
 ESIIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.89
 PIPE TRAVEL IIME(MIN.) =   0.63    Tc(MIN.) =    9.28
 LONGESI FLOWPATH FROM NODE    262.20 TO NODE    256.20 =    545.00 FEEI.

****************************************************************************
 FLOW PROCESS FROM NODE    258.20 IO NODE    256.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNAIE INDEPENDENT SIREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED SIREAM VALUES<<<<<
============================================================================
 TOIAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 IIME OF CONCENIRAIION(MIN.) =    9.28
 RAINFALL INTENSIIY(INCH/HR) =   5.83
 TOTAL STREAM AREA(ACRES) =     1.61
 PEAK FLOW RAIE(CFS) AI CONFLUENCE =       5.89

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INIENSIIY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       114.38    10.50        5.388         47.64
    2         5.89     9.28        5.833          1.61

 RAINFALL INTENSIIY AND IIME OF CONCENIRAIION RAIIO
```



```
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE IABLE **
 SIREAM     RUNOFF       Tc      INIENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       111.55     9.28        5.833
    2       119.82    10.50        5.388

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RAIE(CFS) =     119.82   Tc(MIN.) =   10.50
 TOIAL AREA(ACRES) =       49.2
 LONGESI FLOWPATH FROM NODE    216.60 IO NODE    256.20 =    2322.00 FEEI.

****************************************************************************
 FLOW PROCESS FROM NODE    256.20 TO NODE    242.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESIIMAIED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVAIION DAIA: UPSIREAM(FEET) =   644.00  DOWNSTREAM(FEEI) =   628.00
 FLOW LENGIH(FEEI) =   235.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.8 INCHES
 PIPE-FLOW VELOCIIY(FEEI/SEC.) =  24.99
 ESIIMAIED PIPE DIAMEIER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     129.82
 PIPE TRAVEL IIME(MIN.) =   0.16    Tc(MIN.) =   10.66
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    242.20 =    2557.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    256.20 TO NODE    242.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENI STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 IIME OF CONCENIRAIION(MIN.) =   10.66
 RAINFALL INTENSITY(INCH/HR) =   5.34
 IOIAL SIREAM AREA(ACRES) =    49.25
 PEAK FLOW RAIE(CFS) AI CONFLUENCE =    119.82

****************************************************************************
 FLOW PROCESS FROM NODE    248.20 IO NODE    246.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RAIIONAL MEIHOD INIIIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENI = .6000
 SOIL CLASSIFICAIION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSIREAM ELEVAIION(FEET) =    654.00
 DOWNSIREAM ELEVAIION(FEEI) =    653.00
 ELEVAIION DIFFERENCE(FEEI) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.256
 WARNING: INIIIAL SUBAREA FLOW PAIH LENGIH IS GREAIER IHAN
          IHE MAXIMUM OVERLAND FLOW LENGIH =    65.00
          (Reference: Iable 3-18 of Hydrology Manual)
          IHE MAXIMUM OVERLAND FLOW LENGIH IS USED IN Tc CALCULATION!
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```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.838
SUBAREA RUNOFF(CFS) =      0.41
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    246.20 TO NODE    244.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  653.00  DOWNSTREAM ELEVATION(FEET) =  633.00
 STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    7.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.81
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
 STREET FLOW TRAVEL TIME(MIN.) =   2.41   Tc(MIN.) =    9.66
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.685
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.45      SUBAREA RUNOFF(CFS) =    4.95
 TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CES) =       5.29

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.74
 FLOW VELOCITY(FEET/SEC.) =  4.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
 LONGEST FLOWPATH FROM NODE    248.20 TO NODE    244.20 =     650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    244.20 TO NODE    242.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   628.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.33
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CES) =       5.29
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.69
```



```
 LONGEST FLOWPATH FROM NODE    248.20 TO NODE    242.20 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    244.20 TO NODE    242.20 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.) =    9.69
 RAINFALL INTENSITY(INCH/HR) =   5.67
 TOTAL STREAM AREA(ACRES) =     1.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.29

****************************************************************************
 FLOW PROCESS FROM NODE    254.20 TO NODE    252.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
 UPSTREAM ELEVATION(FEET) =    654.00
 DOWNSTREAM ELEVATION(FEET) =    653.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.012
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    67.65
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.991
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CES) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    252.20 TO NODE    250.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  653.00  DOWNSTREAM ELEVATION(FEET) =  633.00
 STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
```

```
   HALFSIREET FLOOD WIDTH(EEET) =    8.34
   AVERAGE FLOW VELOCTTY(EEET/SEC.) =    4.66
   PRODUCT OE DEPTH&VELOCITY(ET*ET/SEC.) =    1.45
 STREET FLOW TRAVEL TTME(MIN.) =   1.39   Tc(MTN.) =    8.41
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.219
 RESTDENTTAL (14.5 OU/AC OR LESS) RUNOFF COEEFICIENT = .6000
 SOIL CLASSIETCATION TS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOEF COEEETCIENT =  0.600
 SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOEE(CES) =    6.75
 TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       7.13

 END OE SUBAREA STREET ELOW HYDRAULTCS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(EEET) =  11.37
 FLOW VELOCITY(EEET/SEC.) =  5.29   OEPTH*VELOCTTY(ET*ET/SEC.) =   1.93
 LONGEST FLOWPATH EROM NOOE    254.20 TO NOOE    250.20 =     475.00 EEET.

****************************************************************************
 FLOW PROCESS EROM NODE    250.20 TO NODE    242.20 TS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PTPE-ELOW IRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTTMATEO PTPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATTON DATA: UPSTREAM(EEET) =   629.00  DOWNSTREAM(EEET) =   628.00
 ELOW LENGTH(EEET) =     5.00   MANNING'S N =  0.013
 ESTIMATEO PIPE OIAMETER(TNCH) TNCREASED TO 18.000
 DEPTH OE FLOW TN  18.0 TNCH PIPE TS   4.9 TNCHES
 PTPE-ELOW VELOCTTY(FEET/SEC.) =  18.47
 ESTTMATED PTPE DTAMETER(TNCH) =  18.00    NUMBER OF PIPES =   1
 PTPE-FLOW(CES) =       7.13
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MTN.) =    8.41
 LONGESI ELOWPATH FROM NODE    254.20 TO NOOE    242.20 =     480.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NOOE    250.20 TO NODE    242.20 TS COOE =   1
----------------------------------------------------------------------------
 >>>>>OESIGNATE TNDEPENDENT STREAM EOR CONELUENCE<<<<<
 >>>>>ANO COMPUTE VARTOUS CONELUENCEO STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OE STREAMS =  3
 CONELUENCE VALUES USEO FOR TNOEPENOENT STREAM  3 ARE:
 TTME OF CONCENTRATION(MTN.) =    8.41
 RAINEALL TNTENSTTY(TNCH/HR) =   6.22
 TOTAL STREAM AREA(ACRES) =     1.91
 PEAK FLOW RATE(CES) AT CONELUENCE =      7.13

 ** CONFLUENCE DATA **
 STREAM     RUNOEE       Tc      TNTENSITY      AREA
 NUMBER      (CES)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       119.82    10.66        5.337         49.25
    2         5.29     9.69        5.673          1.55
    3         7.13     8.41        6.217          1.91

 RAINEALL TNTENSTTY ANO TIME OE CONCENTRATION RATTO
 CONFLUENCE EORMULA USEO FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
```



```
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CF5)     (MIN.)   (TNCH/HOUR)
    1       114.58     8.41        6.217
    2       124.52     9.69        5.673
    3       130.91    10.66        5.337

 COMPUTEO CONELUENCE ESTTMATES ARE AS EOLLOWS:
 PEAK FLOW RATE(CFS) =     130.91   Tc(MIN.) =   10.66
 TOIAL AREA(ACRES) =       52.7
 LONGEST FLOWPATH FROM NOOE    216.60 TO NOOE    242.20 =    2557.00 EEET.

****************************************************************************
 ELOW PROCESS FROM NODE    242.20 TO NODE    214.20 IS COOE =  31
----------------------------------------------------------------------------
 >>>>>COMPUIE PTPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTTMATED PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
 ELEVATTON OATA: UPSTREAM(EEET) =   628.00  OOWNSTREAM(FEET) =   625.00
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OE FLOW IN  36.0 INCH PIPE IS  27.3 INCHES
 PTPE-ELOW VELOCTIY(EEET/SEC.) =  22.72
 ESTTMATEO PTPE OIAMETER(TNCH) =  36.00    NUMBER OF PTPES =   1
 PIPE-ELOW(CES) =     130.91
 PTPE TRAVEL TIME(MIN.) =   0.04    Tc(MTN.) =   10.70
 LONGESI FLOWPAIH FROM NODE    216.60 TO NODE    214.20 =    2617.00 FEEI.

****************************************************************************
 ELOW PROCESS FROM NOOE    252.20 TO NODE    214.20 IS COOE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE TNDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED EOR INOEPENOENI STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.70
 RATNEALL TNTENSTTY(TNCH/HR) =   5.32
 TOTAL STREAM AREA(ACRES) =    52.71
 PEAK FLOW RATE(CES) AT CONELUENCE =    130.91

****************************************************************************
 FLOW PROCESS FROM NODE    240.20 TO NODE    238.20 TS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATTONAL METHOO INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESTOENTIAL (14.5 OU/AC OR LESS) RUNOEE COEEETCTENT = .6000
 SOIL CLASSTETCAITON TS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(EEET) =    98.00
 UPSTREAM ELEVATTON(EEET) =    634.00
 DOWNSTREAM ELEVATTON(EEET) =    633.00
 ELEVATTON OIFEERENCE(FEET) =      1.00
 SUBAREA OVERLANO TTME OF FLOW(MIN.) =    7.224
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH TS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    65.31
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND ELOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.857
 SUBAREA RUNOFE(CES) =      0.41
```

```
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    238.20 TO NODE    236.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  633.00  DOWNSTREAM ELEVATION(FEET) =  630.00
 STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   10.82
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
 STREET FLOW TRAVEL TIME(MIN.) =   2.29   Tc(MIN.) =    9.51
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.743
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    4.76
 TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.10

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.18
 FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
 LONGEST FLOWPATH FROM NODE    240.20 TO NODE    236.20 =     408.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    236.20 TO NODE    230.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   627.00  DOWNSTREAM(FEET) =   626.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS    5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.22
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.10
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.54
 LONGEST FLOWPATH FROM NODE    240.20 TO NODE    230.20 =     428.00 FEET.
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    230.20 TO NODE    214.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   625.00
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS    9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.10
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.84
 LONGEST FLOWPATH FROM NODE    240.20 TO NODE    214.20 =     528.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.20 TO NODE    214.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   5.62
 TOTAL STREAM AREA(ACRES) =     1.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.10

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1      130.91    10.70        5.323         52.71
    2        5.10     9.84        5.619          1.48

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1      129.11     9.84        5.619
    2      135.74    10.70        5.323

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     135.74   Tc(MIN.) =   10.70
 TOTAL AREA(ACRES) =       54.2
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    214.20 =    2617.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.20 TO NODE    214.20 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    230.20 TO NODE    214.20 IS CODE =  13
```

```
------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
========================================================================

************************************************************************
 FLOW PROCESS FROM NODE    229.20 TO NODE    227.20 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    708.00
 DOWNSTREAM ELEVATION(FEET) =    694.00
 ELEVATION DIFFERENCE(FEET) =     14.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
 SUBAREA RUNOFF(CFS) =      0.19
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.19

************************************************************************
 FLOW PROCESS FROM NODE    227.20 TO NODE    225.20 IS CODE =  51
------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    694.00  DOWNSTREAM(FEET) =    673.00
 CHANNEL LENGTH THRU SUBAREA(EEET) =   180.00   CHANNEL SLOPE =  0.1167
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.296
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.92
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.56
 Tc(MIN.) =    8.25
 SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =     1.51
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       1.68

