HARMONY GROVE VILLAGE SOUTH

APPENDIX M-1

CEQA PRELIMINARY HYDROLOGY/DRAINAGE STUDY

for the

FINAL ENVIRONMENTAL IMPACT REPORT

PDS2015-GPA-15-002
PDS2015-SP-15-002
PDS-REZ-15-003
PDS2018-TM-5626
PDS2015-MUP-15-008
Log No.: PDS2015-ER-15-08-006

JULY 2018

Prepared for:
COUNTY OF SAN DIEGO
PLANNING & DEVELOPMENT SERVICES
5510 OVERLAND AVENUE, SUITE 310
SAN DIEGO, CALIFORNIA 92123

CEQA PRELIMINARY HYDROLOGY / DRAINAGE STUDY
HARMONY GROVE VILLAGE SOUTH

County of San Diego, CA

April 11, 2017

PDS2015-TM-5600, PDS2015-SP-15-002,
PDS2015-GPA-15-002

Prepared For:

Kovach Group of Companies
1420 Decision Street, Suite 200
Vista, CA 92081

Prepared By:

PROJECT DESIGN CONSULTANTS

Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

PDC Job No. 4095.01

REGISTERED PROFESSIONAL ENGINEER
DEBBY SUE REECE
No. C56148
EXP. 12-31-18
CIVIL
STATE OF CALIFORNIA

Prepared by: T. Grace
Updated by: C. Pack
Under the supervision of

Debby Reece

Debby Reece, PE RCE 56148
Registration Expires 12/31/18

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.

REGISTERED PROFESSIONAL ENGINEER
DEBBY SUE REECE
No. C56148
EXP. 12-31-18
CIVIL
STATE OF CALIFORNIA

Debby Reece

Debby Reece, RCE 56148 Date

TABLE OF CONTENTS

1. INTRODUCTION 1

2. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS 2

3. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS 5

3.1 Hydrology Criteria 5

3.2 Hydrologic Methodology 5

3.3 Description of Hydrologic Modeling Software 6

4. HYDROLOGY RESULTS 6

4.1 Water Quality Considerations 8

4.2 Hydromodification Analysis 9

5. HYDRAULIC CRITERIA, METHODOLOGY, AND RESULTS 9

6. ENVIRONMENTAL IMPACTS 10

7. CONCLUSION 12

FIGURES

Figure 1: Project Vicinity Map 1

TABLES

Table 1: Hydrology Criteria 5
Table 2: Hydrology Results 7

APPENDICES

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

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

3 100-year Existing Conditions Rational Method Computer Output

4 100-year Proposed Conditions Rational Method Computer Output

5 Preliminary Detention and Preliminary Hydraulic Calculations (Public Systems)

6 Drainage Exhibits

A – FEMA Floodplain Map

B – Existing Conditions Hydrology Map

C – Proposed Conditions Hydrology Map

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.

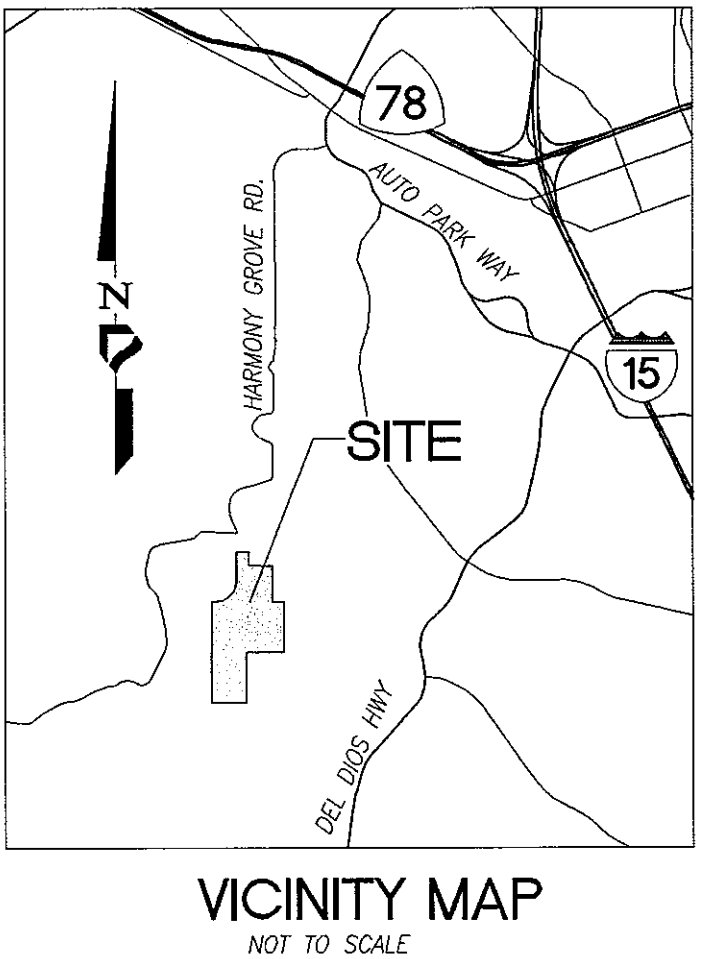


Figure 1: Project Vicinity Map

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?**

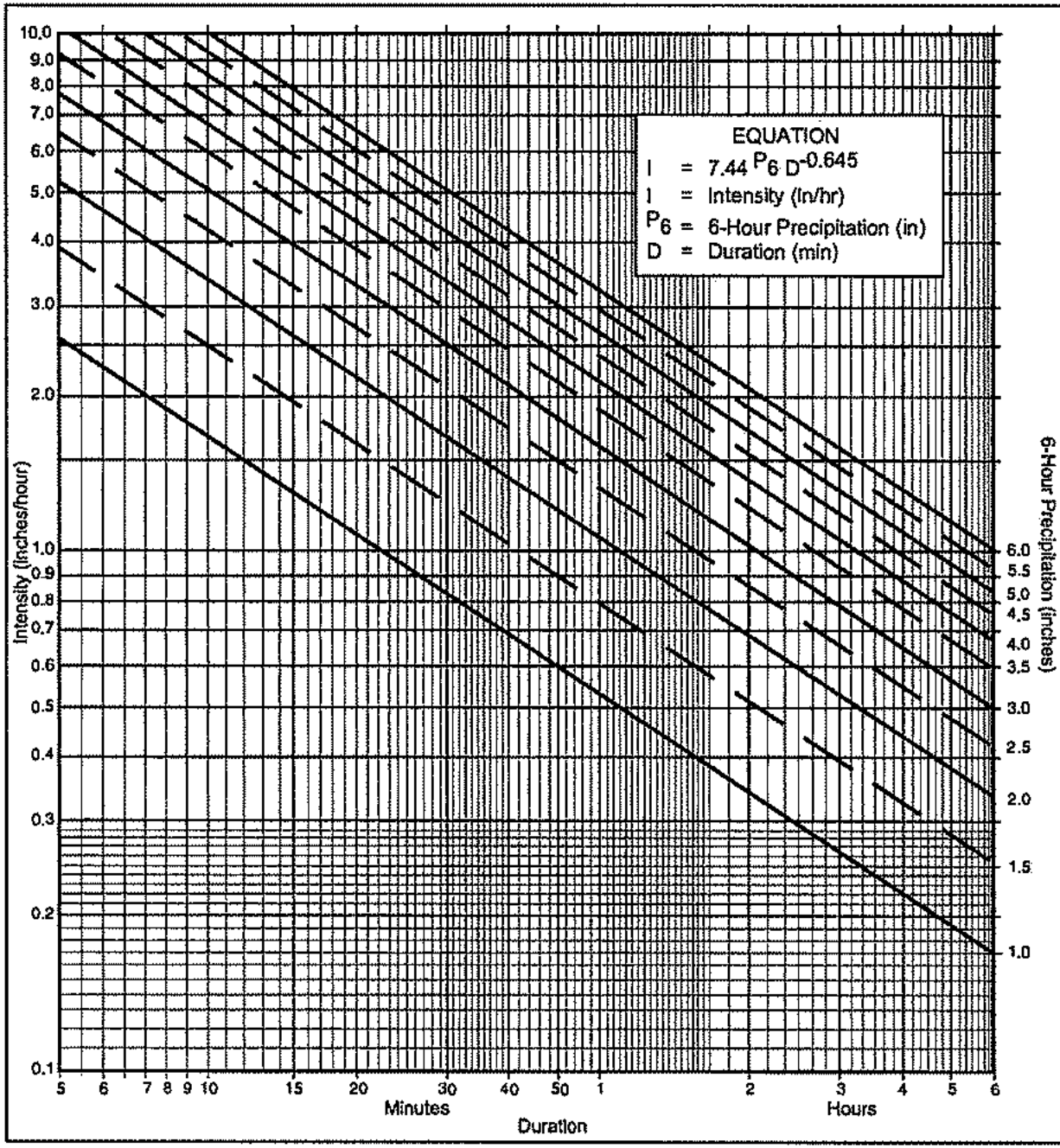
There are no dams or levees within or near the project site.

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 applicable to Desert).

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

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

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

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 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