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.47
 LONGEST FLOWPATH FROM NODE    229.20 TO NODE    225.20 =     280.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    225.20 TO NODE    224.20 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(EEET) =   673.00  DOWNSTREAM(FEET) =   629.00
 FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```



```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
 PIPE-FLOW VELOCITY(EEET/SEC.) =  11.62
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.68
 PIPE TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =    8.60
 LONGEST FLOWPATH FROM NODE    229.20 TO NODE    224.20 =     525.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    225.20 TO NODE    224.20 IS CODE =   1
------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.60
 RAINFALL INTENSITY(INCH/HR) =   6.13
 TOTAL STREAM AREA(ACRES) =     0.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.68

************************************************************************
 FLOW PROCESS FROM NODE    228.20 TO NODE    226.20 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    635.00
 DOWNSTREAM ELEVATION(FEET) =    634.00
 ELEVATION DIFFERENCE(EEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.343
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    68.75
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.786
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.27

************************************************************************
 FLOW PROCESS FROM NODE    226.20 TO NODE    224.20 IS CODE =  62
------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
 UPSTREAM ELEVATION(EEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  632.00
 STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(EEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.S4
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    6.84
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.S2
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
 STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    8.10
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.368
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .S700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.S70
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.S4
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.79

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.41
 FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
 LONGEST FLOWPATH FROM NODE    228.20 TO NODE    224.20 =     19S.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    226.20 TO NODE    224.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.10
 RAINFALL INTENSITY(INCH/HR) =   6.37
 TOTAL STREAM AREA(ACRES) =     0.77
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.79

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        1.68     8.60        6.129          0.89
     2        2.79     8.10        6.368          0.77

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        4.38     8.10        6.368
     2        4.37     8.60        6.129

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.38   Tc(MIN.) =    8.10
 TOTAL AREA(ACRES) =        1.7
 LONGEST FLOWPATH FROM NODE    229.20 TO NODE    224.20 =     S2S.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.20 TO NODE    216.20 IS CODE =  31
```



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----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   628.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   S.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.80
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.38
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.14
 LONGEST FLOWPATH FROM NODE    229.20 TO NODE    216.20 =     54S.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.20 TO NODE    216.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.14
 RAINFALL INTENSITY(INCH/HR) =   6.3S
 TOTAL STREAM AREA(ACRES) =     1.66
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.38

****************************************************************************
 FLOW PROCESS FROM NODE    222.20 TO NODE    220.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .S700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  8S
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    636.00
 DOWNSTREAM ELEVATION(FEET) =    63S.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.343
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    68.7S
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.786
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    220.20 TO NODE    218.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  63S.00  DOWNSTREAM ELEVATION(FEET) =  632.00
 STREET LENGTH(FEET) =   1S0.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00
```

```
 OISIANCE FROM CROWN IO CROSSEALL GRADEBREAK(EEET) =  20.00
 INSIDE SIREET CROSSFALL(DECIMAL) =  0.018
 OUISIOE SIREEI CROSSEALL(OECIMAL)  =  0.018

 SPECIEIED NUMBER OE MALESTREETS CARRYING RUNOEE =  1
 SIREEI PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICIION EACIOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's ERICIION FACIOR for Back-of-Walk Elow Section =   0.0200

   **IRAVEL IIME COMPUIED USING ESIIMATED FLOW(CFS) =       0.97
   SIREETFLOW MODEL RESULIS USING ESIIMAIED ELOW:
   SIREEI FLOW DEPIH(EEET) =  0.24
   MALESIREEI ELOOD WIOIH(EEEI) =    4.53
   AVERAGE ELOW VELOCITY(FEEI/SEC.) =    2.56
   PRODUCT OE DEPIH&VELOCITY(FI*FI/SEC.) =    0.62
 SIREET ELOW TRAVEL TIME(MIN.) =   0.98   Ic(MIN.) =    8.32
  100 YEAR RAINEALL INIENSIIY(INCH/HOUR) =  6.261
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOEF COEEFICIENI = .5700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 AREA-AVERAGE RUNOEE COEEEICIENI =  0.570
 SUBAREA AREA(ACRES) =    0.39      SUBAREA RUNOEE(CES) =    1.39
 IOIAL AREA(ACRES) =       0.5       PEAK ELOW RAIE(CES) =       1.64

 ENO OE SUBAREA SIREEI ELOW HYORAULICS:
 OEPTH(FEEI) = 0.28   HALESIREEI ELOOO WIOTH(EEET) =   6.78
 FLOW VELOCITY(EEEI/SEC.) =  2.72   OEPIH*VELOCIIY(EI*FT/SEC.) =   0.77
 LONGEST ELOWPAIH FROM NOOE    222.20 TO NOOE    218.20 =     230.00 FEEI.

****************************************************************************
 ELOW PROCESS EROM NOOE    218.20 TO NOOE    216.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUIE PIPE-ELOW IRAVEL IIME IHRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVAIION OAIA: UPSIREAM(EEEI) =   629.00  OOWNSIREAM(FEEI) =   628.00
 FLOW LENGIH(FEEI) =     5.00   MANNING'S N =  0.013
 ESIIMAIED PIPE DIAMEIER(INCH) INCREASED IO 18.000
 OEPIH OE FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
 PIPE-FLOW VELOCIIY(FEEI/SEC.) =  12.02
 ESIIMAIED PIPE OIAMEIER(INCH) =  18.00    NUMBER OE PIPES =   1
 PIPE-ELOW(CES) =       1.64
 PIPE IRAVEL IIME(MIN.) =   0.01    Tc(MIN.) =    8.33
 LONGEST ELOWPAIH FROM NOOE    222.20 IO NODE    216.20 =     235.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NOOE    218.20 IO NODE    216.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>OESIGNAIE INOEPENDENI SIREAM FOR CONELUENCE<<<<<
 >>>>>AND COMPUIE VARIOUS CONELUENCED SIREAM VALUES<<<<<
============================================================================
 IOIAL NUMBER OE SIREAMS =  2
 CONFLUENCE VALUES USED EOR INDEPENDENT STREAM  2 ARE:
 IIME OF CONCENIRAIION(MIN.) =    8.33
 RAINEALL INTENSIIY(INCH/HR) =   6.26
 IOIAL SIREAM AREA(ACRES) =     0.46
 PEAK ELOW RAIE(CFS) AT CONFLUENCE =      1.64
```



```
 ** CONFLUENCE DAIA **
 STREAM      RUNOEE        Tc      INIENSIIY      AREA
 NUMBER       (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
     1         4.38       8.14        6.351         1.66
     2         1.64       8.33        6.258         0.46

 RAINEALL INIENSIIY AND IIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED EOR  2 SIREAMS.

 ** PEAK FLOW RAIE TABLE **
 STREAM      RUNOEE        Tc      INIENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         5.98       8.14        6.351
     2         5.96       8.33        6.258

 COMPUTED CONELUENCE ESTIMAIES ARE AS EOLLOWS:
 PEAK ELOW RATE(CFS) =        5.98   Ic(MIN.) =    8.14
 TOTAL AREA(ACRES) =        2.1
 LONGEST FLOWPATH FROM NOOE    229.20 TO NOOE    216.20 =     545.00 EEET.

****************************************************************************
 ELOW PROCESS EROM NOOE    216.20 IO NODE    214.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-ELOW TRAVEL IIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESIIMATED PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
 ELEVAIION OATA: UPSTREAM(FEET) =   628.00  OOWNSTREAM(FEEI) =   625.00
 ELOW LENGIH(EEET) =   115.00   MANNING'S N =  0.013
 ESIIMATED PIPE DIAMEIER(INCH) INCREASED TO 18.000
 OEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
 PIPE-ELOW VELOCIIY(EEEI/SEC.) =   8.44
 ESIIMAIED PIPE OIAMEIER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-ELOW(CFS) =       5.98
 PIPE IRAVEL TIME(MIN.) =   0.23    Ic(MIN.) =    8.37
 LONGEST ELOWPAIH FROM NOOE    229.20 IO NOOE    214.20 =     660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NOOE    216.20 IO NODE    214.20 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WIIH IHE MAIN-SIREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONELUENCE DAIA **
 STREAM      RUNOEE        Ic      INIENSIIY      AREA
 NUMBER       (CFS)      (MIN.)   (INCH/HOUR)   (ACRE)
     1         5.98       8.37        6.239        2.12
 LONGEST FLOWPATH FROM NODE    229.20 TO NODE    214.20 =     660.00 FEET.

 ** MEMORY BANK #  2 CONELUENCE DAIA **
 STREAM      RUNOFF        Ic      INTENSITY      AREA
 NUMBER       (CFS)      (MIN.)   (INCH/HOUR)   (ACRE)
     1       135.74      10.70        5.323       54.19
 LONGESI ELOWPATH FROM NODE    216.60 IO NODE    214.20 =    2617.00 FEEI.

 ** PEAK ELOW RAIE IABLE **
 STREAM    RUNOEE        Ic      INIENSIIY
```

```
  NUMBER      (CFS)      (MIN.)   (INCH/HOUR)
      1      112.11       8.37        6.239
      2      140.8S      10.70        S.323

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RAIE(CES) =      140.8S   Ic(MIN.) =   10.70
  IOIAL AREA(ACRES) =        S6.3

****************************************************************************
  FLOW PROCESS FROM NODE     216.20 TO NODE     214.20 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     214.20 IO NODE     200.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL IIME IHRU SUBAREA<<<<<
  >>>>>USING COMPUIER-ESIIMAIED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVAIION DAIA: UPSTREAM(FEEI) =   62S.00  DOWNSIREAM(FEET) =   608.00
  ELOW LENGIH(EEEI) =   240.00   MANNING'S N =  0.013
  DEPTH OF ELOW IN  36.0 INCH PIPE IS  2S.2 INCHES
  PIPE-FLOW VELOCITY(EEET/SEC.) =  26.67
  ESIIMAIED PIPE DIAMEIER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CES) =     140.8S
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.8S
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    200.20 =    28S7.00 FEEI.

****************************************************************************
  FLOW PROCESS FROM NODE     214.20 IO NODE     200.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  IOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENI SIREAM  1 ARE:
  IIME OF CONCENIRAIION(MIN.) =   10.8S
  RAINFALL INIENSIIY(INCH/HR) =   S.28
  IOTAL STREAM AREA(ACRES) =    S6.31
  PEAK FLOW RAIE(CES) AI CONFLUENCE =    140.8S

****************************************************************************
  FLOW PROCESS FROM NODE     206.20 IO NODE     204.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/SIORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INIIIAL SUBAREA FLOW-LENGIH(EEEI) =   11S.00
  UPSTREAM ELEVAIION(EEEI) =    632.00
  DOWNSTREAM ELEVAIION(EEEI) =    629.S0
  ELEVAIION DIFFERENCE(EEEI) =      2.S0
  SUBAREA OVERLAND IIME OF FLOW(MIN.) =    2.707
  WARNING: INITIAL SUBAREA FLOW PAIH LENGIH IS GREATER IHAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.74
           (Reference: Table 3-1B of Hydrology Manual)
```



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          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.69S
  NOTE: RAINFALL INIENSIIY IS BASED ON Tc = S-MINUTE.
  SUBAREA RUNOFF(CES) =      1.13
  IOTAL AREA(ACRES) =      0.1S   TOTAL RUNOFF(CES) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     204.20 TO NODE     202.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE SIREEI FLOW IRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(SIREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVAIION(FEEI) =  629.S0  DOWNSIREAM ELEVAIION(FEEI) =  612.00
  SIREET LENGTH(EEEI) =   280.00   CURB HEIGHT(INCHES) =  6.0
  SIREEI HALFWIDIH(EEEI) = 30.00

  DISIANCE FROM CROWN TO CROSSFALL GRADEBREAK(EEET) =  20.00
  INSIDE SIREEI CROSSFALL(DECIMAL) =  0.018
  OUTSIDE SIREET CROSSFALL(DECIMAL) =  0.018

  SPECIFIED NUMBER OF HALFSIREETS CARRYING RUNOFF =  1
  SIREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **IRAVEL IIME COMPUTED USING ESIIMATED FLOW(CFS) =       2.23
    SIREEIFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREEI FLOOD WIDTH(EEET) =    S.72
    AVERAGE FLOW VELOCIIY(EEET/SEC.) =    4.S9
    PRODUCI OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL IIME(MIN.) =   1.02   Ic(MIN.) =    3.72
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.69S
  NOTE: RAINFALL INIENSITY IS BASED ON Tc = S-MINUTE.
  SIREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICAIION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CES) =    2.19
  TOTAL AREA(ACRES) =       0.4       PEAK FLOW RAIE(CES) =       3.33

  END OF SUBAREA SIREEI FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDIH(EEET) =   7.34
  FLOW VELOCITY(EEET/SEC.) =  4.93   DEPIH*VELOCIIY(FT*FI/SEC.) =   1.4S
  LONGESI FLOWPAIH FROM NODE    206.20 TO NODE    202.20 =    39S.00 EEEI.

****************************************************************************
  FLOW PROCESS FROM NODE     202.20 TO NODE     202.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.69S
  NOTE: RAINFALL INIENSITY IS BASED ON Ic = S-MINUIE.
  RESIDENIIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICAIION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.S844
```

```
  SUBAREA AREA(ACRES) =     0.56   SUBAREA RUNOFF(CFS) =     1.75
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CES) =       5.08
  TC(MIN.) =     3.72

****************************************************************************
  FLOW PROCESS FROM NODE     202.20 TO NODE     200.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   609.00  DOWNSTREAM(FEET) =   608.00
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.08
  PIPE TRAVEL TIME(MIN.) =    0.00    Tc(MIN.) =     3.73
  LONGEST FLOWPATH FROM NODE    206.20 TO NODE     200.20 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     202.20 TO NODE     200.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =     3.73
  RAINFALL INTENSITY(INCH/HR) =   8.69
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.08

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      140.85    10.85        5.27         56.31
      2        5.08     3.73        8.69          1.00

  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       53.48     3.73        8.69
      2      143.93    10.85        5.27

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     143.93   Tc(MIN.) =   10.85
  TOTAL AREA(ACRES) =       57.3
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE     200.20 =    2857.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     202.20 TO NODE     200.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
```



```
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     202.20 TO NODE     200.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     212.20 TO NODE     210.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   163.00
  UPSTREAM ELEVATION(FEET) =    633.00
  DOWNSTREAM ELEVATION(FEET) =    632.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.42
  TOTAL AREA(ACRES) =      0.32   TOTAL RUNOFF(CFS) =      2.42

****************************************************************************
  FLOW PROCESS FROM NODE     210.20 TO NODE     208.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  632.50  DOWNSTREAM ELEVATION(FEET) =  612.00
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    5.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.291
```

```
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.676
 SUBAREA AREA(ACRES) =     0.81     SUBAREA RUNOFF(CFS) =     4.03
 TOTAL AREA(ACRES) =      1.1      PEAK FLOW RATE(CFS) =     6.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.13
 FLOW VELOCITY(FEET/SEC.) =  4.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.76
 LONGEST FLOWPATH FROM NODE    212.20 TO NODE    208.20 =    623.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.20 TO NODE    208.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.38
 RAINFALL INTENSITY(INCH/HR) =   8.29
 TOTAL STREAM AREA(ACRES) =     1.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.34

****************************************************************************
 FLOW PROCESS FROM NODE    213.20 TO NODE    211.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    646.00
 DOWNSTREAM ELEVATION(FEET) =    645.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.880
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.831
 SUBAREA RUNOFF(CFS) =      0.89
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.89

****************************************************************************
 FLOW PROCESS FROM NODE    211.20 TO NODE    209.20 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    615.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   670.00   CHANNEL SLOPE =  0.0448
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.557
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.70
```



```
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   4.13
 Tc(MIN.) =   10.01
 SUBAREA AREA(ACRES) =     2.55     SUBAREA RUNOFF(CFS) =     8.50
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 TOTAL AREA(ACRES) =      2.7      PEAK FLOW RATE(CFS) =     9.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   3.29
 LONGEST FLOWPATH FROM NODE    213.20 TO NODE    209.20 =    730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    211.20 TO NODE    209.20 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.01
 RAINFALL INTENSITY(INCH/HR) =   5.56
 TOTAL STREAM AREA(ACRES) =     2.74
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.14

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1          6.34     5.38       8.291          1.13
    2          9.14    10.01       5.557          2.74

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
    1         11.25     5.38       8.291
    2         13.38    10.01       5.557

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.38   Tc(MIN.) =   10.01
 TOTAL AREA(ACRES) =       3.9
 LONGEST FLOWPATH FROM NODE    213.20 TO NODE    209.20 =    730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    211.20 TO NODE    209.20 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         13.38    10.01       5.557          3.87
 LONGEST FLOWPATH FROM NODE    213.20 TO NODE    209.20 =    730.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
```

```
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1      143.93     10.85        5.275        57.31
 LONGEST FLOWPATH FROM NODE    216.60 TO NDDE    209.20 =    2857.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1     146.16      10.01        5.557
     2     156.64      10.85        5.275

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     156.64   Tc(MIN.) =   10.85
 TOTAL AREA(ACRES) =       61.2

****************************************************************************
 FLOW PROCESS FROM NODE    211.20 TO NODE    209.20 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    208.20 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   608.00  DOWNSTREAM(FEET) =   606.00
 FLOW LENGTH(FEET) =    98.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.89
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     156.64
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.95
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    216.00 =    2955.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.20 TO NODE    216.00 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      156.64     10.95        5.245       61.18
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    216.00 =    2955.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
     1       39.06     10.69        5.328       11.68
 LONGEST FLOWPATH FROM NODE    286.00 TO NODE    216.00 =    2056.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1     191.95      10.69        5.328
```



```
     2     195.09      10.95        5.245

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     195.09   Tc(MIN.) =   10.95
 TOTAL AREA(ACRES) =       72.9

****************************************************************************
 FLOW PROCESS FROM NODE    200.20 TO NODE    216.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   583.00
 FLOW LENGTH(FEET) =   472.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.86
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     195.09
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.26
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    202.00 =    3427.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    202.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.26
 RAINFALL INTENSITY(INCH/HR) =   5.15
 TOTAL STREAM AREA(ACRES) =    72.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    195.09

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    617.00
 DOWNSTREAM ELEVATION(FEET) =    611.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.185
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    92.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  611.00  DOWNSTREAM ELEVATION(FEET) =  587.00
  STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =    4.23
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    3.78
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       4.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.34
  FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE    214.00 TO NODE    210.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   584.00  DOWNSTREAM(FEET) =   583.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
```



```
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.26
  LONGEST FLOWPATH FROM NODE    214.00 TO NODE    202.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    202.00 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.) =    4.26
  RAINFALL INTENSITY(INCH/HR) =   8.69
  TOTAL STREAM AREA(ACRES) =      0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.54

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    617.00
  DOWNSTREAM ELEVATION(FEET) =    611.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.185
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    92.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  611.00  DOWNSTREAM ELEVATION(FEET) =  587.00
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
```

```
    STREEIFLOW MOOEL RESULIS USING ESIIMATEO FLOW:
    STREET FLOW OEPTH(EEET) =  0.2S
    HALESTREEI ELOOO WIOTH(EEET) =    S.03
    AVERAGE FLOW VELOCITY(EEEI/SEC.) =    3.96
    PRODUCI OF OEPTH&VELOCITY(ET*ET/SEC.) =    1.00
  STREET ELOW IRAVEL TIME(MIN.) =   2.10   Ic(MIN.) =    4.29
   100 YEAR RAINEALL INIENSIIY(INCH/HOUR) =  8.69S
  NOTE: RAINFALL INIENSIIY IS BASEO ON Ic = 5-MINUIE.
  STREETS & ROADS (CURBS/SIORM ORAINS) RUNOFE COEEEICIENT = .8700
  SOIL CLASSIEICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENI =  0.870
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOEF(CES) =    2.S7
  IOIAL AREA(ACRES) =       0.4       PEAK FLOW RATE(CES) =       2.9S

  END OE SUBAREA STREET FLOW HYORAULICS:
  DEPIH(EEEI) = 0.29   HALFSTREEI ELOOO WIOIH(EEEI) =   7.41
  FLOW VELOCITY(FEET/SEC.) =  4.32   OEPIH*VELOCIIY(FI*EI/SEC.) =   1.27
  LONGEST ELOWPATH FROM NODE    208.00 TO NOOE    204.00 =    600.00 EEET.

****************************************************************************
  FLOW PROCESS EROM NODE    204.00 IO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUIE PIPE-FLOW IRAVEL IIME IHRU SUBAREA<<<<<
  >>>>>USING COMPUIER-ESIIMAIEO PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVAIION OAIA: UPSIREAM(FEET) =   S84.00  OOWNSTREAM(FEET) =   583.00
  ELOW LENGTH(FEET) =     S.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  OEPTH OF ELOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCIIY(FEET/SEC.) =  14.29
  ESIIMAIEO PIPE DIAMEIER(INCH) =  18.00    NUMBER OE PIPES =   1
  PIPE-FLOW(CFS) =       2.9S
  PIPE TRAVEL IIME(MIN.) =   0.01    Tc(MIN.) =    4.29
  LONGEST ELOWPAIH EROM NODE    208.00 TO NOOE    202.00 =    60S.00 FEET.

****************************************************************************
  ELOW PROCESS EROM NODE    204.00 IO NODE    202.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INOEPENOENI SIREAM EOR CONFLUENCE<<<<<
  >>>>>ANO COMPUTE VARIOUS CONFLUENCED SIREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OE SIREAMS =  3
  CONFLUENCE VALUES USEO FOR INOEPENDENT SIREAM  3 ARE:
  TIME OE CONCENTRAIION(MIN.) =    4.29
  RAINEALL INTENSITY(INCH/HR) =   8.69
  TOTAL SIREAM AREA(ACRES) =     0.39
  PEAK ELOW RAIE(CFS) AT CONFLUENCE =      2.9S

  ** CONFLUENCE DATA **
  STREAM     RUNOEE       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      19S.09    11.26       S.1S0         72.86
      2        4.S4     4.26       8.69S          0.60
      3        2.9S     4.29       8.695          0.39

  RAINEALL INIENSIIY AND TIME OE CONCENTRATION RAIIO
```



```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RAIE TABLE **
  SIREAM     RUNOEE       Ic      INIENSIIY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1      81.23      4.26       8.695
      2      81.86      4.29       8.69S
      3     199.S3     11.26       S.1S0

  COMPUIED CONELUENCE ESIIMATES ARE AS FOLLOWS:
  PEAK ELOW RAIE(CFS) =     199.S3   Ic(MIN.) =   11.26
  IOTAL AREA(ACRES) =       73.8
  LONGEST ELOWPAIH FROM NODE    216.60 IO NODE    202.00 =    3427.00 FEEI.

****************************************************************************
  ELOW PROCESS EROM NOOE    202.00 IO NOOE    201.00 IS COOE =  31
----------------------------------------------------------------------------
  >>>>>COMPUIE PIPE-FLOW IRAVEL IIME IHRU SUBAREA<<<<<
  >>>>>USING COMPUIER-ESIIMAIEO PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
  ELEVATION OATA: UPSTREAM(FEEI) =   S83.00  OOWNSTREAM(EEEI) =   S80.00
  FLOW LENGIH(FEET) =   100.00   MANNING'S N =  0.013
  DEPIH OF FLOW IN  48.0 INCH PIPE IS  33.9 INCHES
  PIPE-ELOW VELOCITY(FEET/SEC.) =  21.06
  ESTIMAIED PIPE OIAMETER(INCH) =  48.00    NUMBER OE PIPES =   1
  PIPE-FLOW(CFS) =     199.S3
  PIPE TRAVEL IIME(MIN.) =   0.08    Tc(MIN.) =   11.34
  LONGEST ELOWPATH EROM NOOE    216.60 TO NODE    201.00 =    3527.00 FEET.

****************************************************************************
  ELOW PROCESS EROM NODE    202.00 IO NOOE    201.00 IS COOE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK ELOW<<<<<
============================================================================
   100 YEAR RAINFALL INIENSIIY(INCH/HOUR) =  S.126
  RESIDENTIAL (1. OU/AC OR LESS) RUNOFF COEFEICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  AREA-AVERAGE RUNOEE COEEFICIENI = 0.4826
  SUBAREA AREA(ACRES) =    1.96   SUBAREA RUNOFF(CES) =    3.62
  IOIAL AREA(ACRES) =       7S.8   TOTAL RUNOEE(CES) =    199.S3
  TC(MIN.) =   11.34
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSIREAM VALUE

****************************************************************************
  ELOW PROCESS EROM NOOE    201.00 IO NODE    201.00 IS COOE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNAIE INDEPENOENI SIREAM FOR CONFLUENCE<<<<<
============================================================================
  TOIAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INOEPENOENI SIREAM  1 ARE:
  TIME OF CONCENTRAIION(MIN.) =   11.34
  RAINFALL INTENSITY(INCH/HR) =   S.13
  TOTAL STREAM AREA(ACRES) =    7S.81
  PEAK ELOW RAIE(CES) AT CONELUENCE =    199.S3

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