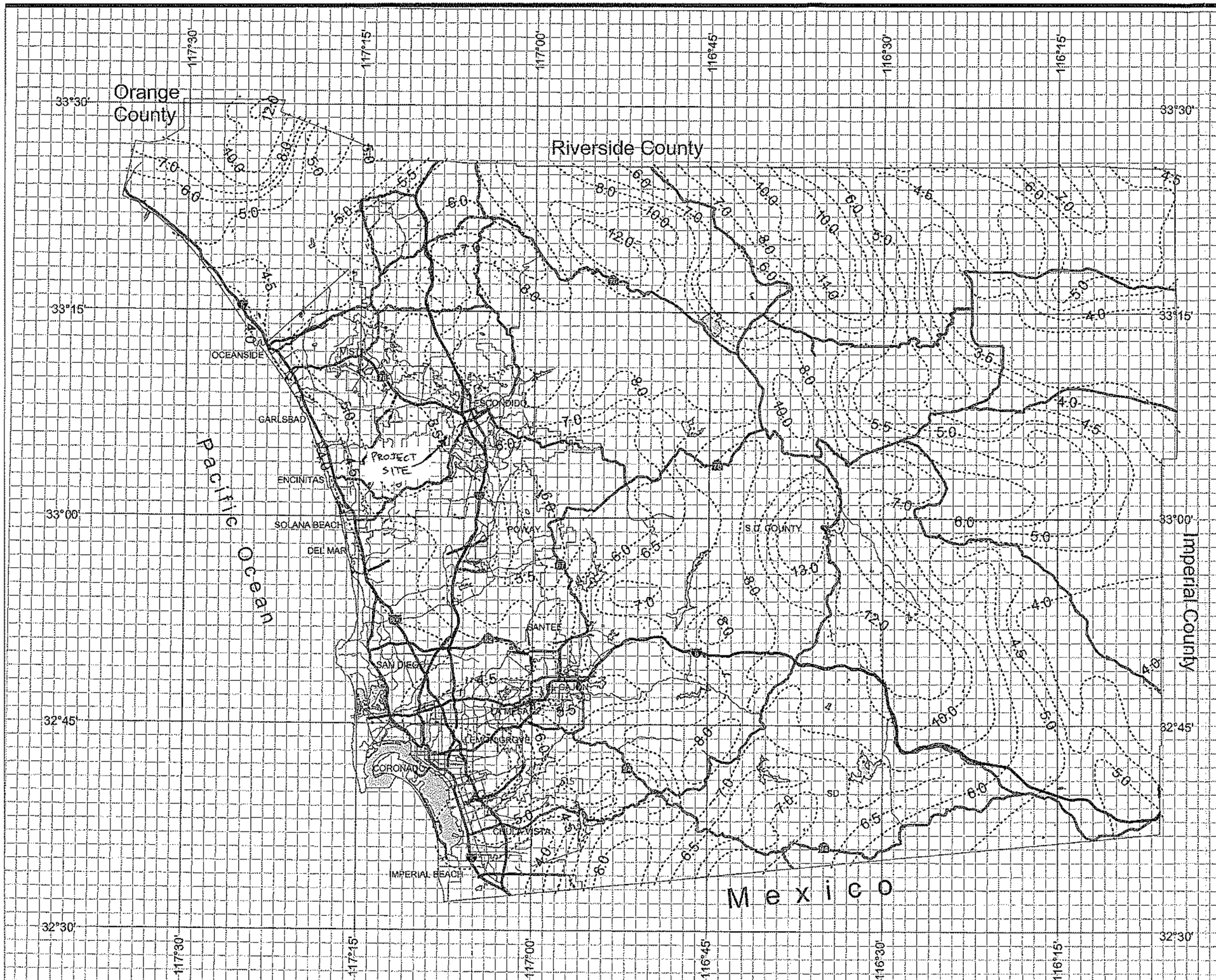
3-1

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

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

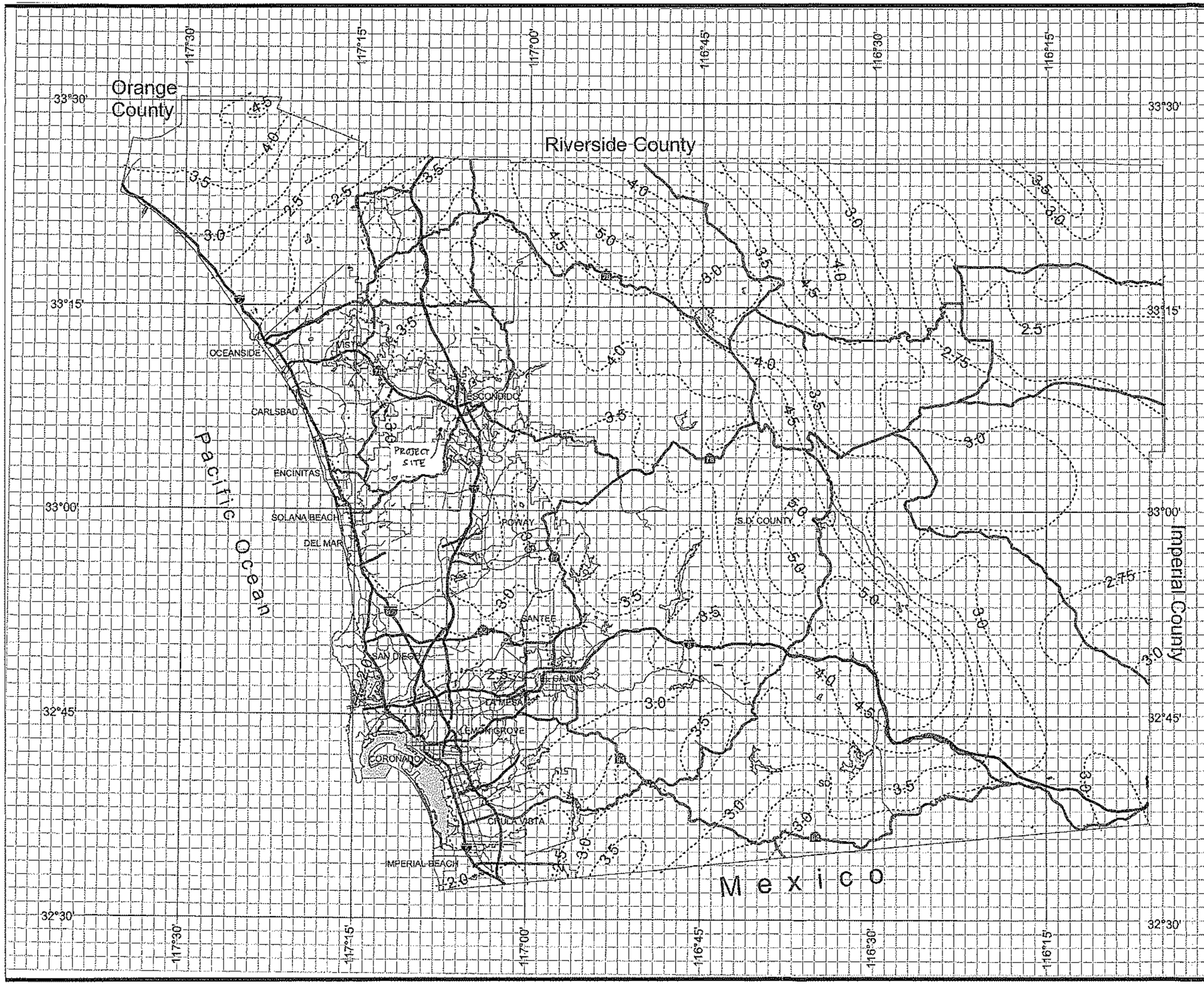
This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

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!

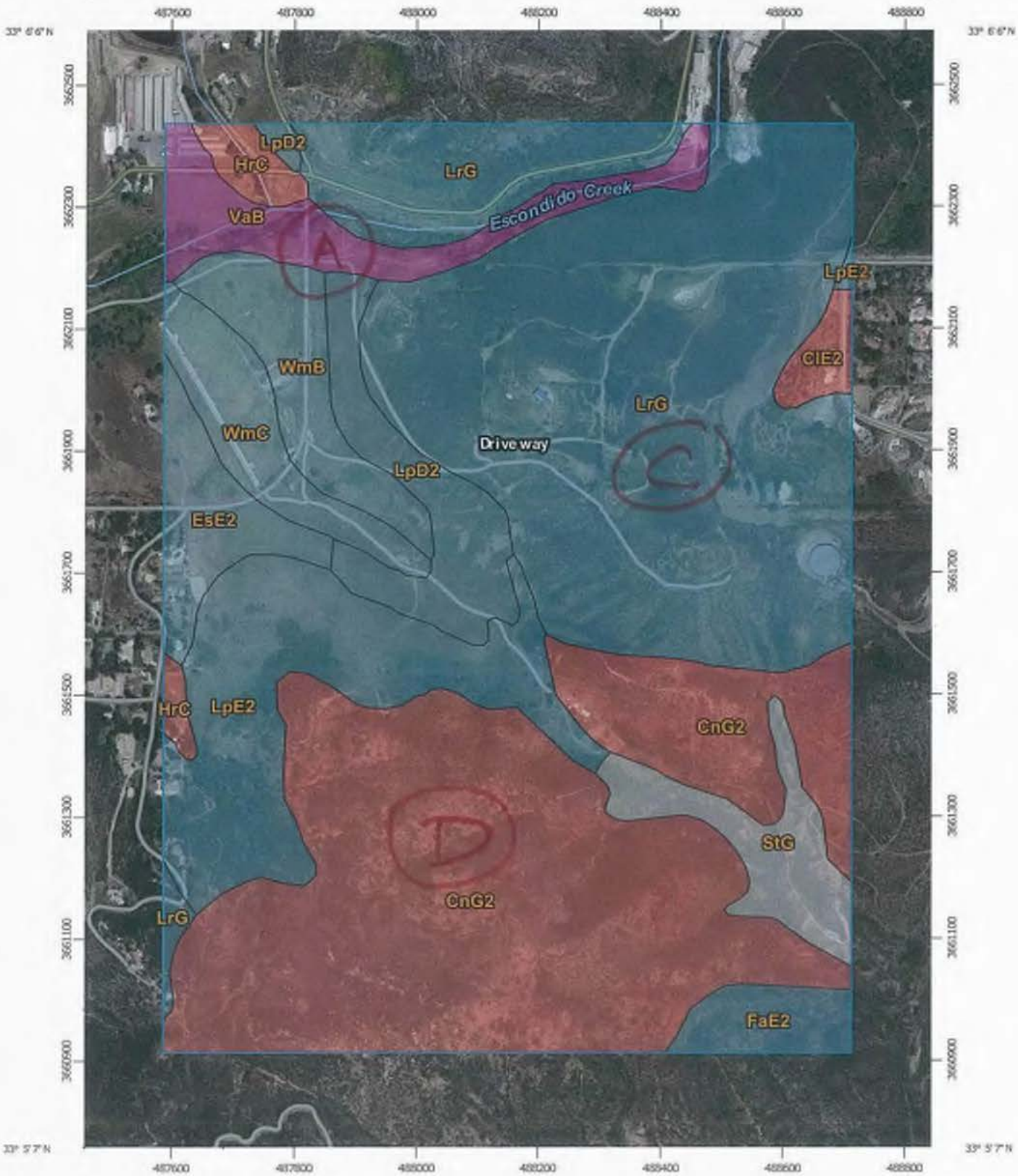
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

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
ClE2	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
       (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                                                        *
 * 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 =   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    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) =      6.59
  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 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    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) =      13.80
  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 HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                     2003,1985,1987 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 400 - EXISTING CONDITION - 100-YEAR STORM EVENT                  *
 ************************************************************************

  FILE NAME: S400E100.DAT
  TIME/DATE OF STUDY: 09:36 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    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 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.516
  SUBAREA RUNOFF(CFS) =      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 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 3-18 of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.516
SUBAREA RUNOFF(CFS) =      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 =  0.346
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 3-18 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 OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.33
  RAINFALL INTENSITY(INCH/HR) =   6.80
  TOTAL STREAM AREA(ACRES) =      0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.67

******************************************************************************
  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 3-18 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) =  0.018
  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) =       2.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   4.51   Tc(MIN.) =    7.07
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.951
```



```
  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) =     0.74      SUBAREA RUNOFF(CFS) =     4.47
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.38
  FLOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  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   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.84
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.26
  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.) =    7.26
  RAINFALL INTENSITY(INCH/HR) =   6.84
  TOTAL STREAM AREA(ACRES) =      0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.84

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.67     7.33        6.795         0.62
     2        4.84     7.26        6.836         0.80

  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        8.47     7.26        6.836
     2        8.47     7.33        6.795

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  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 =   I
  PIPE-FLOW(CFS) =       8.47
  PIPE TRAVEL TIME(MTN.) =   0.02    Tc(MIN.) =    7.3S
  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) =  6.78S
  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.) =    7.3S
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.4  TC(MIN.) =      7.3S
  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                                                               *
* BASIN 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 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
  SUBAREA RUNOFF(CFS) =      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 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 200 - PROPOSED CONDITION - 100-YR STORM EVENT                    *
 **************************************************************************

  FILE NAME: S200P100.DAT
  TIME/DATE OF STUDY: 09:15 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    286.00 TO NODE    284.00 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) =   120.00
  UPSTREAM ELEVATION(FEET) =    697.00
  DOWNSTREAM ELEVATION(FEET) =    696.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.408
  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) =  6.747
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    282.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  696.00  DOWNSTREAM ELEVATION(FEET) =  690.00
  STREET LENGTH(FEET) =   190.00   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) =       2.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    8.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.258
  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) =    0.76      SUBAREA RUNOFF(CFS) =    2.85
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    282.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    280.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED 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) =   0.01150
  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 3-18 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) =   150.00   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      INTENSITY
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 IS 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 TNCH 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 GRAOE8REAK(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 FLOW 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 CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      39.06   Tc(MIN.) =   10.62
TOTAL AREA(ACRES) =       11.7
LONGEST FLOWPATH FROM NODE    286.00 TO NODE    218.00 =    1991.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    218.00 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) =   609.00  DOWNSTREAM(FEET) =   606.00
FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  16.46
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      39.06
PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.69
LONGEST FLOWPATH FROM NODE    286.00 TO NODE    216.00 =    2056.00 FEET.