```
 FLOW PROCESS FROM NODE    231.60 TO NODE    231.40 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 UPSTREAM ELEVATION(FEET) =    625.00
 DOWNSTREAM ELEVATION(FEET) =    619.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.243
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    90.91
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.30
 TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.30

**********************************************************************
 FLOW PROCESS FROM NODE    231.40 TO NODE    231.20 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) =  619.00  DOWNSTREAM ELEVATION(FEET) =  582.00
 STREET LENGTH(FEET) =   350.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.76
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    2.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.06
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
 STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    3.07
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.91
 TOTAL AREA(ACRES) =      0.2       PEAK FLOW RATE(CFS) =      1.21

 END OF SUBAREA STREET FLOW HYDRAULICS:
```



```
 DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   2.00
 FLOW VELOCITY(FEET/SEC.) =  7.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
 LONGEST FLOWPATH FROM NODE    231.60 TO NODE    231.20 =    460.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    231.20 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   228.00  DOWNSTREAM(FEET) =   227.80
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.21
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    3.16
 LONGEST FLOWPATH FROM NODE    231.60 TO NODE    231.00 =    480.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    1.06
 TOTAL AREA(ACRES) =       0.3   TOTAL RUNOFF(CFS) =      2.27
 TC(MIN.) =    3.16

**********************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    230.80 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   227.80  DOWNSTREAM(FEET) =   226.60
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.27
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    3.62
 LONGEST FLOWPATH FROM NODE    231.60 TO NODE    230.80 =    605.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    230.80 TO NODE    230.80 IS CODE =  81
----------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
```

```
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8100
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  94
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8302
 SUBAREA AREA(ACRES) =     0.59   SUBAREA RUNOFF(CFS) =     4.16
 TOTAL AREA(ACRES) =       0.9   TOTAL RUNOFF(CFS) =      6.42
 TC(MIN.) =    3.62

****************************************************************************
 FLOW PROCESS FROM NODE    230.80 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.62
 RAINFALL INTENSITY(INCH/HR) =   8.69
 TOTAL STREAM AREA(ACRES) =     0.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.42

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      199.53    11.34        5.126         75.81
     2        6.42     3.62        8.695          0.89

 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      124.07     3.62        8.695
     2      203.31    11.34        5.126

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     203.31   Tc(MIN.) =   11.34
 TOTAL AREA(ACRES) =       76.7
 LONGEST FLOWPATH FROM NODE    216.60 TO NODE    201.00 =    3527.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    220.80 TO NODE    218.80 IS CODE =  21
----------------------------------------------------------------------------
```



```
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 UPSTREAM ELEVATION(FEET) =    635.00
 DOWNSTREAM ELEVATION(FEET) =    634.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.771
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    62.27
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.542
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE    218.80 TO NODE    216.80 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  629.00
 STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    8.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.76
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
 STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =    9.49
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.750
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    3.97
 TOTAL AREA(ACRES) =       1.3       PEAK FLOW RATE(CFS) =       4.36

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.60
 FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
 LONGEST FLOWPATH FROM NODE    220.80 TO NODE    216.80 =     395.00 FEET.
```

```
**************************************************************************
 FLOW PROCESS FROM NODE    218.80 TO NODE    216.80 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.) =    9.49
 RAINFALL INTENSITY(INCH/HR) =   5.75
 TOTAL STREAM AREA(ACRES) =     1.33
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.36

**************************************************************************
 FLOW PROCESS FROM NODE    226.80 TO NODE    224.80 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 UPSTREAM ELEVATION(FEET) =    726.00
 DOWNSTREAM ELEVATION(FEET) =    696.00
 ELEVATION DIFFERENCE(FEET) =     30.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
 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) =  7.210
 SUBAREA RUNOFF(CFS) =      0.30
 TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.30

**************************************************************************
 FLOW PROCESS FROM NODE    224.80 TO NODE    222.80 IS CODE =  51
--------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    696.00  DOWNSTREAM(FEET) =    666.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.1667
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.970
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.35
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   0.36
 Tc(MIN.) =    7.04
 SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    1.46
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.76

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =  10.20
```



```
 LONGEST FLOWPATH FROM NODE    226.80 TO NODE    222.80 =     290.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    222.80 TO NODE    216.80 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   666.00  DOWNSTREAM(FEET) =   626.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.45
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.76
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    7.30
 LONGEST FLOWPATH FROM NODE    226.80 TO NODE    216.80 =     480.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    222.80 TO NODE    216.80 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.) =    7.30
 RAINFALL INTENSITY(INCH/HR) =   6.81
 TOTAL STREAM AREA(ACRES) =     0.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.76

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         4.36      9.49        5.750         1.33
    2         1.76      7.30        6.813         0.84

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1         5.11      7.30        6.813
    2         5.84      9.49        5.750

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.84   Tc(MIN.) =    9.49
 TOTAL AREA(ACRES) =       2.2
 LONGEST FLOWPATH FROM NODE    226.80 TO NODE    216.80 =     480.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    216.80 TO NODE    208.80 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
```

```
 ELEVAIION OATA: UPSTREAM(EEET) =   626.00  OOWNSTREAM(EEET) =   625.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE OIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF ELOW IN  18.0 INCH PIPE IS   6.3 INCHES
 PIPE-ELOW VELOCITY(FEET/SEC.) =  10.62
 ESTIMATED PIPE DIAMETER(INCH) =  I8.00    NUMBER OF PIPES =   1
 PIPE-ELOW(CFS) =       S.84
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.52
 LONGEST ELOWPATH EROM NODE    226.80 TO NOOE    208.80 =     S00.00 EEET.

****************************************************************************
 ELOW PROCESS FROM NODE    216.80 TO NOOE    208.80 IS COOE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM EOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONELUENCE VALUES USEO FOR INDEPENDENT STREAM  I ARE:
 TIME OF CONCENTRAIION(MIN.) =    9.52
 RAINEALL INTENSITY(INCH/HR) =   S.74
 TOTAL STREAM AREA(ACRES) =     2.17
 PEAK FLOW RAIE(CES) AT CONELUENCE =      S.84

****************************************************************************
 ELOW PROCESS EROM NODE    214.80 TO NODE    212.80 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIOENTIAL (10.9 DU/AC OR LESS) RUNOEF COEEFICIENT = .S700
 SOIL CLASSIEICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  8S
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    8S.00
 UPSTREAM ELEVATION(EEET) =    634.00
 DOWNSTREAM ELEVATION(FEET) =    633.00
 ELEVATION DIFEERENCE(EEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.433
 WARNING: INITIAL SUBAREA ELOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND ELOW LENGTH =    67.65
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND ELOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.733
 SUBAREA RUNOFF(CFS) =      0.3S
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFE(CES) =      0.3S

****************************************************************************
 FLOW PROCESS FROM NODE    212.80 TO NODE    210.80 IS COOE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME IHRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USEO)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEEI) =  633.00  OOWNSTREAM ELEVATION(FEET) =  629.00
 STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE EROM CROWN TO CROSSFALL GRADE8REAK(EEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIOE STREET CROSSFALL(OECIMAL) =  0.018
```



```
 SPECIEIED NUMBER OF HALFSTREETS CARRYING RUNOEE =  1
 STREET PARKWAY CROSSFALL(OECIMAL)  =  0.020
 Manning's FRICTION EACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's ERICTION FACTOR for Back-of-Walk Elow Section =   0.0200

   **TRAVEL TIME COMPUTEO USING ESTIMATED ELOW(CES) =       I.70
   STREETELOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET ELOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    7.22
   AVERAGE ELOW VELOCITY(EEET/SEC.) =    2.S7
   PROOUCT OE DEPTH&VELOCITY(ET*FT/SEC.) =    0.7S
 SIREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =    8.92
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  S.984
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOEE COEEEICIENT = .S700
 SOIL CLASSIEICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  8S
 AREA-AVERAGE RUNOFF COEFEICIENT =  0.S70
 SUBAREA AREA(ACRES) =    0.79      SUBAREA RUNOEE(CES) =    2.69
 TOTAL AREA(ACRES) =       0.9       PEAK FLOW RATE(CFS) =       3.00

 END OF SUBAREA STREET ELOW HYORAULICS:
 DEPTH(FEEI) = 0.34   HALESTREET FLOOD NIOTH(EEET) =   9.78
 ELOW VELOCITY(EEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
 LONGEST ELOWPATH FROM NOOE    214.80 TO NODE    210.80 =     315.00 EEET.

****************************************************************************
 FLOW PROCESS EROM NOOE    210.80 TO NODE    208.80 IS COOE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION OATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(EEET) =   625.00
 ELOW LENGTH(FEET) =     S.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF ELOW IN  18.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.36
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUM8ER OE PIPES =   1
 PIPE-ELOW(CES) =       3.00
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.93
 LONGEST ELOWPATH EROM NOOE    214.80 TO NODE    208.80 =     320.00 EEET.

****************************************************************************
 FLOW PROCESS EROM NODE    210.80 TO NODE    208.80 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCEO STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONELUENCE VALUES USED FOR INOEPENOENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.93
 RAINFALL INTENSITY(INCH/HR) =   S.98
 TOTAL STREAM AREA(ACRES) =     0.88
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.00

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

```
      1        5.84     9.52        5.738          2.17
      2        3.00     8.93        5.982          0.88

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CES)     (MIN.)    (INCH/HOUR)
      1        8.60     8.93        5.982
      2        8.72     9.52        5.738

  COMPUTED CONELUENCE ESTIMATES ARE AS EOLLOWS:
  PEAK ELOW RATE(CES) =       8.72   Tc(MIN.) =    9.52
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    226.80 TO NOOE    208.80 =     500.00 FEET.

****************************************************************************
  ELOW PROCESS EROM NOOE    208.80 TO NODE    202.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(EEET) =   620.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OE ELOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-ELOW VELOCITY(EEET/SEC.) =   8.81
  ESTIMATED PIPE OIAMETER(INCH) =  18.00    NUMBER OE PIPES =   1
  PIPE-ELOW(CES) =       8.72
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.94
  LONGEST FLOWPATH EROM NOOE    226.80 TO NODE    202.80 =     720.00 EEET.

****************************************************************************
  FLOW PROCESS EROM NODE    202.80 TO NODE    202.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>OESIGNATE INDEPENOENT STREAM FOR CONELUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED EOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   5.58
  TOTAL STREAM AREA(ACRES) =     3.05
  PEAK FLOW RATE(CES) AT CONELUENCE =      8.72

****************************************************************************
  FLOW PROCESS EROM NODE    206.80 TO NODE    204.80 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOO INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIOENTIAL (10.9 DU/AC OR LESS) RUNOEF COEEEICIENT = .5700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(EEET) =    630.00
  OOWNSTREAM ELEVATION(FEET) =    629.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```



```
  SUBAREA OVERLAND TIME OE FLOW(MIN.) =    7.433
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND ELOW LENGTH =    67.65
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.733
  SUBAREA RUNOEE(CES) =      0.35
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFE(CES) =      0.35

****************************************************************************
  FLOW PROCESS EROM NODE    204.80 TO NODE    202.80 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USE0)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  629.00  DOWNSTREAM ELEVATION(EEET) =  623.00
  STREET LENGTH(EEET) =   280.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSEALL GRADEBREAK(EEET) =  20.00
  INSIDE STREET CROSSEALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIEIED NUMBER OE HALFSTREETS CARRYING RUNOFE =  1
  STREET PARKWAY CROSSEALL(DECIMAL)  =  0.020
  Manning's FRICTION EACTOR for StreetFlow Section(curb-to-curb) =   0.0150
  Manning's ERICTION EACTOR for Back-of-Walk Elow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.66
    STREETFLOW MODEL RESULTS USING ESTIMATED ELOW:
    STREET FLOW DEPTH(EEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.72
    AVERAGE FLOW VELOCITY(EEET/SEC.) =    3.05
    PRODUCT OE DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET ELOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.967
  RESIOENTIAL (10.9 DU/AC OR LESS) RUNOEF COEFFICIENT = .5700
  SOIL CLASSIEICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  85
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
  SUBAREA AREA(ACRES) =     1.36      SUBAREA RUNOFE(CFS) =    4.63
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CES) =       4.93

  END OE SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(EEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
  FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*ET/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE    206.80 TO NODE    202.80 =     365.00 EEET.

****************************************************************************
  FLOW PROCESS EROM NODE    204.80 TO NODE    202.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONELUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONELUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED EOR INDEPENOENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.96
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.97
 TOTAL STREAM AREA(ACRES) =     1.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.93

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         8.72      9.94         5.582          3.05
     2         4.93      8.96         5.967          1.45

 RATNFALL TNTFNSTTY AND TTME OF CONCFNTRATTON RATTO
 CONFLUENCE FORMULA USFD FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLF **
 STREAM      RUNOFF        Tc       INTENSITY
 NUMBER       (CFS)     (MTN.)    (INCH/HOUR)
     1        13.09      8.96         5.967
     2        13.33      9.94         5.582

 COMPUTFD CONFLUENCE ESTTMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       13.33   Tc(MIN.) =     9.94
 TOTAL AREA(ACRES) =        4.5
 LONGEST FLOWPATH FROM NODE     226.80 TO NODE     202.80 =     720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     202.80 TO NODE     200.80 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PTPE-FLOW TRAVEL TTME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTTMATFD PTPESTZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   580.00
 FLOW LENGTH(FEET) =    90.00   MANNTNG'S N =  0.013
 ESTTMATED PTPE DIAMETER(INCH) TNCREASED TO 18.000
 DEPTH OF FLOW TN  18.0 TNCH PTPE TS    5.5 TNCHES
 PTPE-FLOW VELOCITY(FEET/SEC.) =  29.39
 ESTTMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PTPES =   1
 PTPE-FLOW(CFS) =      13.33
 PTPE TRAVFL TTME(MTN.) =   0.05    Tc(MIN.) =     9.99
 LONGEST FLOWPATH FROM NODE     226.80 TO NODE     200.80 =     810.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     202.80 TO NODE     200.80 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WTTH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       TNTENSITY      AREA
 NUMBER       (CFS)     (MTN.)    (TNCH/HOUR)    (ACRE)
     1        13.33      9.99         5.563          4.50
 LONGEST FLOWPATH FROM NODE     226.80 TO NODE     200.80 =     810.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       TNTENSITY      AREA
 NUMBER       (CFS)     (MTN.)    (TNCH/HOUR)    (ACRE)
     1       203.31     11.34         5.126         76.70
 LONGEST FLOWPATH FROM NODE     216.60 TO NODE     200.80 =    3527.00 FEET.
```



```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF        Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1       192.44      9.99         5.563
     2       215.60     11.34         5.126

 COMPUTFD CONFLUENCE ESTTMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     215.60   Tc(MIN.) =   11.34
 TOTAL AREA(ACRES) =       81.2

****************************************************************************
 FLOW PROCESS FROM NODE     202.80 TO NODE     201.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     201.00 TO NODE     200.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTTMATFD PTPESTZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   580.00  DOWNSTREAM(FEET) =   576.00
 FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 TNCH PTPE TS  43.9 TNCHES
 PTPE-FLOW VELOCTTY(FEET/SEC.) =  15.57
 ESTTMATED PTPE DTAMETER(TNCH) =  54.00    NUMBER OF PTPES =   1
 PIPE-FLOW(CFS) =     215.60
 PTPE TRAVEL TTME(MTN.) =   0.32    Tc(MTN.) =   11.66
 LONGEST FLOWPATH FROM NODE     216.60 TO NODE     200.00 =    3822.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     200.00 TO NODE     200.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDTTTON OF SUBAREA TO MATNLTNE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.036
 STREETS & ROADS (CURBS/STORM DRATNS) RUNOFF COEFFICTENT = .8700
 SOIL CLASSIFICATION TS "C"
 S.C.S. CURVE NUMBER (AMC TT) =  98
 AREA-AVERAGE RUNOFF COEFFICTENT = 0.4884
 SUBAREA AREA(ACRES) =     0.00   SUBAREA RUNOFF(CFS) =     0.00
 TOTAL AREA(ACRES) =       81.2   TOTAL RUNOFF(CFS) =     215.60
 TC(MIN.) =   11.66
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       81.2  TC(MIN.) =     11.66
 PEAK FLOW RATE(CFS)   =     215.60
============================================================================
============================================================================
 END OF RATTONAL METHOD ANALYSTS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2012 Advanced Engineering Software (aes)
            Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* HARMONAY GROVE                                                          *
* JN 4095.01                                                              *
* BASIN 300 - PROPOSED CONDITION - 100-YEAR STORM EVENT                   *
 **************************************************************************

  FILE NAME: S300P100.DAT
  TIME/DATE OF STUDY: 16:56 11/10/2015
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    3S4.00 TO NODE    3S2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =  0
```



```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  725.00
  DOWNSTREAM ELEVATION(FEET) =  723.00
  ELEVATION DIFFERENCE(FEET) =  2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.749
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =  70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =  0.61
  TOTAL AREA(ACRES) =  0.08  TOTAL RUNOFF(CFS) =  0.61

**************************************************************************
  FLOW PROCESS FROM NODE    3S2.00 TO NODE    3S0.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  723.00  DOWNSTREAM ELEVATION(FEET) =  710.00
  STREET LENGTH(FEET) =  360.00  CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  3.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =  8.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =  3.85
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =  1.20
  STREET FLOW TRAVEL TIME(MIN.) =  1.56  Tc(MIN.) =  4.31
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  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 =  0.724
  SUBAREA AREA(ACRES) =  0.81  SUBAREA RUNOFF(CFS) =  5.00
  TOTAL AREA(ACRES) =  0.9  PEAK FLOW RATE(CFS) =  5.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36  HALFSTREET FLOOD WIDTH(FEET) =  11.05
  FLOW VELOCITY(FEET/SEC.) =  4.36  DEPTH*VELOCITY(FT*FT/SEC.) =  1.57
  LONGEST FLOWPATH FROM NODE    3S4.00 TO NODE    3S0.00 =  460.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    3S0.00 TO NODE    342.00 IS CODE =  31
--------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(EEET) =   707.00  DOWNSTREAM(EEET) =   706.00
  FLOW LENGTH(FEET) =    2S.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OE ELOW IN  18.0 INCH PIPE IS   6.S INCHES
  PIPE-ELOW VELOCITY(EEET/SEC.) =   9.69
  ESTIMATED PIPE DIAMETER(INCH) =  1B.00    NUMBER OE PIPES =   1
  PIPE-FLOW(CFS) =       S.61
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    4.3S
  LONGEST ELOWPATH EROM NODE    3S4.00 TO NODE    342.00 =    48S.00 EEET.

****************************************************************************
  ELOW PROCESS EROM NOOE    3S0.00 TO NODE    342.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INOEPENOENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED EOR INOEPENOENT STREAM  1 ARE:
  TIME OE CONCENTRATION(MIN.) =    4.35
  RAINFALL INTENSITY(INCH/HR) =   8.69
  TOTAL STREAM AREA(ACRES) =     0.89
  PEAK ELOW RATE(CFS) AT CONELUENCE =      S.61

****************************************************************************
  FLOW PROCESS FROM NODE    348.00 TO NODE    346.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIEIED(SUBAREA):
  RESIDENTIAL (14.S DU/AC OR LESS) RUNOFF COEFEICIENT = .6100
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    72S.00
  DOWNSTREAM ELEVATION(EEET) =    723.00
  ELEVATION DIEEERENCE(EEET) =      2.00
  SUBAREA OVERLAND TIME OF ELOW(MIN.) =    6.262
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND ELOW LENGTH =    80.00
           (Reference: Table 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  7.S20
  SUBAREA RUNOEE(CES) =      0.87
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOEF(CES) =      0.87

****************************************************************************
  ELOW PROCESS EROM NODE    346.00 TO NODE    344.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET ELOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  723.00  DOWNSTREAM ELEVATION(FEET) =  710.00
  STREET LENGTH(EEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALEWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(EEET) =  20.00
```



```
  INSIOE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIOE STREET CROSSEALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSEALL(DECIMAL)  =  0.020
  Manning's ERICTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
  Manning's FRICTION FACTOR for 8ack-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CES) =       3.3S
    STREETELOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET ELOW DEPTH(FEET) =  0.32
    HALESTREET ELOOD WIDTH(FEET) =    8.97
    AVERAGE ELOW VELOCITY(EEET/SEC.) =    3.67
    PRODUCT OE OEPTH&VELOCITY(ET*FT/SEC.) =    1.19
  STREET ELOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =    8.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.336
  *USER SPECIEIED(SUBAREA):
  RESIDENTIAL (24. DU/AC OR LESS) RUNOEF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOEF COEEEICIENT =  0.69S
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFE(CES) =    4.9S
  TOTAL AREA(ACRES) =       1.3       PEAK FLOW RATE(CES) =       S.68

  END OE SUBAREA STREET ELOW HYORAULICS:
  DEPTH(EEET) = 0.37   HALFSTREET FLOOO WIDTH(EEET) =  11.S2
  ELOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(ET*ET/SEC.) =   1.S2
  LONGEST FLOWPATH FROM NODE    348.00 TO NODE    344.00 =     S20.00 EEET.

****************************************************************************
  ELOW PROCESS EROM NODE    344.00 TO NODE    342.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION OATA: UPSTREAM(FEET) =   707.00  OOWNSTREAM(EEET) =   706.00
  FLOW LENGTH(FEET) =     S.00   MANNING'S N =  0.013
  ESTIMATED PIPE OIAMETER(INCH) INCREASED TO 18.000
  OEPTH OE FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLON VELOCITY(FEET/SEC.) =  17.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUM8ER OF PIPES =   1
  PIPE-FLOW(CES) =       S.68
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NOOE    348.00 TO NODE    342.00 =     S2S.00 EEET.