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

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

****************************************************************************
FLOW PROCESS FROM NODE    216.60 TO NODE    214.60 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) =   150.00
UPSTREAM ELEVATION(FEET) =    876.00
DOWNSTREAM ELEVATION(FEET) =    816.00
ELEVATION DIFFERENCE(FEET) =     60.00
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) =      0.24
TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
FLOW PROCESS FROM NODE    214.60 TO NODE    212.60 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    816.00  DOWNSTREAM(FEET) =    746.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   270.00   CHANNEL SLOPE =  0.2593
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) =  6.271
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) =       0.80
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.03
Tc(MIN.) =    8.30
SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    1.10
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   2.60
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    212.60 =     420.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    212.60 TO NODE    210.60 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    746.00  DOWNSTREAM(FEET) =    722.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   120.00   CHANNEL SLOPE =  0.2000
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) =  6.194
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4100
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  82
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.51
AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.16
Tc(MIN.) =    8.46
SUBAREA AREA(ACRES) =     1.18       SUBAREA RUNOFF(CFS) =    3.00
AREA-AVERAGE RUNOFF COEFFICIENT =  0.390
TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =  14.23
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    210.60 =     540.00 FEET.

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

```
  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) =   705.00
  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) =   705.00
  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       5.982        2.76
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    292.40 =     830.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       16.90      8.17       6.334
     2       17.02      8.93       5.982

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

****************************************************************************
  FLOW 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-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   705.00  DOWNSTREAM(FEET) =   692.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.02
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    9.20
  LONGEST FLOWPATH FROM NODE    216.60 TO NODE    284.40 =    1065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    292.40 TO NODE    284.40 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.) =    9.20
  RAINFALL INTENSITY(INCH/HR) =   5.87
  TOTAL STREAM AREA(ACRES) =      6.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.02

****************************************************************************
  FLOW PROCESS FROM NODE    290.40 TO NODE    288.40 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) =   162.00
  UPSTREAM ELEVATION(FEET) =    958.00
  DOWNSTREAM ELEVATION(FEET) =    894.00
```



```
  ELEVATION DIFFERENCE(FEET) =     64.00
  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) =      0.21
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    288.40 TO NODE    286.40 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    894.00  DOWNSTREAM(FEET) =    728.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.3952
  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) =  6.383
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =  88
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.87
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.81
  Tc(MIN.) =    8.07
  SUBAREA AREA(ACRES) =      1.65       SUBAREA RUNOFF(CFS) =    3.58
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.340
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       3.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   4.57
  LONGEST FLOWPATH FROM NODE    290.40 TO NODE    286.40 =     582.00 FEET.

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

****************************************************************************
  FLOW PROCESS FROM NODE    286.40 TO NODE    284.40 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.) =    8.14
  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 3-18 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 USEO FOR INOEPENOENT 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        B.695         1.94

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFE       Tc      INTENSITY
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       30.35     3.87       B.695
    2       37.78     7.40       6.753
    3       37.B3     9.34       5.B11

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 SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATEO PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   6B6.00  DOWNSTREAM(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 PIPES =   1
PIPE-FLOW(CFS) =      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-STREAM MEMORY<<<<<
============================================================================

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



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

****************************************************************************
FLOW PROCESS FROM NOOE    266.60 TO NOOE    266.40 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIOAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING 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'S EACTOR = 0.035   MAXIMUM DEPTH(EEET) =   1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.064
*USER SPECIFIED(SUBAREA):
NATURAL OESERT LANDSCAPING RUNOEE COEFFICIENT = .3200
S.C.S. CURVE NUMBER (AMC II) =  BB
TRAVEL TIME COMPUTEO USING ESTIMATEO FLOW(CFS) =       1.07
TRAVEL TIME THRU SUBAREA BASEO ON VELOCITY(EEET/SEC.) =   2.16
AVERAGE FLOW DEPTH(EEET) =   0.05   TRAVEL TIME(MIN.) =   2.47
Tc(MIN.) =    B.74
SUBAREA AREA(ACRES) =     0.85       SUBAREA RUNOFE(CES) =    1.65
AREA-AVERAGE RUNDFE COEEFICIENT =  0.323
TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CES) =       1.B4

END OF SUBAREA CHANNEL ELOW HYDRAULICS:
DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.71
LONGEST FLOWPATH FROM NODE    266.B0 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  1B.0 INCH PIPE IS   2.B INCHES
PIPE-FLOW VELOCITY(EEET/SEC.) =  10.52
ESTIMATED PIPE DIAMETER(INCH) =  1B.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 3-18 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 FROM NODE    252.40 TO NODE    250.40 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) =    80.00
 UPSTREAM ELEVATION(FEET) =    683.00
 DOWNSTREAM ELEVATION(FEET) =    682.30
 ELEVATION DIFFERENCE(FEET) =      0.70
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.364
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    61.25
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.773
 SUBAREA RUNOFF(CFS) =      0.61
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.61

**********************************************************************
 FLOW PROCESS FROM NODE    250.40 TO NODE    248.40 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) =  682.30  DOWNSTREAM ELEVATION(FEET) =  678.00
 STREET LENGTH(FEET) =   155.00   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) =       1.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    6.59
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
 STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.18
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.330
 RESIDENTIAL (14.5 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) =    0.65      SUBAREA RUNOFF(CFS) =    2.47
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.72
 FLOW VELOCITY(FEET/SEC.) =  3.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
```



```
 LONGEST FLOWPATH FROM NODE    252.40 TO NODE    248.40 =     235.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    248.40 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) =     5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        3.04
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.19
 LONGEST FLOWPATH FROM NODE    252.40 TO NODE    246.40 =     240.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    248.40 TO NODE    246.40 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.) =    8.19
 RAINFALL INTENSITY(INCH/HR) =   6.33
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.04

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        26.14     8.90        5.996        14.02
    2         7.70     5.37        8.304         1.54
    3         3.04     8.19        6.327         0.80

 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        28.57     5.37        8.304
    2        33.68     8.19        6.327
    3        34.58     8.90        5.996

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      34.58   Tc(MIN.) =    8.90
 TOTAL AREA(ACRES) =       16.4
 LONGEST FLOWPATH FROM NODE    264.40 TO NODE    246.40 =    1125.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    246.40 TO NODE    244.40 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) =    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.S7
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
```

```
          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) =      0.28
 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
```



```
  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        5.706
     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.

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

```
 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
```



```
 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    200.40 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 3-18 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 USEO EOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.99
  RAINFALL INTENSITY(INCH/HR) =   5.56
  TOTAL STREAM AREA(ACRES) =     1.53
  PEAK FLOW RAIE(CES) AT CONELUENCE =      5.54

******************************************************************************
  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) =  85
  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 OVERLANO ELOW LENGTH =   100.00
           (Reference: Table 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLANO ELOW LENGIH TS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
  SUBAREA RUNOEE(CES) =      0.61
  TOTAL AREA(ACRES) =      0.28   TOTAL RUNOEF(CES) =      0.61

******************************************************************************
  ELOW PROCESS FROM NOOE    296.20 IO NODE    294.20 TS COOE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIOAL CHANNEL ELOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTTNG ELEMENT)<<<<<
==============================================================================
  ELEVATION OATA: UPSTREAM(EEEI) =    778.00  DOWNSIREAM(EEET) =    708.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.2258
  CHANNEL BASE(FEET) =   10.00   "Z" EACTOR =   5.000
  MANNING'S FACTOR = 0.035   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) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED ELOW(CES) =       1.33
  TRAVEL TIME THRU SUBAREA BASEO ON VELOCITY(FEET/SEC.) =   2.66
  AVERAGE ELOW DEPTH(EEET) =   0.05   TRAVEL TIME(MIN.) =   1.94
  Tc(MIN.) =    8.63
  SUBAREA AREA(ACRES) =     0.78       SUBAREA RUNOEF(CES) =    1.43
  AREA-AVERAGE RUNOEE COEEETCIENT =  0.300
  IOTAL AREA(ACRES) =        1.1         PEAK ELOW RATE(CES) =       1.95

  END OF SUBAREA CHANNEL ELOW HYDRAULICS:
  DEPIH(EEET) =  0.06   FLOW VELOCITY(FEEI/SEC.) =   2.95
  LONGESI FLOWPAIH FROM NOOE    298.20 TO NOOE    294.20 =     550.00 FEET.

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



```
------------------------------------------------------------------------------
  >>>>>COMPUTE PTPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATEO PTPESIZE (NON-PRESSURE ELOW)<<<<<
==============================================================================
  ELEVATION DAIA: UPSTREAM(EEEI) =   708.00  DOWNSTREAM(EEET) =   704.00
  ELOW LENGTH(EEEI) =    20.00   MANNING'S N =  0.013
  ESTIMATEO 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
  ESTIMATEO PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-ELOW(CFS) =        1.95
  PIPE TRAVEL IIME(MIN.) =   0.03    Tc(MIN.) =    8.65
  LONGEST FLOWPATH EROM NODE    298.20 TO NODE    292.20 =     570.00 EEET.

******************************************************************************
  FLOW PROCESS FROM NODE    294.20 TO NODE    292.20 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT SIREAM EOR CONELUENCE<<<<<
  >>>>>ANO COMPUTE VARIOUS CONELUENCEO STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OE STREAMS =  2
  CONELUENCE VALUES USEO FOR INDEPENDENT STREAM  2 ARE:
  TIME OE CONCENTRATION(MIN.) =    8.65
  RAINEALL INTENSITY(INCH/HR) =   6.10
  TOTAL STREAM AREA(ACRES) =     1.06
  PEAK FLOW RAIE(CES) AT CONELUENCE =      1.95

  ** CONFLUENCE DATA **
  STREAM     RUNOFE       Tc      INTENSIIY      AREA
  NUMBER      (CES)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.54      9.99        5.563         1.53
     2        1.95      8.65        6.105         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      8.65       6.105
     2        7.31      9.99       5.563

  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 =     875.00 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) =   150.00   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
  ESTIMATEO PIPE OIAMETER(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 NOOE    212.40 TO NODE    284.20 =    102S.00 EEET.

****************************************************************************
  FLOW PROCESS FROM NODE    292.20 TO NOOE    284.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OE STREAMS =  2
  CONFLUENCE VALUES USEO FOR INOEPENDENT STREAM  1 ARE:
  TIME OE CONCENTRATION(MIN.) =   10.13
  RAINFALL INTENSITY(INCH/HR) =   S.S2
  TOTAL STREAM AREA(ACRES) =     2.S9
  PEAK ELOW RATE(CES) AT CONELUENCE =      7.31

****************************************************************************
  ELOW PROCESS FROM NODE    290.20 TO NODE    288.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFEICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  8S
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   1S0.00
  UPSTREAM ELEVATION(EEET) =    880.00
  DOWNSTREAM ELEVATION(EEET) =    826.00
  ELEVATION OIFFERENCE(EEET) =     S4.00
  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 OVERLANO FLOW LENGTH IS USEO IN Tc CALCULATION!
   100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  7.210
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOEE(CES) =      0.S6

****************************************************************************
  ELOW PROCESS FROM NOOE    288.20 TO NOOE    286.20 IS CODE =  S1
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL ELOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    826.00  DOWNSTREAM(EEET) =    680.00
  CHANNEL LENGTH THRU SUBAREA(EEET) =   600.00   CHANNEL SLOPE =  0.2433
  CHANNEL BASE(EEET) =   10.00   "Z" FACTOR =   S.000
  MANNING'S FACTOR = 0.03S   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINEALL INTENSITY(INCH/HOUR) =  S.980
  NATURAL DESERT LANDSCAPING RUNOFF COEEFICIENT = .3000
  SOIL CLASSIEICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  8S
  TRAVEL TIME COMPUTED USING ESTIMATEO FLOW(CFS) =       4.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.45
  AVERAGE ELOW DEPTH(EEET) =   0.10   TRAVEL TIME(MIN.) =   2.2S
  Tc(MIN.) =    8.93
```



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

  END OF SUBAREA CHANNEL ELOW HYORAULICS:
  DEPTH(EEET) =  0.14   ELOW VELOCITY(EEET/SEC.) =   S.4S
  LONGEST FLOWPATH FROM NODE    290.20 TO NODE    286.20 =     7S0.00 FEET.