****************************************************************************
  FLOW PROCESS FROM NODE    344.00 TO NOOE    342.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM EOR CONFLUENCE<<<<<
  >>>>>ANO COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.17
  RAINEALL INTENSITY(INCH/HR) =   6.33
  TOTAL STREAM AREA(ACRES) =     1.29
  PEAK ELOW RATE(CFS) AT CONELUENCE =      S.6B
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
    1         5.61       4.35        8.695          0.89
    2         5.68       8.17        6.333          1.29

 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         8.63       4.35        8.695
    2         9.77       8.17        6.333

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.77   Tc(MIN.) =    8.17
 TOTAL AREA(ACRES) =        2.2
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    342.00 =     525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    342.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   706.00  DOWNSTREAM(FEET) =   694.00
 FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.77
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    8.54
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    332.00 =     785.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    342.00 TO NODE    332.00 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.) =    8.54
 RAINFALL INTENSITY(INCH/HR) =   6.16
 TOTAL STREAM AREA(ACRES) =     2.18
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.77

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    336.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
```



```
 UPSTREAM ELEVATION(FEET) =    711.00
 DOWNSTREAM ELEVATION(FEET) =    710.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.075
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.669
 SUBAREA RUNOFF(CFS) =      1.64
 TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      1.64

****************************************************************************
 FLOW PROCESS FROM NODE    336.00 TO NODE    334.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  710.00  DOWNSTREAM ELEVATION(FEET) =  698.00
 STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    8.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.38
 STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    7.11
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.928
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
 SUBAREA AREA(ACRES) =    0.88      SUBAREA RUNOFF(CFS) =    4.21
 TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       5.69

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.59
 FLOW VELOCITY(FEET/SEC.) =  4.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE    338.00 TO NODE    334.00 =     390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    334.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEEI) =   69S.00  DOWNSIREAM(FEET) =   694.00
  FLOW LENGTH(FEEI) =     S.00   MANNING'S N =  0.013
  ESIIMATED PIPE DIAMETER(INCH) INCREASEO TO 18.000
  OEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.31
  ESIIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       S.69
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    7.12
  LONGEST FLOWPATH FROM NOOE    338.00 TO NODE    332.00 =     39S.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NOOE    332.00 IS COOE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INOEPENOENT 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.) =    7.12
  RAINFALL INTENSITY(INCH/HR) =   6.92
  TOTAL STREAM AREA(ACRES) =     1.19
  PEAK FLOW RATE(CFS) AI CONFLUENCE =       S.69

  ** CONFLUENCE OATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         9.77     8.S4       6.1S7          2.18
     2         5.69     7.12       6.92S          1.19

  RAINFALL INTENSITY AND TIME OF CONCENIRATION RATIO
  CONFLUENCE FORMULA USEO FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  SIREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        14.37     7.12       6.925
     2        14.82     8.54       6.1S7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RAIE(CFS) =      14.82   Tc(MIN.) =    8.54
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE    348.00 TO NODE    332.00 =     78S.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   694.00  OOWNSTREAM(FEET) =   681.00
  FLOW LENGTH(FEET) =   2S0.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.70
  ESTIMATEO PIPE OIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.82
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    8.84
  LONGEST FLONPATH FROM NODE    348.00 TO NODE    316.00 =    103S.00 FEEI.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    316.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENOENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOIAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USEO FOR INOEPENDENT SIREAM  1 ARE:
  IIME OF CONCENTRATION(MIN.) =    8.84
  RAINFALL INTENSITY(INCH/HR) =   6.02
  TOTAL STREAM AREA(ACRES) =     3.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.82

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    320.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOO INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  90
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  UPSTREAM ELEVATION(FEET) =    699.00
  OOWNSTREAM ELEVAIION(FEET) =    698.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.07S
  WARNING: INITIAL SUBAREA FLOW PAIH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLANO FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           IHE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.669
  SUBAREA RUNOFF(CFS) =      1.64
  TOTAL AREA(ACRES) =      0.31   TOIAL RUNOFF(CFS) =      1.64

****************************************************************************
  FLOW PROCESS FROM NOOE    320.00 IO NODE    318.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL IIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  698.00  OOWNSTREAM ELEVATION(FEET) =  68S.00
  STREET LENGTH(FEET) =   2S0.00   CURB HEIGHI(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(OECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

  SPECIFIEO NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.01S0
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUIED USING ESTIMATEO FLOW(CFS) =       3.72
    STREETFLOW MODEL RESULTS USING ESIIMATEO FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOO WIDTH(FEET) =    8.28
```

```
   AVERAGE FLOW VELOCIIY(EEET/SEC.) =    4.62
   PRODUCT OE DEPTH&VELOCITY(ET*FT/SEC.) =    1.43
 STREET ELOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =    6.98
  100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  7.013
 RESIOENTIAL (24. DU/AC OR LESS) RUNOFE COEEFICIENI = .6900
 SOIL CLASSIEICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOEF COEEEICIENT =  0.690
 SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFE(CFS) =    4.16
 TOTAL AREA(ACRES) =        1.2       PEAK ELOW RAIE(CFS) =       5.66

 ENO OE SUBAREA SIREET ELOW HYDRAULICS:
 OEPIH(FEET) = 0.34   HALFSIREET ELOOO WIDTH(FEET) =  10.20
 ELOW VELOCITY(FEET/SEC.) =  5.05   DEPTH*VELOCITY(FT*ET/SEC.) =   1.74
 LONGEST ELOWPATH EROM NODE    322.00 TO NODE    318.00 =     370.00 FEET.

****************************************************************************
 ELOW PROCESS EROM NODE    318.00 TO NOOE    316.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION OATA: UPSIREAM(EEET) =   682.00  OOWNSTREAM(EEET) =   681.00
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 ESIIMATEO PIPE OIAMETER(INCH) INCREASEO TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(EEET/SEC.) =  17.29
 ESTIMATED PIPE OIAMETER(INCH) =  18.00    NUMBER OE PIPES =   1
 PIPE-FLOW(CES) =       5.66
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    6.98
 LONGEST FLOWPATH FROM NODE    322.00 TO NOOE    316.00 =     375.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NOOE    318.00 TO NODE    316.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>OESIGNATE INDEPENDENT STREAM FOR CONELUENCE<<<<<
 >>>>>ANO COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 IOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED EOR INDEPENDENI STREAM  2 ARE:
 IIME OF CONCENTRATION(MIN.) =    6.98
 RAINFALL INTENSITY(INCH/HR) =   7.01
 TOTAL STREAM AREA(ACRES) =     1.17
 PEAK ELOW RATE(CFS) AT CONELUENCE =      5.66

 ** CONFLUENCE OATA **
 STREAM     RUNOEE       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       14.82     8.84        6.019          3.37
    2        5.66     6.98        7.010          1.17

 RAINEALL INTENSITY AND TIME OE CONCENTRAIION RATIO
 CONELUENCE EORMULA USED EOR  2 STREAMS.

 ** PEAK ELOW RATE TABLE **
 STREAM     RUNOEE       Tc      INTENSITY
 NUMBER      (CES)     (MIN.)   (INCH/HOUR)
```



```
    1       18.39     6.98       7.010
    2       19.69     8.84       6.019

 COMPUTED CONFLUENCE ESTIMATES ARE AS EOLLOWS:
 PEAK ELOW RATE(CFS) =      19.69   Tc(MIN.) =    8.84
 TOTAL AREA(ACRES) =        4.5
 LONGEST ELOWPATH FROM NODE    348.00 TO NODE    316.00 =    1035.00 EEET.

****************************************************************************
 FLOW PROCESS FROM NODE    318.00 TO NOOE    316.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS EROM NOOE    330.00 TO NODE    328.00 IS COOE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL MEIHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 INITIAL SUBAREA ELOW-LENGTH(EEET) =   185.00
 UPSIREAM ELEVAIION(FEEI) =    728.00
 DOWNSTREAM ELEVATION(EEET) =    727.00
 ELEVATION DIEEERENCE(EEET) =      1.00
 SUBAREA OVERLAND IIME OE FLON(MIN.) =    6.483
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER IHAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    51.22
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINEALL INIENSIIY(INCH/HOUR) =  7.353
 SUBAREA RUNOFF(CES) =      2.69
 TOIAL AREA(ACRES) =      0.53   TOTAL RUNOFF(CFS) =      2.69

****************************************************************************
 FLOW PROCESS FROM NOOE    328.00 TO NODE    326.00 IS COOE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSIREAM ELEVATION(EEET) =  727.00  DOWNSIREAM ELEVATION(EEEI) =  718.00
 STREET LENGTH(EEET) =   450.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALEWIOTH(EEET) = 30.00

 OISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIOE SIREET CROSSFALL(OECIMAL) =  0.018
 OUTSIOE STREET CROSSEALL(OECIMAL)  =  0.018

 SPECIEIED NUMBER OF HALESTREETS CARRYING RUNOFE =  2
 SIREET PARKWAY CROSSEALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Elow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATEO ELOW(CFS) =      14.64
   STREETELOW MODEL RESULTS USING ESTIMATEO FLOW:
   STREET ELOW DEPTH(FEET) =  0.42
```

```
   HAEFSTREET EEOOD WIDTH(FEET) =   I4.I8
   AVERAGE FEOW VEEOCITY(FEET/SEC.) =    3.68
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.S3
 STREET FEOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =    8.S2
  100 YEAR RAINFAEE INTENSITY(INCH/HOUR) =  6.16S
 *USER SPECIFIEO(SU8AREA):
 RESIDENTIAE (24. OU/AC OR EESS) RUNOFF COEFFICIENT = .6900
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOFF COEFEICIENT =  0.690
 SUBAREA AREA(ACRES) =    S.S9      SUBAREA RUNOFF(CES) =   23.78
 TOTAE AREA(ACRES) =       6.I       PEAK FEOW RATE(CFS) =      26.03

 ENO OF SUBAREA STREET ELOW HYDRAUEICS:
 DEPTH(FEET) = 0.48   HAEFSTREET EEOOD WIDTH(EEET) =  I7.93
 FLOW VEEOCITY(FEET/SEC.) =  4.2S   DEPTH*VEEOCITY(FT*FT/SEC.) =   2.0S
 *NOTE: INITIAE SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
       AND L =  4S0.0 FT WITH EEEVATION-DROP =   9.0 FT, IS   33.2 CFS,
       WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NOOE    326.00
 EONGEST ELOWPATH EROM NODE    330.00 TO NODE    326.00 =     63S.00 FEET.

****************************************************************************
 ELOW PROCESS EROM NOOE    326.00 TO NODE    322.00 IS COOE =  3I
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FEOW)<<<<<
============================================================================
 ELEVATION OATA: UPSTREAM(FEET) =   71S.00  OOWNSTREAM(FEET) =   682.00
 EEOW EENGTH(EEET) =   220.00   MANNING'S N =  0.0I3
 OEPTH OF FEOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FEDW VELOCITY(FEET/SEC.) =  23.44
 ESTIMATED PIPE OIAMETER(INCH) =  18.00    NUMBER OE PIPES =   I
 PIPE-FEOW(CFS) =      26.03
 PIPE TRAVEE TIME(MIN.) =   0.16    Tc(MIN.) =    8.68
 EONGEST FEOWPATH FROM NODE    330.00 TO NOOE    322.00 =     8SS.00 FEET.