****************************************************************************
  ELOW PROCESS FROM NOOE    286.20 TO NOOE    284.20 IS COOE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATEO PIPESIZE (NON-PRESSURE ELOW)<<<<<
============================================================================
  ELEVATION OATA: UPSTREAM(FEET) =   680.00  DOWNSTREAM(FEET) =   674.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE OIAMETER(INCH) INCREASEO TO 18.000
  DEPTH OF ELOW 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-ELOW(CFS) =       8.29
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.95
  LONGEST FLOWPATH EROM NOOE    290.20 TO NODE    284.20 =     770.00 EEET.

****************************************************************************
  ELOW PROCESS EROM NODE    286.20 TO NODE    284.20 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INOEPENOENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONELUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OE STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENOENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.9S
  RAINFALL INTENSITY(INCH/HR) =   S.97
  TOTAL STREAM AREA(ACRES) =     4.62
  PEAK ELOW RATE(CES) AT CONELUENCE =      8.29

  ** CONELUENCE DATA **
  STREAM     RUNOEE       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         7.31    10.13        S.S1S         2.S9
     2         8.29     8.9S        S.973         4.62

  RAINFALL INTENSITY AND TIME OE CONCENTRATION RATIO
  CONFLUENCE EORMULA USEO FOR  2 STREAMS.

  ** PEAK ELOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CES)     (MIN.)   (INCH/HOUR)
     1        1S.04     8.9S        S.973
     2        14.96    10.13        S.S1S

  COMPUTED CONELUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK ELOW RATE(CES) =      1S.04   Tc(MIN.) =    8.9S
  TOTAL AREA(ACRES) =        7.2
  LONGEST ELOWPATH EROM NODE    212.40 TO NODE    284.20 =    102S.00 EEET.
```

```
****************************************************************************
  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 3-18 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) =       4.50

  END OF SUBAREA SIREET FLOW HYORAULICS:
  DEPIH(FEET) = 0.36   HALFSTREET FLOOD WIDIH(FEET) =  11.0S
  FLOW VELOCITY(FEET/SEC.) =  3.50   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    26B.20 TO NODE    266.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RAIIONAL 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 3-1B 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) =  659.00
  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) =  0.01B
  OUTSIDE STREEI CROSSFALL(DECIMAL)  =  0.01B

  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.) =    5.94
    PRODUCI OF DEPIH&VELOCITY(FT*FT/SEC.) =    I.6S
  STREEI FLOW IRAVEL TIME(MIN.) =   I.B0   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) =       5.60

  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
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.36
  HALFSTREET FLOOD WIDTH(FEET) =   10.90
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    8.66
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.102
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) =    1.50      SUBAREA RUNOFF(CFS) =    5.49
TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       5.89

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.26
FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
LONGEST FLOWPATH FROM NODE    262.20 TO NODE    258.20 =     330.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    258.20 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) =   646.00  DOWNSTREAM(FEET) =   644.00
FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       5.89
PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =    9.28
LONGEST FLOWPATH FROM NODE    262.20 TO NODE    256.20 =     545.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    258.20 TO NODE    256.20 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.) =    9.28
RAINFALL INTENSITY(INCH/HR) =   5.83
TOTAL STREAM AREA(ACRES) =     1.61
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.89

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      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 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      111.55     9.28        5.833
    2      119.82    10.50        5.388

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     119.82   Tc(MIN.) =   10.50
TOTAL AREA(ACRES) =       49.2
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    256.20 =    2322.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    256.20 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) =   644.00  DOWNSTREAM(FEET) =   628.00
FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  24.99
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     129.82
PIPE TRAVEL TIME(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 INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   10.66
RAINFALL INTENSITY(INCH/HR) =   5.34
TOTAL STREAM AREA(ACRES) =    49.25
PEAK FLOW RATE(CFS) AT CONFLUENCE =    119.82

****************************************************************************
FLOW PROCESS FROM NODE    248.20 TO NODE    246.20 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) =    654.00
DOWNSTREAM ELEVATION(FEET) =    653.00
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 3-18 of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.838
SUBAREA RUNOFF(CFS) =      0.41
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(CFS) =       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(CFS) =       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 3-18 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(CFS) =      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 FLOOO WIDTH(EEET) =    8.34
  AVERAGE FLOW VELOCTTY(EEET/SEC.) =    4.66
  PRODUCT OE DEPTH&VELOCITY(ET*ET/SEC.) =    1.4S
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) =    6.7S
TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.13

END OE SUBAREA STREET ELOW HYDRAULTCS:
DEPTH(FEET) = 0.37   HALFSTREET FLOOO WIDTH(EEET) =  11.37
FLOW VELOCITY(EEET/SEC.) =  5.29   OEPTH*VELOCTTY(ET*ET/SEC.) =   1.93
LONGEST FLOWPATH EROM NOOE    2S4.20 TO NOOE    2S0.20 =     47S.00 EEET.

****************************************************************************
FLOW PROCESS EROM NODE    2S0.20 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) =     S.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    2S0.20 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        S.337        49.2S
    2        S.29     9.69        S.673         1.5S
    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      (CFS)    (MIN.)   (TNCH/HDUR)
    1      114.S8     8.41       6.217
    2      124.S2     9.69       S.673
    3      130.91    10.66       S.337

COMPUTEO CONELUENCE ESTTMATES ARE AS EOLLOWS:
PEAK FLOW RATE(CFS) =     130.91   Tc(MIN.) =   10.66
TOIAL AREA(ACRES) =       S2.7
LONGEST FLOWPATH FROM NOOE    216.60 TO NOOE    242.20 =    2SS7.00 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) =   62S.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    2S2.20 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) =   S.32
TOTAL STREAM AREA(ACRES) =    S2.71
PEAK FLOW RATE(CES) AT CONELUENCE =    130.91

****************************************************************************
FLOW PROCESS FROM NODE    240.20 TO NODE    238.20 TS CODE =  21
----------------------------------------------------------------------------
>>>>>RATTONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
RESTOENTIAL (14.S 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 =    6S.31
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND ELOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.8S7
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) =   0.01S0
  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.S1
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.743
  RESIDENTIAL (14.S 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.S        PEAK FLOW RATE(CFS) =       S.10

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.18
  FLOW VELOCITY(FEET/SEC.) =  2.S6   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(EEET) =   627.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(EEET) =    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.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       S.10
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.S4
  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.) =   S.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       S.10
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.84
  LONGEST FLOWPATH FROM NODE    240.20 TO NODE    214.20 =     S28.00 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) =   S.62
  TOTAL STREAM AREA(ACRES) =     1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      S.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      130.91    10.70        S.323         S2.71
     2        S.10     9.84        S.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        S.619
     2      135.74    10.70        S.323

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     135.74   Tc(MIN.) =   10.70
  TOTAL AREA(ACRES) =       S4.2
  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(FEET) =   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(FEET) =   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(FEET/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(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 =    68.75
           (Reference: Table 3-18 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(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  632.00
  STREET LENGTH(FEET) =   115.00   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) =       1.54
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.28
  HALFSTREET FLOOD WIDTH(FEET) =    6.84
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.52
  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 = .5700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  85
AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.54
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 =     195.00 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 =     525.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    224.20 TO NODE    216.20 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   5.4 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 =     545.00 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) =   6.35
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 = .5700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  85
INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
UPSTREAM ELEVATION(FEET) =    636.00
DOWNSTREAM ELEVATION(FEET) =    635.00
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 =    68.75
         (Reference: Table 3-18 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) =  635.00  DOWNSTREAM ELEVATION(FEET) =  632.00
STREET LENGTH(FEET) =   150.00   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) =       0.97
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.24
  HALFSTREET FLOOD WIDTH(FEET) =    4.53
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
STREET FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    8.32
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.261
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) =    0.39      SUBAREA RUNOFF(CFS) =    1.39
TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.64

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.78
FLOW VELOCITY(FEET/SEC.) =  2.72   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
LONGEST FLOWPATH FROM NODE    222.20 TO NODE    218.20 =     230.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    218.20 TO NODE    216.20 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) =     5.00   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.) =  12.02
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        1.64
PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.33
LONGEST FLOWPATH FROM NODE    222.20 TO NODE    216.20 =     235.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    218.20 TO NODE    216.20 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.) =    8.33
RAINFALL INTENSITY(INCH/HR) =   6.26
TOTAL STREAM AREA(ACRES) =     0.46
PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.64
```



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

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        5.98     8.14        6.351
    2        5.96     8.33        6.258

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       5.98   Tc(MIN.) =    8.14
TOTAL AREA(ACRES) =        2.1
LONGEST FLOWPATH FROM NODE    229.20 TO NODE    216.20 =     545.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    216.20 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) =   628.00  DOWNSTREAM(FEET) =   625.00
FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        5.98
PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.37
LONGEST FLOWPATH FROM NODE    229.20 TO NODE    214.20 =     660.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    216.20 TO NODE    214.20 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        5.98     8.37        6.239         2.12
LONGEST FLOWPATH FROM NODE    229.20 TO NODE    214.20 =     660.00 FEET.

** MEMORY BANK #  2 CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1      135.74    10.70        5.323        54.19
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    214.20 =    2617.00 FEET.

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

```
NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1     112.11      8.37        6.239
    2     140.85     10.70        5.323

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     140.85   Tc(MIN.) =   10.70
TOTAL AREA(ACRES) =       56.3

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

****************************************************************************
FLOW PROCESS FROM NODE    214.20 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) =   625.00  DOWNSTREAM(FEET) =   608.00
FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  26.67
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     140.85
PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.85
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    200.20 =    2857.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    214.20 TO NODE    200.20 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.) =   10.85
RAINFALL INTENSITY(INCH/HR) =   5.28
TOTAL STREAM AREA(ACRES) =    56.31
PEAK FLOW RATE(CFS) AT CONFLUENCE =    140.85

****************************************************************************
FLOW PROCESS FROM NODE    206.20 TO NODE    204.20 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) =   115.00
UPSTREAM ELEVATION(FEET) =    632.00
DOWNSTREAM ELEVATION(FEET) =    629.50
ELEVATION DIFFERENCE(FEET) =      2.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.707
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    71.74
         (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) =      1.13
TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      1.13

****************************************************************************
FLOW PROCESS FROM NODE    204.20 TO NODE    202.20 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  629.50  DOWNSTREAM ELEVATION(FEET) =  612.00
STREET LENGTH(FEET) =   280.00   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) =       2.23
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.26
  HALFSTREET FLOOD WIDTH(FEET) =    5.72
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =    3.72
 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) =    0.29      SUBAREA RUNOFF(CFS) =    2.19
TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       3.33

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.34
FLOW VELOCITY(FEET/SEC.) =  4.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
LONGEST FLOWPATH FROM NODE    206.20 TO NODE    202.20 =     395.00 FEET.

****************************************************************************
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) =  8.695
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 = 0.5844
```

```
  SUBAREA AREA(ACRES) =     0.56   SUBAREA RUNOFF(CFS) =     1.75
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       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        5.275         56.31
     2         5.08      3.73        8.695          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       8.695
     2       143.93     10.85       5.275

  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 3-18 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 NODE    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    200.20 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) =    3.73
  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 3-18 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
```

```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    5.03
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.96
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
STREET FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =    4.29
 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) =    0.34      SUBAREA RUNOFF(CFS) =    2.57
TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.95

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.41
FLOW VELOCITY(FEET/SEC.) =  4.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
LONGEST FLOWPATH FROM NODE    208.00 TO NODE    204.00 =     600.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    204.00 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) =     5.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.29
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        2.95
PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    4.29
LONGEST FLOWPATH FROM NODE    208.00 TO NODE    202.00 =     605.00 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 =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =    4.29
RAINFALL INTENSITY(INCH/HR) =   8.69
TOTAL STREAM AREA(ACRES) =     0.39
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.95

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1      195.09    11.26        5.150        72.86
    2        4.54     4.26        8.695         0.60
    3        2.95     4.29        8.695         0.39

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       81.23     4.26        8.695
    2       81.86     4.29        8.695
    3      199.53    11.26        5.150

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     199.53   Tc(MIN.) =   11.26
TOTAL AREA(ACRES) =       73.8
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    202.00 =    3427.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    202.00 TO NODE    201.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   583.00  DOWNSTREAM(FEET) =   580.00
FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  21.06
ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     199.53
PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.34
LONGEST FLOWPATH FROM NODE    216.60 TO NODE    201.00 =    3527.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    202.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.126
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 = 0.4826
SUBAREA AREA(ACRES) =    1.96   SUBAREA RUNOFF(CFS) =    3.62
TOTAL AREA(ACRES) =       75.8   TOTAL RUNOFF(CFS) =     199.53
TC(MIN.) =   11.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   11.34
RAINFALL INTENSITY(INCH/HR) =   5.13
TOTAL STREAM AREA(ACRES) =    75.81
PEAK FLOW RATE(CFS) AT CONFLUENCE =    199.53

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

```
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 3-18 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 3-18 of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.210
  SUBAREA RUNOFF(CFS) =       0.30
  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)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   625.00
  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   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.62
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        5.84
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE    226.80 TO NODE    208.80 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.80 TO NODE    208.80 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.) =    9.52
  RAINFALL INTENSITY(INCH/HR) =   5.74
  TOTAL STREAM AREA(ACRES) =     2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.84

****************************************************************************
  FLOW PROCESS FROM NODE    214.80 TO NODE    212.80 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) =    85.00
  UPSTREAM ELEVATION(FEET) =    634.00
  DOWNSTREAM ELEVATION(FEET) =    633.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.433
  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) =  6.733
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    212.80 TO NODE    210.80 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  633.00  DOWNSTREAM ELEVATION(FEET) =  629.00
  STREET LENGTH(FEET) =   230.00   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) =       1.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =    8.92
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.984
  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) =    0.79      SUBAREA RUNOFF(CFS) =    2.69
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE    214.80 TO NODE    210.80 =     315.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.80 TO NODE    208.80 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) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.00
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.93
  LONGEST FLOWPATH FROM NODE    214.80 TO NODE    208.80 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.80 TO NODE    208.80 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.) =    8.93
  RAINFALL INTENSITY(INCH/HR) =   5.98
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (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 OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        8.60     8.93       5.982
     2        8.72     9.52       5.738

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.72   Tc(MIN.) =    9.52
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    226.80 TO NODE    208.80 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.80 TO NODE    202.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.72
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.94
  LONGEST FLOWPATH FROM NODE    226.80 TO NODE    202.80 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.80 TO NODE    202.80 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.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   5.58
  TOTAL STREAM AREA(ACRES) =     3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.72

****************************************************************************
  FLOW PROCESS FROM NODE    206.80 TO NODE    204.80 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) =    85.00
  UPSTREAM ELEVATION(FEET) =    630.00
  DOWNSTREAM ELEVATION(FEET) =    629.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```



```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.433
  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) =  6.733
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    204.80 TO NODE    202.80 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  629.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   280.00   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) =       2.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.967
  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) =    1.36      SUBAREA RUNOFF(CFS) =    4.63
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
  FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE    206.80 TO NODE    202.80 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.80 TO NODE    202.80 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.) =    8.96
```

```
RAINEALL INTENSITY(TNCH/HR) =   S.97
TOTAL STREAM AREA(ACRES) =     1.45
PEAK ELOW RATE(CES) AT CONFLUENCE =      4.93

** CONFLUFNCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CES)     (MIN.)   (TNCH/HOUR)    (ACRE)
    1        8.72     9.94        S.S82         3.0S
    2        4.93     8.96        S.967         1.4S

RATNEALL TNTENSTTY AND TTME OE CONCENTRATTON RATIO
CONFLUENCE FORMULA USEO EOR  2 STREAMS.

** PEAK FLOW RATE TABLF **
STREAM     RUNOEF       Tc      INTENSITY
NUMBER      (CFS)     (MTN.)   (INCH/HOUR)
    1       13.09     8.96        S.967
    2       13.33     9.94        S.S82

COMPUTEO CONFLUENCE ESTTMATES ARE AS EOLLOWS:
PEAK ELOW RATE(CES) =      13.33   Tc(MIN.) =    9.94
TOTAL AREA(ACRES) =        4.S
LONGEST FLOWPATH FROM NODE    226.80 TO NOOE    202.80 =     720.00 FEET.

****************************************************************************
ELOW PROCESS EROM NOOE    202.80 TO NODE    200.80 IS COOE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PTPE-ELOW TRAVEL TTME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTTMATEO PTPESTZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   620.00  OOWNSTREAM(EEET) =   580.00
FLOW LENGTH(EEET) =    90.00   MANNTNG'S N =  0.013
ESTTMATED PTPE OIAMETER(INCH) TNCREASEO TO 18.000
DEPTH OF ELOW TN  18.0 TNCH PTPE TS   S.S TNCHES
PTPE-FLOW VELOCITY(FEET/SEC.) =  29.39
ESTTMATED PIPE OIAMETER(INCH) =  18.00    NUMBER OE PTPES =   1
PTPE-ELOW(CFS) =      13.33
PTPE TRAVFL TTME(MTN.) =   0.0S    Tc(MIN.) =    9.99
LONGEST ELOWPATH EROM NODE    226.80 TO NODE    200.80 =     810.00 EEET.

****************************************************************************
FLOW PROCESS EROM NOOE    202.80 TO NODE    200.80 IS COOE =  11
----------------------------------------------------------------------------
>>>>>CONELUENCE MEMORY BANK # 1 WTTH THE MAIN-STRFAM MEMORY<<<<<
============================================================================

** MAIN STREAM CONELUENCE DATA **
STREAM     RUNOEE       Tc      TNTENSITY      AREA
NUMBER      (CFS)     (MTN.)   (TNCH/HOUR)    (ACRE)
    1       13.33     9.99        S.S63         4.S0
LONGEST FLOWPATH FROM NOOE    226.80 TO NOOE    200.80 =     810.00 EEET.

** MEMORY BANK #  1 CONELUENCE DATA **
STREAM     RUNOFE       Tc      TNTENSITY      AREA
NUMBER      (CES)     (MTN.)   (TNCH/HOUR)    (ACRE)
    1      203.31    11.34        S.126        76.70
LONGEST ELOWPATH FROM NODE    216.60 TO NODE    200.80 =    3527.00 FEET.
```



```
** PEAK ELOW RATE TABLE **
STREAM     RUNOEF       Tc      INTENSITY
NUMBER      (CES)     (MIN.)   (TNCH/HOUR)
    1      192.44      9.99        S.S63
    2      21S.60     11.34        S.126

COMPUTFD CONFLUENCE ESTTMATES ARE AS EOLLOWS:
PEAK ELOW RATE(CES) =     21S.60   Tc(MIN.) =   11.34
TOTAL AREA(ACRES) =       81.2

****************************************************************************
ELOW PROCESS FROM NOOE    202.80 TO NODE    201.00 TS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # I <<<<<
============================================================================

****************************************************************************
ELOW PROCESS EROM NOOE    201.00 TO NODE    200.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-ELOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTTMATEO PTPESTZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   S80.00  DOWNSTREAM(EEET) =   S76.00
ELOW LENGTH(FEET) =   29S.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  S4.0 TNCH PTPE TS  43.9 TNCHES
PTPE-ELOW VELOCTTY(EEET/SEC.) =  1S.S7
ESTTMATED PTPE OTAMETER(TNCH) =  S4.00    NUMBER OF PTPES =   1
PIPE-ELOW(CES) =     21S.60
PTPE TRAVEL TTME(MTN.) =   0.32    Tc(MTN.) =   11.66
LONGEST ELOWPATH FROM NODE    216.60 TO NOOE    200.00 =    3822.00 FEET.