****************************************************************************
 FEOW PROCESS FROM NODE    326.00 TO NOOE    322.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>OESIGNATE INDEPENDENT STREAM FOR CONFEUENCE<<<<<
============================================================================
 TOTAE NUMBER OF STREAMS =  2
 CONFEUENCE VAEUES USED EOR INOEPENOENT STREAM  I ARE:
 TIME OE CONCENTRATION(MIN.) =    8.68
 RAINFAEE INTENSITY(INCH/HR) =   6.09
 TOTAE STREAM AREA(ACRES) =     6.12
 PEAK ELOW RATE(CES) AT CONFEUENCE =     26.03

****************************************************************************
 FLOW PROCESS EROM NOOE    325.00 TO NOOE    324.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAE METHOD INITIAE SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIEO(SUBAREA):
 RESIOENTIAE (24. OU/AC OR EESS) RUNOEF COEEFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  90
 INITIAE SUBAREA FLOW-LENGTH(FEET) =   120.00
 UPSTREAM ELEVATION(FEET) =    706.00
```



```
 OOWNSTREAM ELEVATION(FEET) =    70S.00
 EEEVATION DIFFERENCE(FEET) =      I.00
 SUBAREA OVEREANO TIME OF FEOW(MIN.) =    S.927
 WARNING: INITIAE SUBAREA FEOW PATH EENGTH IS GREATER THAN
         THE MAXIMUM OVEREANO FLOW LENGTH =    60.00
         (Reference: Table 3-I8 of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USEO IN Tc CALCUEATION!
  100 YEAR RAINEAEE INTENSITY(INCH/HOUR) =  7.792
 SUBAREA RUNOFF(CFS) =      1.8S
 TOTAE AREA(ACRES) =     0.34   TOTAE RUNOEF(CFS) =      1.8S

****************************************************************************
 FLOW PROCESS FROM NODE    324.00 TO NOOE    322.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FEOW TRAVEE TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABEE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM EEEVATION(FEET) =  70S.00  OOWNSTREAM ELEVATION(FEET) =  68S.00
 STREET EENGTH(FEET) =   380.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALEWIOTH(EEET) = 30.00

 OISTANCE FROM CROWN TO CROSSFAEE GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFAEL(DECIMAL) =  0.018
 OUTSIOE STREET CROSSFAEE(OECIMAE)  =  0.0I8

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFE =  1
 STREET PARKWAY CROSSFAEE(DECIMAE)  =  0.020
 Manning's FRICTIDN EACTOR for Streetflow Section(curb-to-curb) =   0.0IS0
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEE TIME COMPUTED USING ESTIMATEO EEOW(CES) =       3.91
   STREETFEOW MODEE RESULTS USING ESTIMATEO FEOW:
   STREET FLOW OEPTH(EEET) =  0.31
   HAEFSTREET FEDDD WIDTH(FEET) =    8.47
   AVERAGE FLOW VELOCITY(EEET/SEC.) =    4.68
   PROOUCT OF OEPTH&VEEOCITY(FT*FT/SEC.) =    1.47
 STREET FEOW TRAVEE TIME(MIN.) =   I.3S   Tc(MIN.) =    7.28
  100 YEAR RAINFALE INTENSITY(INCH/HOUR) =  6.82S
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFEICIENT = .6900
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOEE COEFFICIENT =  0.693
 SUBAREA AREA(ACRES) =    0.87      SUBAREA RUNOEF(CFS) =    4.I0
 TOTAE AREA(ACRES) =       1.2       PEAK FLOW RATE(CFS) =       S.72

 END OF SUBAREA STREET FEOW HYDRAUEICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.20
 ELOW VEEOCITY(FEET/SEC.) =  S.I0   DEPTH*VEEOCITY(ET*FT/SEC.) =   1.76
 EONGEST FLOWPATH FROM NODE    32S.00 TO NOOE    322.00 =     S00.00 FEET.

****************************************************************************
 FEOW PROCESS FROM NOOE    324.00 TO NODE    322.00 IS CODE =   I
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFEUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFEUENCED STREAM VAEUES<<<<<
============================================================================
 TOTAE NUMBER OF STREAMS =  2
```

```
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.28
 RAINFALL INTENSITY(INCH/HR) =   6.82
 TOTAL STREAM AREA(ACRES) =     1.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.72

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        26.03     8.68        6.093         6.12
    2         5.72     7.28        6.825         1.21

 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        27.55     7.28        6.825
    2        31.14     8.68        6.093

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      31.14   Tc(MIN.) =    8.68
 TOTAL AREA(ACRES) =       7.3
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    322.00 =     855.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    322.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   682.00  DOWNSTREAM(FEET) =   681.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.89
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.14
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.71
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    316.00 =     880.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    322.00 TO NODE    316.00 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        31.14     8.71        6.080        7.33
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    316.00 =     880.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1        19.69     8.84        6.019        4.54
```



```
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    316.00 =    1035.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1        50.52     8.71        6.080
    2        50.51     8.84        6.019

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.52   Tc(MIN.) =    8.71
 TOTAL AREA(ACRES) =       11.9

****************************************************************************
 FLOW PROCESS FROM NODE    322.00 TO NODE    316.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    316.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   681.00  DOWNSTREAM(FEET) =   658.00
 FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.52
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.52
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.97
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    314.00 =    1360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    316.00 TO NODE    314.00 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.) =    8.97
 RAINFALL INTENSITY(INCH/HR) =   5.96
 TOTAL STREAM AREA(ACRES) =    11.87
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     50.52

****************************************************************************
 FLOW PROCESS FROM NODE    312.00 TO NODE    311.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
 UPSTREAM ELEVATION(FEET) =    687.00
 DOWNSTREAM ELEVATION(FEET) =    678.00
 ELEVATION DIFFERENCE(FEET) =      9.00
```

```
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.841
 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) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      1.20
 TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      1.20

****************************************************************************
 FLOW PROCESS FROM NODE    317.00 TO NODE    310.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  678.00  DOWNSTREAM ELEVATION(FEET) =  662.00
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.38
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =   5.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =   5.16
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =   1.34
 STREET FLOW TRAVEL TIME(MIN.) =  0.65   Tc(MIN.) =   5.49
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.189
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
 SUBAREA AREA(ACRES) =   0.48     SUBAREA RUNOFF(CFS) =   2.36
 TOTAL AREA(ACRES) =      0.7     PEAK FLOW RATE(CFS) =      3.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =  7.03
 FLOW VELOCITY(FEET/SEC.) =  5.49   DEPTH*VELOCITY(FT*FT/SEC.) =  1.58
 LONGEST FLOWPATH FROM NODE   312.00 TO NODE   310.00 =   340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  659.00  DOWNSTREAM(FEET) =  658.00
 FLOW LENGTH(FEET) =   25.00   MANNING'S N =  0.013
```



```
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.48
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.49
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE   312.00 TO NODE   314.00 =    365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    314.00 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.54
 RAINFALL INTENSITY(INCH/HR) =   8.14
 TOTAL STREAM AREA(ACRES) =     0.71
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.49

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        50.52     8.97        5.964         11.87
     2         3.49     5.54        8.143          0.71

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        34.67     5.54        8.143
     2        33.08     8.97        5.964

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      33.08   Tc(MIN.) =    8.97
 TOTAL AREA(ACRES) =      12.6
 LONGEST FLOWPATH FROM NODE   348.00 TO NODE   314.00 =   1360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    314.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  658.00  DOWNSTREAM(FEET) =  657.00
 FLOW LENGTH(FEET) =    5.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  30.98
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      33.08
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    8.97
 LONGEST FLOWPATH FROM NODE   348.00 TO NODE   306.00 =   1365.00 FEET.