****************************************************************************
ELOW PROCESS FROM NOOE    200.00 TO NODE    200.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>AOOTTTON OE SUBAREA TO MATNLTNE PEAK ELOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.036
STREETS & ROADS (CUR8S/STORM ORATNS) RUNOEE COEEETCTENT = .8700
SOIL CLASSIEICATION TS "C"
S.C.S. CURVE NUMBER (AMC TT) =  98
AREA-AVERAGE RUNOEE COEEFICTENT = 0.4884
SUBAREA AREA(ACRES) =    0.00   SUBAREA RUNOFE(CES) =    0.00
TOTAL AREA(ACRES) =       81.2   TOTAL RUNOEF(CFS) =     21S.60
TC(MIN.) =   11.66
NOTE: PEAK FLOW RATE OEFAULTED TO UPSTREAM VALUF
============================================================================
END OF STUOY SUMMARY:
TOTAL AREA(ACRES)     =       81.2  TC(MIN.) =     11.66
PEAK FLOW RATE(CFS)   =     21S.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 3-3B 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-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   707.00  DOWNSTREAM(FEET) =   706.00
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   6.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.69
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       5.61
PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    4.35
LONGEST FLOWPATH FROM NODE    354.00 TO NODE    342.00 =    485.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    350.00 TO NODE    342.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    4.35
RAINFALL INTENSITY(INCH/HR) =   8.69
TOTAL STREAM AREA(ACRES) =     0.89
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.61

****************************************************************************
FLOW PROCESS FROM NODE    348.00 TO NODE    346.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6100
S.C.S. CURVE NUMBER (AMC II) =  92
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.) =    6.262
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
         (Reference: Table 3-18 of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.520
SUBAREA RUNOFF(CFS) =      0.87
TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.87

****************************************************************************
FLOW PROCESS FROM NODE    346.00 TO NODE    344.00 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) =   420.00   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) =       3.35
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.32
  HALFSTREET FLOOD WIDTH(FEET) =    8.97
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.19
STREET FLOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =    8.17
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.336
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.695
SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =    4.95
TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.68

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.52
FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
LONGEST FLOWPATH FROM NODE    348.00 TO NODE    344.00 =     520.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    344.00 TO NODE    342.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   707.00  DOWNSTREAM(FEET) =   706.00
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.) =  17.31
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       5.68
PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    8.17
LONGEST FLOWPATH FROM NODE    348.00 TO NODE    342.00 =     525.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    344.00 TO NODE    342.00 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.) =    8.17
RAINFALL INTENSITY(INCH/HR) =   6.33
TOTAL STREAM AREA(ACRES) =     1.29
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.68
```

```
** 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 FRICITON 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(FEET) =   695.00  DOWNSTREAM(FEET) =   694.00
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.) =  17.31
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        5.69
PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    7.12
LONGEST FLOWPATH FROM NODE    338.00 TO NODE    332.00 =     395.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    334.00 TO NODE    332.00 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.) =    7.12
RAINFALL INTENSITY(INCH/HR) =   6.92
TOTAL STREAM AREA(ACRES) =     1.19
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.69

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        9.77     8.54        6.157         2.18
    2        5.69     7.12        6.925         1.19

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc      INTENSITY
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       14.37     7.12        6.925
    2       14.82     8.54        6.157

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      14.82   Tc(MIN.) =    8.54
TOTAL AREA(ACRES) =         3.4
LONGEST FLOWPATH FROM NODE    348.00 TO NODE    332.00 =     785.00 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  DOWNSTREAM(FEET) =   681.00
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.) =  13.70
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      14.82
PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    8.84
LONGEST FLOWPATH FROM NODE    348.00 TO NODE    316.00 =    1035.00 FEET.
```



```
****************************************************************************
FLOW PROCESS FROM NODE    332.00 TO NODE    316.00 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.) =    8.84
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 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) =    699.00
DOWNSTREAM ELEVATION(FEET) =    698.00
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    320.00 TO NODE    318.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  698.00  DOWNSTREAM ELEVATION(FEET) =  685.00
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) =       3.72
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.31
  HALFSTREET FLOOD WIDTH(FEET) =    8.28
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.62
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =    6.98
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.013
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) =    0.86      SUBAREA RUNOFF(CFS) =    4.16
TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       5.66

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.20
FLOW VELOCITY(FEET/SEC.) =  5.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
LONGEST FLOWPATH FROM NODE    322.00 TO NODE    318.00 =     370.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    318.00 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) =     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.) =  17.29
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        5.66
PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    6.98
LONGEST FLOWPATH FROM NODE    322.00 TO NODE    316.00 =     375.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    318.00 TO NODE    316.00 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.) =    6.98
RAINFALL INTENSITY(INCH/HR) =   7.01
TOTAL STREAM AREA(ACRES) =     1.17
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.66

** CONFLUENCE DATA **
STREAM     RUNOFF       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

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       18.39     6.98       7.010
    2       19.69     8.84       6.019

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      19.69   Tc(MIN.) =    8.84
TOTAL AREA(ACRES) =        4.5
LONGEST FLOWPATH FROM NODE    348.00 TO NODE    316.00 =    1035.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    318.00 TO NODE    316.00 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE    330.00 TO NODE    328.00 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) =   185.00
UPSTREAM ELEVATION(FEET) =    728.00
DOWNSTREAM ELEVATION(FEET) =    727.00
ELEVATION DIFFERENCE(FEET) =      1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.483
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         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 RAINFALL INTENSITY(INCH/HOUR) =  7.353
SUBAREA RUNOFF(CFS) =      2.69
TOTAL AREA(ACRES) =      0.53   TOTAL RUNOFF(CFS) =      2.69

****************************************************************************
FLOW PROCESS FROM NODE    328.00 TO NODE    326.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  727.00  DOWNSTREAM ELEVATION(FEET) =  718.00
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 =  2
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.64
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW 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
  SU8AREA AREA(ACRES) =    S.S9      SU8AREA RUNOFF(CES) =   23.78
  TOTAL 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 SU8AREA 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. DU/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: INITIAL 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   TOTAL 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 TA8EE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM EEEVATION(FEET) =  70S.00  DOWNSTREAM 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 FRICTION 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 3-103 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    311.00 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   5.1 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       53.08     8.97       5.964

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      53.08   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) =      53.08
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  DOWNSTREAM(FEET) =    6S2.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   7S0.00   CHANMEL 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:
DEPTH(FEET) =  0.19   FLOW VELOCITY(EEET/SEC.) =   7.33
LONGEST ELDWPATH FROM NODE    466.00 TO NODE    468.00 =     9S0.00 FEET.

****************************************************************************
ELOW PROCESS FROM NOOE    464.00 TO NODE    468.00 IS COOE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT 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 DATA **
STREAM     RUNOEF       Tc      INTENSITY      AREA
NUMBER      (CES)     (MIN.)   (INCH/HOUR)    (ACRE)
```



```
    I       S4.20     9.64        S.694         27.20
    2       1S.06     8.3S        6.247          6.89

RAINEALL INTENSITY AND TIME OF CDNCENTRATION 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 NDDE    468.00 TO NODE    462.00 IS CODE =  5I
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL 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.) =   10.70
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    4S8.00 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

9
```

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

          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) =    3.69
  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) =  0.016
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.) =  18.96
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
```

APPENDIX 5

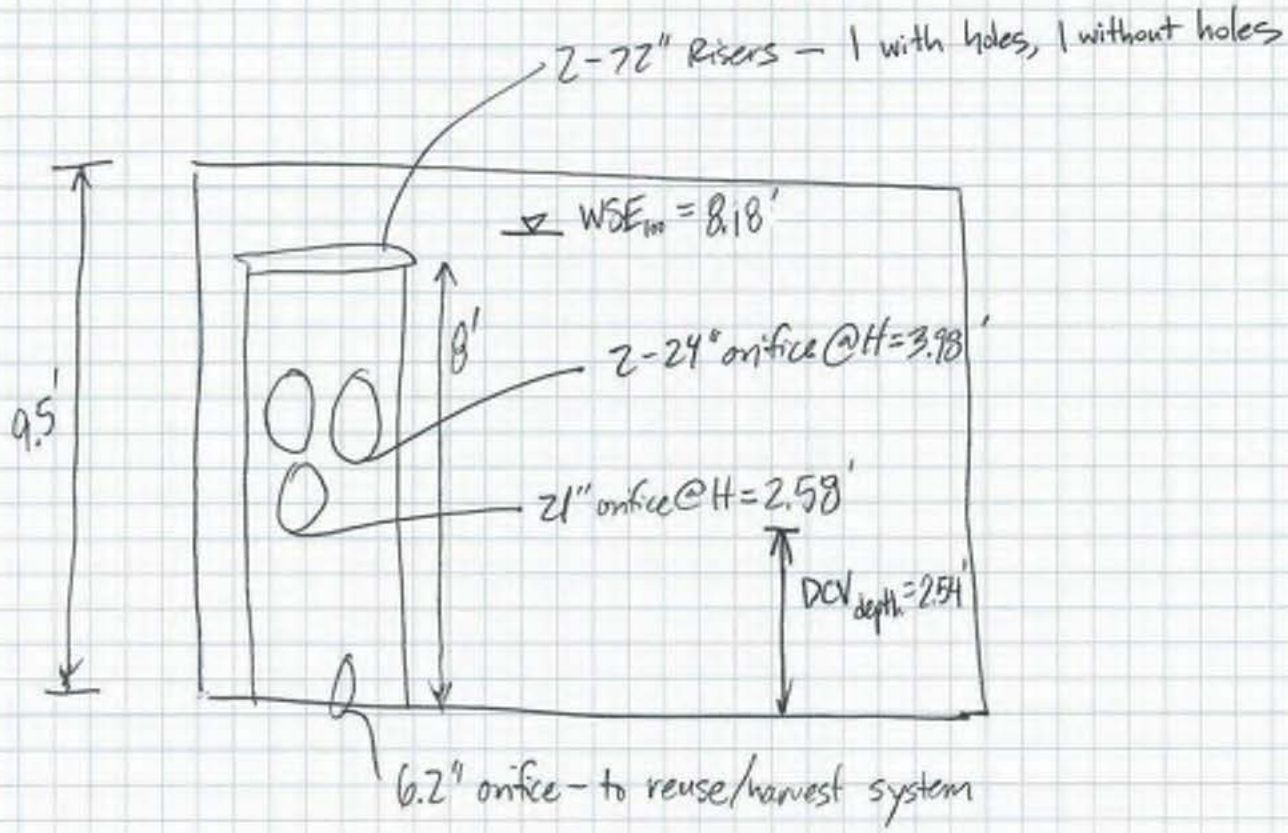
Preliminary Detention and Preliminary Hydraulic Calculations

PROJECT DESIGN CONSULTANTS

PLANNING | LANDSCAPE ARCHITECTURE
ENGINEERING | SURVEY

WWW.PROJECTDESIGN.COM

PROJECT: HGVS
SUBJECT: Detention Vault Cross Section
PAGE: 1 OF 1 JOB NO.: 4095.01
DRAWN BY: CP DATE: 1/16/16
CHECKED BY: DATE:



NORTH BASIN

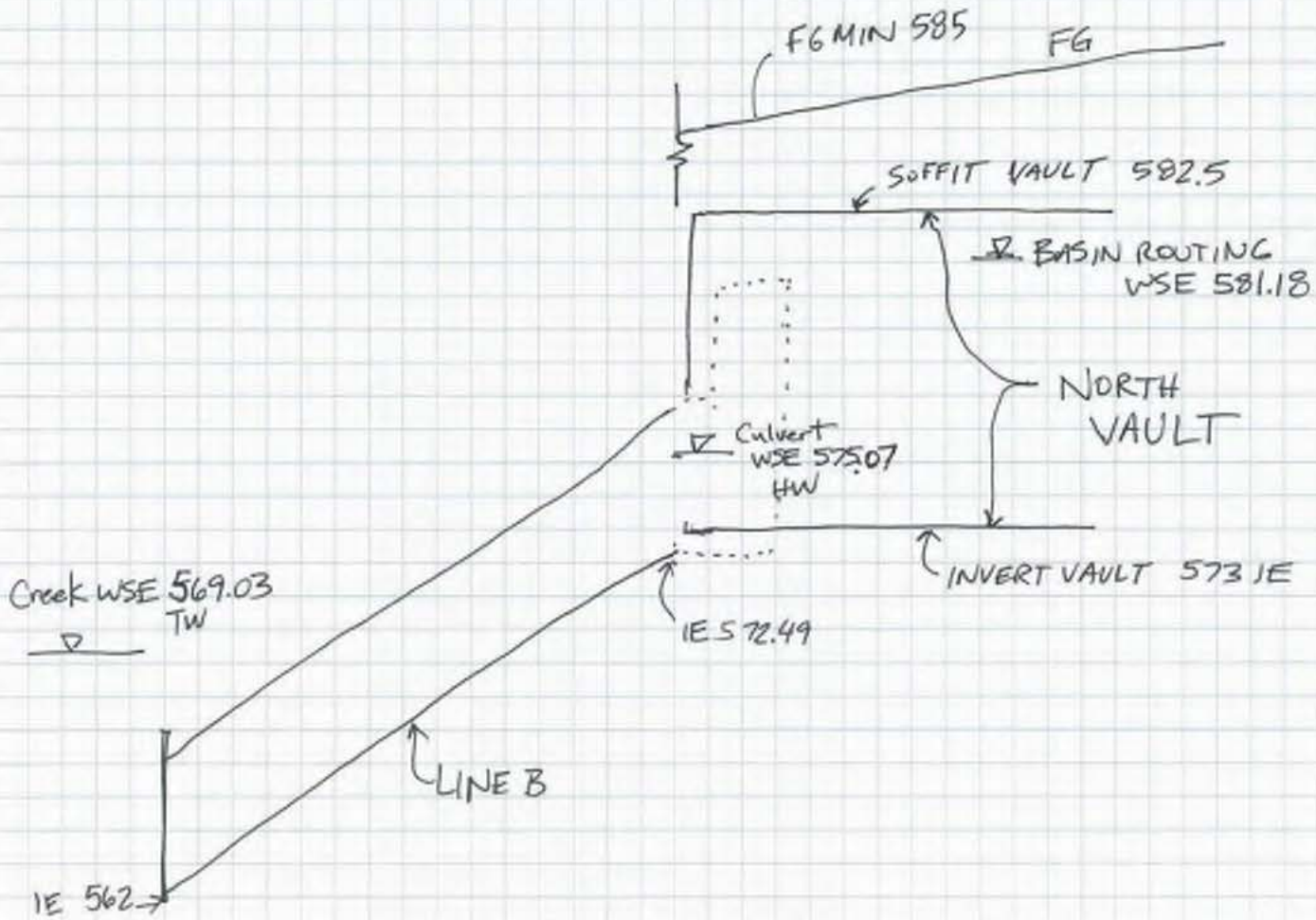
NTS

PROJECT DESIGN CONSULTANTS

PLANNING | LANDSCAPE ARCHITECTURE
ENGINEERING | SURVEY

WWW.PROJECTDESIGN.COM

PROJECT: HGVS
SUBJECT: Tailwater Calcs
PAGE: 1 OF 1 JOB NO.: 4095.01
DRAWN BY: CP DATE: 12/29/16
CHECKED BY: _____ DATE: _____

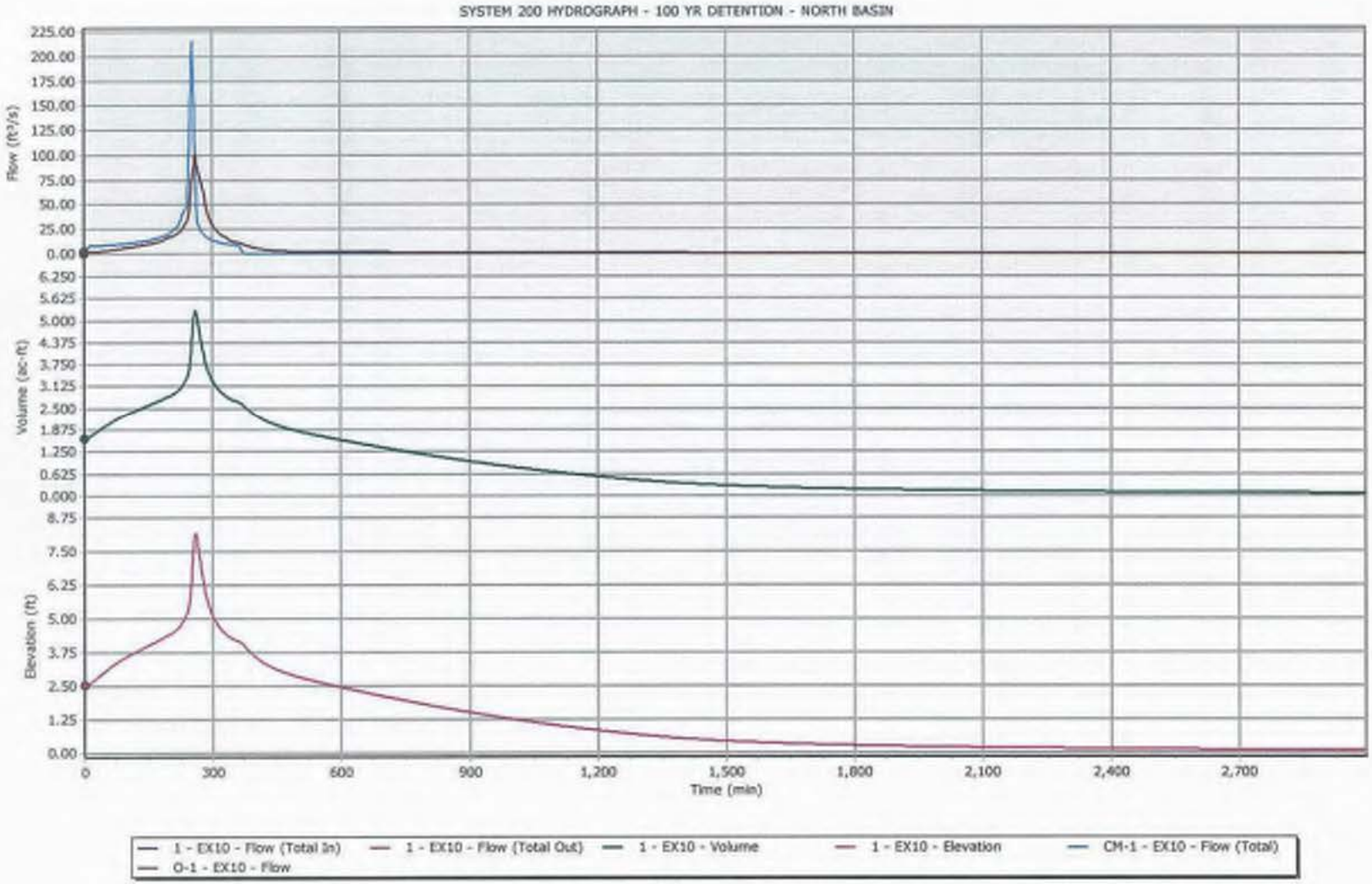


ROUGH SECTION
SHOWING DOWNSTREAM
ESCONDIDO CREEK TAILWATER
DOES NOT CREATE BACKWATER EFFECT ON NORTH BASIN
(N.T.S.)

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 11/17/2015
HYDROGRAPH FILE NAME S200P100.txt
TIME OF CONCENTRATION 11 MIN.
6 HOUR RAINFALL 3.3 INCHES
BASIN AREA 81.2 ACRES
RUNOFF COEFFICIENT 0.4884
PEAK DISCHARGE 215.6 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 11	DISCHARGE (CFS) = 7.8
TIME (MIN) = 22	DISCHARGE (CFS) = 8
TIME (MIN) = 33	DISCHARGE (CFS) = 8.3
TIME (MIN) = 44	DISCHARGE (CFS) = 8.5
TIME (MIN) = 55	DISCHARGE (CFS) = 8.9
TIME (MIN) = 66	DISCHARGE (CFS) = 9.1
TIME (MIN) = 77	DISCHARGE (CFS) = 9.6
TIME (MIN) = 88	DISCHARGE (CFS) = 9.9
TIME (MIN) = 99	DISCHARGE (CFS) = 10.5
TIME (MIN) = 110	DISCHARGE (CFS) = 10.8
TIME (MIN) = 121	DISCHARGE (CFS) = 11.6
TIME (MIN) = 132	DISCHARGE (CFS) = 12.1
TIME (MIN) = 143	DISCHARGE (CFS) = 13.1
TIME (MIN) = 154	DISCHARGE (CFS) = 13.7
TIME (MIN) = 165	DISCHARGE (CFS) = 15.2
TIME (MIN) = 176	DISCHARGE (CFS) = 16.2
TIME (MIN) = 187	DISCHARGE (CFS) = 18.5
TIME (MIN) = 198	DISCHARGE (CFS) = 20.1
TIME (MIN) = 209	DISCHARGE (CFS) = 24.5
TIME (MIN) = 220	DISCHARGE (CFS) = 28
TIME (MIN) = 231	DISCHARGE (CFS) = 41.1
TIME (MIN) = 242	DISCHARGE (CFS) = 49.6
TIME (MIN) = 253	DISCHARGE (CFS) = 215.6
TIME (MIN) = 264	DISCHARGE (CFS) = 32.9
TIME (MIN) = 275	DISCHARGE (CFS) = 22
TIME (MIN) = 286	DISCHARGE (CFS) = 17.2
TIME (MIN) = 297	DISCHARGE (CFS) = 14.4
TIME (MIN) = 308	DISCHARGE (CFS) = 12.6
TIME (MIN) = 319	DISCHARGE (CFS) = 11.2
TIME (MIN) = 330	DISCHARGE (CFS) = 10.2
TIME (MIN) = 341	DISCHARGE (CFS) = 9.4
TIME (MIN) = 352	DISCHARGE (CFS) = 8.7
TIME (MIN) = 363	DISCHARGE (CFS) = 8.1
TIME (MIN) = 374	DISCHARGE (CFS) = 0


SYSTEM 200 HYDROGRAPH - 100 YR DETENTION - NORTH BASIN
Flow (ft³/s)
225.00
200.00
175.00
150.00
125.00
100.00
75.00
50.00
25.00
0.00
Volume (ac-ft)
6.250
5.625
5.000
4.375
3.750
3.125
2.500
1.875
1.250
0.625
0.000
Elevation (ft)
8.75
7.50
6.25
5.00
3.75
2.50
1.25
0.00
0
300
600
900
1,200
1,500
1,800
2,100
2,400
2,700
Time (min)
1 - EX10 - Flow (Total In)
1 - EX10 - Flow (Total Out)
1 - EX10 - Volume
1 - EX10 - Elevation
CM-1 - EX10 - Flow (Total)
O-1 - EX10 - Flow

Vault

Project Summary	
Title	North Basin
Engineer	PDC
Company	PDC
Date	12/29/2016

Notes	WQ volume in basin at time=0 for 100-year hydrograph routing

Vault

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
CM-1	EX10	0	10.870	253	215.60

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
O-1	EX10	0	12.441	260	101.31

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	10.870	253	215.60	(N/A)	(N/A)
1 (OUT)	EX10	0	12.441	260	101.31	8.18	5.271

Vault

Subsection: Read Hydrograph
Label: CM-1

Return Event: 0 years
Storm Event:

Peak Discharge	215.60 ft³/s
Time to Peak	253 min
Hydrograph Volume	10.870 ac-ft

HYOROGRAPH ORDINATES (ft³/s)
Output Time Increment = 11 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0	0.00	7.80	8.00	8.30
55	8.90	9.10	9.60	9.90
110	10.80	11.60	12.10	13.10
165	15.20	16.20	18.50	20.10
220	28.00	41.10	49.60	215.60
275	22.00	17.20	14.40	12.60
330	10.20	9.40	8.70	8.10