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

```
 FLOW PROCESS FROM NODE    314.00 TO NODE    306.00 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.) =    8.97
 RAINFALL INTENSITY(INCH/HR) =   5.96
 TOTAL STREAM AREA(ACRES) =    12.58
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     53.08

****************************************************************************
 FLOW PROCESS FROM NODE    308.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
 UPSTREAM ELEVATION(FEET) =    683.00
 DOWNSTREAM ELEVATION(FEET) =    682.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.075
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-18 of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.669
 SUBAREA RUNOFF(CFS) =      1.22
 TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      1.22

****************************************************************************
 FLOW PROCESS FROM NODE    307.00 TO NODE    306.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  682.00  DOWNSTREAM ELEVATION(FEET) =  662.00
 STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    7.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.54
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
```



```
 STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =    6.83
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.112
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  90
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.690
 SUBAREA AREA(ACRES) =    1.01      SUBAREA RUNOFF(CFS) =    4.96
 TOTAL AREA(ACRES) =       1.2       PEAK FLOW RATE(CFS) =       6.09

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.47
 FLOW VELOCITY(FEET/SEC.) =  6.12   DEPTH*VELOCITY(FT*FT/SEC.) =   2.03
 LONGEST FLOWPATH FROM NODE    308.00 TO NODE    306.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    307.00 TO NODE    306.00 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.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   7.11
 TOTAL STREAM AREA(ACRES) =     1.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.09

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
    1         53.08      8.97        5.963         12.58
    2          6.09      6.83        7.112          1.24

 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         50.58      6.83        7.112
    2         58.18      8.97        5.963

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       58.18   Tc(MIN.) =    8.97
 TOTAL AREA(ACRES) =       13.8
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    306.00 =    1365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   657.00  DOWNSTREAM(FEET) =   650.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  36.11
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       58.18
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.98
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    304.00 =    1390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    300.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    648.60
 CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.585
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      58.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.46
 AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.95
 Tc(MIN.) =    9.93
 SUBAREA AREA(ACRES) =     0.33       SUBAREA RUNOFF(CFS) =    0.66
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.681
 TOTAL AREA(ACRES) =       14.1         PEAK FLOW RATE(CFS) =      58.18

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   2.45
 LONGEST FLOWPATH FROM NODE    348.00 TO NODE    300.00 =    1530.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.585
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6807
 SUBAREA AREA(ACRES) =     0.00   SUBAREA RUNOFF(CFS) =    0.00
 TOTAL AREA(ACRES) =       14.1   TOTAL RUNOFF(CFS) =      58.18
 TC(MIN.) =    9.93
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       14.1  TC(MIN.) =      9.93
 PEAK FLOW RATE(CFS)   =      58.18
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
           Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* HARMONAY GROVE                                                          *
* JN 4095.01                                                              *
* BASIN 400 - PROPOSED CONDITION - 100-YEAR STORM EVENT                   *
 **************************************************************************

  FILE NAME: S400P100.DAT
  TIME/DATE OF STUDY: 17:01 11/10/2015
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ==========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    472.00 TO NODE    470.00 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) =  220.00
  UPSTREAM ELEVATION(FEET) =  983.00
  DOWNSTREAM ELEVATION(FEET) =  875.00
  ELEVATION DIFFERENCE(FEET) =  108.00
  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) =  7.516
  SUBAREA RUNOFF(CFS) =     3.42
  TOTAL AREA(ACRES) =     1.30   TOTAL RUNOFF(CFS) =     3.42

**************************************************************************
  FLOW PROCESS FROM NODE    470.00 TO NODE    468.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  875.00  DOWNSTREAM(FEET) =  652.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1480.00   CHANNEL SLOPE =  0.1507
  CHANNEL BASE(FEET) =  10.00   "Z" FACTOR =  5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.694
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  7.31
  AVERAGE FLOW DEPTH(FEET) =  0.35   TRAVEL TIME(MIN.) =  3.37
  Tc(MIN.) =  9.64
  SUBAREA AREA(ACRES) =  25.90      SUBAREA RUNOFF(CFS) =  51.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =  27.2         PEAK FLOW RATE(CFS) =     54.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =  8.99
  LONGEST FLOWPATH FROM NODE    472.00 TO NODE    468.00 =  1700.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    470.00 TO NODE    468.00 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.) =  9.64
  RAINFALL INTENSITY(INCH/HR) =  5.69
  TOTAL STREAM AREA(ACRES) =  27.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     54.20

**************************************************************************
  FLOW PROCESS FROM NODE    466.00 TO NODE    464.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
```

```
  SOIL CLASSIEICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) = 88
  INITIAL SUBAREA FLOW-LENGTH(EEET) = 200.00
  UPSTREAM ELEVATION(EEET) = 99S.00
  DOWNSTREAM ELEVATION(FEET) = 87S.00
  ELEVATION OIFFERENCE(FEET) = 120.00
  SUBAREA OVERLANO 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!
   I00 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.S16
  SUBAREA RUNOEF(CFS) = 2.42
  TOTAL AREA(ACRES) = 0.92 TOTAL RUNOEE(CFS) = 2.42

****************************************************************************
  FLOW PROCESS FROM NOOE 464.00 TO NODE 468.00 IS CODE = SI
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIOAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION OATA: UPSTREAM(FEET) = 87S.00 OOWNSTREAM(FEET) = 6S2.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 7S0.00 CHANNEL SLOPE = 0.2973
  CHANNEL 8ASE(EEET) = 10.00 "Z" EACTOR = S.000
  MANNING'S EACTOR = 0.03S MAXIMUM OEPTH(FEET) = 1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.247
  *USER SPECIFIED(SUBAREA):
  NATURAL OESERT LANDSCAPING RUNOFF COEFEICIENT = .3S00
  S.C.S. CURVE NUMBER (AMC II) = 88
  TRAVEL TIME COMPUTED USING ESTIMATEO FLOW(CFS) = 9.0I
  TRAVEL TIME THRU SUBAREA BASEO ON VELOCITY(FEET/SEC.) = 6.01
  AVERAGE FLOW DEPTH(FEET) = 0.14 TRAVEL TIME(MIN.) = 2.08
  Tc(MIN.) = 8.3S
  SUBAREA AREA(ACRES) = S.97 SUBAREA RUNOEE(CES) = 13.05
  AREA-AVERAGE RUNOFE COEEFICIENT = 0.3S0
  TOTAL AREA(ACRES) = 6.9 PEAK FLOW RATE(CFS) = 1S.06

  END OE SUBAREA CHANNEL ELOW HYDRAULICS:
  OEPTH(FEET) = 0.19 FLOW VELOCITY(EEET/SEC.) = 7.33
  LONGEST ELOWPATH FROM NODE 466.00 TO NODE 468.00 = 9S0.00 FEET.

****************************************************************************
  ELOW PROCESS FROM NOOE 464.00 TO NODE 468.00 IS COOE = 1
----------------------------------------------------------------------------
  >>>>>OESIGNATE INOEPENOENT STREAM FOR CONFLUENCE<<<<<
  >>>>>ANO COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS = 2
  CONFLUENCE VALUES USEO FOR INDEPENDENT STREAM 2 ARE:
  TIME OE CONCENTRATION(MIN.) = 8.3S
  RAINFALL INTENSITY(INCH/HR) = 6.2S
  TOTAL STREAM AREA(ACRES) = 6.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE = 1S.06

  ** CONFLUENCE OATA **
  STREAM RUNOEF Tc INTENSITY AREA
  NUMBER (CES) (MIN.) (INCH/HOUR) (ACRE)
      I 54.20 9.64 S.694 27.20
      2 1S.06 8.3S 6.247 6.89

  RAINEALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USEO EOR 2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM RUNOEF Tc INTENSITY
  NUMBER (CFS) (MIN.) (INCH/HOUR)
      1 62.01 8.3S 6.247
      2 67.93 9.64 S.694

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) = 67.93 Tc(MIN.) = 9.64
  TOTAL AREA(ACRES) = 34.1
  LONGEST FLOWPATH FROM NODE 472.00 TO NOOE 468.00 = 1700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NOOE 468.00 TO NODE 462.00 IS CODE = 5I
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIOAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION OATA: UPSTREAM(EEET) = 6S2.00 OOWNSTREAM(FEET) = 618.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 480.00 CHANNEL SLOPE = 0.0708
  CHANNEL BASE(FEET) = I0.00 "Z" EACTOR = S.000
  MANNING'S EACTOR = 0.03S MAXIMUM OEPTH(FEET) = 1.00
   I00 YEAR RAINFALL INTENSITY(INCH/HOUR) = S.322
  *USER SPECIFIED(SUBAREA):
  NATURAL OESERT LANDSCAPING RUNOFF COEFEICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) = 88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 69.10
  TRAVEL TIME THRU SUBAREA 8ASED ON VELOCITY(EEET/SEC.) = 7.S3
  AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 1.06
  Tc(MIN.) = I0.70
  SUBAREA AREA(ACRES) = 1.46 SUBAREA RUNOFE(CES) = 2.33
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.348
  TOTAL AREA(ACRES) = 3S.5 PEAK FLOW RATE(CFS) = 67.93

  END OF SUBAREA CHANNEL ELOW HYDRAULICS:
  DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 7.S1
  LONGEST ELOWPATH FROM NODE 472.00 TO NOOE 462.00 = 2180.00 EEET.

****************************************************************************
  ELOW PROCESS EROM NODE 468.00 TO NOOE 462.00 IS CODE = 1
----------------------------------------------------------------------------
  >>>>>OESIGNATE INOEPENDENT STREAM FOR CONELUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS = 2
  CONFLUENCE VALUES USEO FOR INOEPENDENT STREAM 1 ARE:
  TIME OE CONCENTRATION(MIN.) = I0.70
  RAINEALL INTENSITY(INCH/HR) = 5.32
  TOTAL STREAM AREA(ACRES) = 3S.SS
  PEAK FLOW RATE(CES) AT CONFLUENCE = 67.93

****************************************************************************
  FLOW PROCESS FROM NODE 460.00 TO NODE 458.00 IS CODE = 2I
```

```
------------------------------------------------------------------------------
  >>>>>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) =   180.00
  UPSTREAM ELEVATION(FEET) =   1324.00
  DOWNSTREAM ELEVATION(FEET) =   1200.00
  ELEVATION DIFFERENCE(FEET) =    124.00
  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 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.516
  SUBAREA RUNOFF(CFS) =      4.76
  TOTAL AREA(ACRES) =      1.81   TOTAL RUNOFF(CFS) =      4.76

******************************************************************************
  FLOW PROCESS FROM NODE    458.00 TO NODE    462.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1200.00  DOWNSTREAM(FEET) =    618.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2720.00   CHANNEL SLOPE =  0.2140
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.099
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     35.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.77
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   5.17
  Tc(MIN.) =   11.43
  SUBAREA AREA(ACRES) =    34.50       SUBAREA RUNOFF(CFS) =   59.82
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.340
  TOTAL AREA(ACRES) =      36.3        PEAK FLOW RATE(CFS) =     63.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =  10.65
  LONGEST FLOWPATH FROM NODE    460.00 TO NODE    462.00 =    2900.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    458.00 TO NODE    462.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.43
  RAINFALL INTENSITY(INCH/HR) =   5.10
  TOTAL STREAM AREA(ACRES) =    36.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     63.05
```



```
  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         67.93     10.70       5.322        35.55
     2         63.05     11.43       5.099        36.31

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc      INTENSITY
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        126.94     10.70       5.322
     2        128.14     11.43       5.099

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     128.14   Tc(MIN.) =   11.43
  TOTAL AREA(ACRES) =       71.9
  LONGEST FLOWPATH FROM NODE    460.00 TO NODE    462.00 =    2900.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    462.00 TO NODE    400.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    606.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   170.00   CHANNEL SLOPE =  0.0706
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     129.08
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.03
  AVERAGE FLOW DEPTH(FEET) =   0.96   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =   11.75
  SUBAREA AREA(ACRES) =     1.22       SUBAREA RUNOFF(CFS) =    1.90
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.344
  TOTAL AREA(ACRES) =       73.1        PEAK FLOW RATE(CFS) =     128.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   9.04
  LONGEST FLOWPATH FROM NODE    460.00 TO NODE    400.00 =    3070.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    456.00 TO NODE    400.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
  RESIDENTIAL (1.0U/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3444
```

```
 SUBAREA AREA(ACRES) =     3.77   SUBAREA RUNOFF(CFS) =     6.80
 TOTAL AREA(ACRES) =       76.8   TOTAL RUNOFF(CFS) =     132.64
 TC(MIN.) =   11.75

****************************************************************************
 FLOW PROCESS FROM NODE    400.00 TO NODE    400.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3444
 SUBAREA AREA(ACRES) =     0.00   SUBAREA RUNOFF(CFS) =     0.00
 TOTAL AREA(ACRES) =       76.8   TOTAL RUNOFF(CFS) =     132.64
 TC(MIN.) =   11.75
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       76.8  TC(MIN.) =     11.75
 PEAK FLOW RATE(CFS)   =     132.64
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                  2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2012 Advanced Engineering Software (aes)
          Ver. 19.0 Release Date: 06/01/2012  License ID 1509

                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
 * HARMONY GROVE VILLAGE SOUTH                                              *
 * JN 4095                                                                  *
 * BASIN 500 - PROPOSED CONDITION - 100-YEAR STORM EVENT                    *
 **************************************************************************

  FILE NAME: S500P100.DAT
  TIME/DATE OF STUDY: 13:00 12/20/2016
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-   HEIGHT  WIDTH  LIP   HIKE  FACTOR
 NO.  (FT)    (FT)     SIDE / SIDE/ WAY    (FT)   (FT)  (FT)   (FT)    (n)
 ===  =====  =======  =================  ======  =====  ======  =====  ======
  1   30.0    20.0    0.018/0.018/0.020   0.50    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = 0.40 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  0.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    506.00 TO NODE    504.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
  UPSTREAM ELEVATION(FEET) =     589.00
  DOWNSTREAM ELEVATION(FEET) =     586.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.568
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```



```
           THE MAXIMUM OVERLAND FLOW LENGTH =     80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =       0.05   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    502.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  574.00
  STREET LENGTH(FEET) =   740.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        2.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     0.85
  STREET FLOW TRAVEL TIME(MIN.) =    4.63    Tc(MIN.) =     7.20
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.875
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =     0.65      SUBAREA RUNOFF(CFS) =     3.89
  TOTAL AREA(ACRES) =         0.7         PEAK FLOW RATE(CFS) =        4.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.60
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =  1.11
  LONGEST FLOWPATH FROM NODE    506.00 TO NODE    502.00 =     840.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    502.00 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.) =     7.20
  RAINFALL INTENSITY(INCH/HR) =    6.88
  TOTAL STREAM AREA(ACRES) =      0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.19

****************************************************************************
  FLOW PROCESS FROM NODE    514.00 TO NODE    512.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    589.00
 DOWNSTREAM ELEVATION(FEET) =    586.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.568
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.695
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE    512.00 TO NODE    510.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
----------------------------------------------------------------------------
 UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  574.00
 STREET LENGTH(FEET) =   740.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.019
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.018

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.02
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =    9.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.80
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
 STREET FLOW TRAVEL TIME(MIN.) =   4.41   Tc(MIN.) =    6.98
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.012
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    5.06
 TOTAL AREA(ACRES) =      0.9       PEAK FLOW RATE(CFS) =      5.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.01
 FLOW VELOCITY(FEET/SEC.) =  3.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
 LONGEST FLOWPATH FROM NODE    514.00 TO NODE    510.00 =     840.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    510.00 TO NODE    502.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
----------------------------------------------------------------------------
```



```
 ELEVATION DATA: UPSTREAM(FEET) =   570.00  DOWNSTREAM(FEET) =   569.40
 FLOW LENGTH(FEET) =    61.50   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.71
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.43
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.16
 LONGEST FLOWPATH FROM NODE    514.00 TO NODE    502.00 =     901.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    512.00 TO NODE    510.00 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.) =    7.16
 RAINFALL INTENSITY(INCH/HR) =   6.90
 TOTAL STREAM AREA(ACRES) =     0.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.43

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         4.19      7.20        6.875         0.70
     2         5.43      7.16        6.898         0.89

 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         9.59      7.16        6.898
     2         9.60      7.20        6.875

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.60   Tc(MIN.) =    7.20
 TOTAL AREA(ACRES) =       1.6
 LONGEST FLOWPATH FROM NODE    514.00 TO NODE    510.00 =     901.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    502.00 TO NODE    500.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
----------------------------------------------------------------------------
 ELEVATION DATA: UPSTREAM(FEET) =   569.40  DOWNSTREAM(FEET) =   566.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.96
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.60
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.21
 LONGEST FLOWPATH FROM NODE    514.00 TO NODE    500.00 =     921.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    500.00 TO NODE    500.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.864
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
SUBAREA AREA(ACRES) =     0.00   SUBAREA RUNOFF(CFS) =     0.00
TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.60
TC(MIN.) =     7.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =         1.6  TC(MIN.) =      7.21
PEAK FLOW RATE(CFS)    =        9.60
```

```
END OF RATIONAL METHOD ANALYSIS
```