Flow (ft³/s)
8.50
10.50
13.70
24.50
32.90
11.20
0.00

Vault

Subsection: Elevation-Area Volume Curve
Label: 1

Return Event: 0 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr(A1*A2) (ft²)
0.00	0.0	28,073.190	0.000
9.50	0.0	28,073.190	84,219.570

Volume (ac-ft)	Volume (Total) (ac-ft)
0.000	0.000
6.122	6.122

Vault

Subsection: Volume Equations
Label: 1

Return Event: 0 years
Storm Event:

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Vault

Subsection: Outlet Input Data
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	9.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2	Forward	TW	3.98	9.5
Stand Pipe	Riser - 1	Forward	TW	8.00	9.5
Orifice-Circular	WQ Orifice to reuse	Forward	TW	0.00	9.5
Stand Pipe	Riser - 2	Forward	TW	8.00	9.5
Orifice-Circular	Orifice - 1	Forward	TW	2.58	9.5
Tailwater Settings	Tailwater			(N/A)	(N/A

Vault

Subsection: Outlet Input Data
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Structure ID: Riser - 2 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	8.00 ft
Diameter	72.0 in
Orifice Area	0.0 ft²
Orifice Coefficient	0.670
Weir Length	0.00 ft
Weir Coefficient	3.33 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	2.58 ft
Orifice Diameter	21.0 in
Orifice Coefficient	0.670

Structure ID: Orifice - 2 Structure Type: Orifice-Circular	
Number of Openings	2
Elevation	3.98 ft
Orifice Diameter	24.0 in
Orifice Coefficient	0.670

Structure ID: WQ Orifice to reuse Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	6.2 in
Orifice Coefficient	0.670

Structure ID: Riser - 1 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	8.00 ft
Diameter	72.0 in
Orifice Area	0.0 ft²

Vault

Subsection: Outlet Input Data
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Structure ID: Riser - 1 Structure Type: Stand Pipe	
Orifice Coefficient	0.670
Weir Length	0.00 ft
Weir Coefficient	3.33 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Vault

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
0.00	0.00	(N/A)
0.10	0.02	(N/A)
0.20	0.09	(N/A)
0.30	0.19	(N/A)
0.40	0.32	(N/A)
0.50	0.47	(N/A)
0.60	0.66	(N/A)
0.70	0.75	(N/A)
0.80	0.83	(N/A)
0.90	0.90	(N/A)
1.00	0.97	(N/A)
1.10	1.03	(N/A)
1.20	1.09	(N/A)
1.30	1.15	(N/A)
1.40	1.20	(N/A)
1.50	1.26	(N/A)
1.60	1.31	(N/A)
1.70	1.35	(N/A)
1.80	1.40	(N/A)
1.90	1.44	(N/A)
2.00	1.49	(N/A)
2.10	1.53	(N/A)
2.20	1.57	(N/A)
2.30	1.61	(N/A)
2.40	1.65	(N/A)
2.50	1.69	(N/A)
2.58	1.72	(N/A)
2.60	1.73	(N/A)
2.70	1.83	(N/A)
2.80	2.01	(N/A)
2.90	2.28	(N/A)
3.00	2.63	(N/A)
3.10	3.06	(N/A)
3.20	3.55	(N/A)
3.30	4.11	(N/A)
3.40	4.74	(N/A)
3.50	5.43	(N/A)
3.60	6.17	(N/A)
3.70	6.96	(N/A)
3.80	7.79	(N/A)
3.90	8.66	(N/A)
3.98	9.38	(N/A)
4.00	9.58	(N/A)

Vault

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
4.10	10.64	(N/A)
4.20	11.92	(N/A)
4.30	13.42	(N/A)
4.40	16.51	(N/A)
4.50	18.03	(N/A)
4.60	19.68	(N/A)
4.70	21.45	(N/A)
4.80	23.36	(N/A)
4.90	25.37	(N/A)
5.00	27.49	(N/A)
5.10	29.71	(N/A)
5.20	32.05	(N/A)
5.30	34.43	(N/A)
5.40	36.94	(N/A)
5.50	39.47	(N/A)
5.60	42.12	(N/A)
5.70	44.75	(N/A)
5.80	47.48	(N/A)
5.90	50.23	(N/A)
6.00	57.43	(N/A)
6.10	59.49	(N/A)
6.20	61.46	(N/A)
6.30	63.37	(N/A)
6.40	65.22	(N/A)
6.50	67.01	(N/A)
6.60	68.74	(N/A)
6.70	70.44	(N/A)
6.80	72.08	(N/A)
6.90	73.69	(N/A)
7.00	75.26	(N/A)
7.10	76.80	(N/A)
7.20	78.30	(N/A)
7.30	79.77	(N/A)
7.40	81.22	(N/A)
7.50	82.64	(N/A)
7.60	84.03	(N/A)
7.70	85.40	(N/A)
7.80	86.75	(N/A)
7.90	88.07	(N/A)
8.00	89.38	(N/A)
8.10	94.64	(N/A)
8.20	103.16	(N/A)
8.30	113.81	(N/A)

Vault

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
8.40	126.17	(N/A)
8.50	140.01	(N/A)
8.60	155.17	(N/A)
8.70	171.53	(N/A)
8.80	189.01	(N/A)
8.90	207.52	(N/A)
9.00	227.02	(N/A)
9.10	247.44	(N/A)
9.20	268.75	(N/A)
9.30	290.91	(N/A)
9.40	313.88	(N/A)
9.50	337.63	(N/A)

Convergence Error (ft)	Contributing Structures
0.00	None Contributing
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1

Vault

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1

Vault

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + WQ Orifice to reuse + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1
0.00	Orifice - 2 + Riser - 1 + WQ Orifice to reuse + Riser - 2 + Orifice - 1

Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	2.54 ft
Volume (Initial)	1.637 ac-ft
Flow (Initial Outlet)	1.70 ft^3/s
Flow (Initial Infiltration)	0.00 ft^3/s
Flow (Initial, Total)	1.70 ft^3/s
Time Increment	1 min

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)
0.00	0.00	0.000	28,073.190	0.00
0.10	0.02	0.064	28,073.190	0.00
0.20	0.09	0.129	28,073.190	0.00
0.30	0.19	0.193	28,073.190	0.00
0.40	0.32	0.258	28,073.190	0.00
0.50	0.47	0.322	28,073.190	0.00
0.60	0.66	0.387	28,073.190	0.00
0.70	0.75	0.451	28,073.190	0.00
0.80	0.83	0.516	28,073.190	0.00
0.90	0.90	0.580	28,073.190	0.00
1.00	0.97	0.644	28,073.190	0.00
1.10	1.03	0.709	28,073.190	0.00
1.20	1.09	0.773	28,073.190	0.00
1.30	1.15	0.838	28,073.190	0.00
1.40	1.20	0.902	28,073.190	0.00
1.50	1.26	0.967	28,073.190	0.00
1.60	1.31	1.031	28,073.190	0.00
1.70	1.35	1.096	28,073.190	0.00
1.80	1.40	1.160	28,073.190	0.00
1.90	1.44	1.224	28,073.190	0.00
2.00	1.49	1.289	28,073.190	0.00
2.10	1.53	1.353	28,073.190	0.00
2.20	1.57	1.418	28,073.190	0.00
2.30	1.61	1.482	28,073.190	0.00
2.40	1.65	1.547	28,073.190	0.00
2.50	1.69	1.611	28,073.190	0.00
2.58	1.72	1.663	28,073.190	0.00
2.60	1.73	1.676	28,073.190	0.00
2.70	1.83	1.740	28,073.190	0.00

Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
2.80	2.01	1.805	28,073.190	0.00
2.90	2.28	1.869	28,073.190	0.00
3.00	2.63	1.933	28,073.190	0.00
3.10	3.06	1.998	28,073.190	0.00
3.20	3.55	2.062	28,073.190	0.00
3.30	4.11	2.127	28,073.190	0.00
3.40	4.74	2.191	28,073.190	0.00
3.50	5.43	2.256	28,073.190	0.00
3.60	6.17	2.320	28,073.190	0.00
3.70	6.96	2.385	28,073.190	0.00
3.80	7.79	2.449	28,073.190	0.00
3.90	8.66	2.513	28,073.190	0.00
3.98	9.38	2.565	28,073.190	0.00
4.00	9.58	2.578	28,073.190	0.00
4.10	10.64	2.642	28,073.190	0.00
4.20	11.92	2.707	28,073.190	0.00
4.30	13.42	2.771	28,073.190	0.00
4.40	16.51	2.836	28,073.190	0.00
4.50	18.03	2.900	28,073.190	0.00
4.60	19.68	2.965	28,073.190	0.00
4.70	21.45	3.029	28,073.190	0.00
4.80	23.36	3.093	28,073.190	0.00
4.90	25.37	3.158	28,073.190	0.00
5.00	27.49	3.222	28,073.190	0.00
5.10	29.71	3.287	28,073.190	0.00
5.20	32.05	3.351	28,073.190	0.00
5.30	34.43	3.416	28,073.190	0.00
5.40	36.94	3.480	28,073.190	0.00
5.50	39.47	3.545	28,073.190	0.00
5.60	42.12	3.609	28,073.190	0.00
5.70	44.75	3.673	28,073.190	0.00
5.80	47.48	3.738	28,073.190	0.00
5.90	50.23	3.802	28,073.190	0.00
6.00	57.43	3.867	28,073.190	0.00
6.10	59.49	3.931	28,073.190	0.00
6.20	61.46	3.996	28,073.190	0.00
6.30	63.37	4.060	28,073.190	0.00
6.40	65.22	4.125	28,073.190	0.00
6.50	67.01	4.189	28,073.190	0.00
6.60	68.74	4.254	28,073.190	0.00
6.70	70.44	4.318	28,073.190	0.00
6.80	72.08	4.382	28,073.190	0.00
6.90	73.69	4.447	28,073.190	0.00

Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
7.00	75.26	4.511	28,073.190	0.00
7.10	76.80	4.576	28,073.190	0.00
7.20	78.30	4.640	28,073.190	0.00
7.30	79.77	4.705	28,073.190	0.00
7.40	81.22	4.769	28,073.190	0.00
7.50	82.64	4.834	28,073.190	0.00
7.60	84.03	4.898	28,073.190	0.00
7.70	85.40	4.962	28,073.190	0.00
7.80	86.75	5.027	28,073.190	0.00
7.90	88.07	5.091	28,073.190	0.00
8.00	89.38	5.156	28,073.190	0.00
8.10	94.64	5.220	28,073.190	0.00
8.20	103.16	5.285	28,073.190	0.00
8.30	113.81	5.349	28,073.190	0.00
8.40	126.17	5.414	28,073.190	0.00
8.50	140.01	5.478	28,073.190	0.00
8.60	155.17	5.542	28,073.190	0.00
8.70	171.53	5.607	28,073.190	0.00
8.80	189.01	5.671	28,073.190	0.00
8.90	207.52	5.736	28,073.190	0.00
9.00	227.02	5.800	28,073.190	0.00
9.10	247.44	5.865	28,073.190	0.00
9.20	268.75	5.929	28,073.190	0.00
9.30	290.91	5.994	28,073.190	0.00
9.40	313.88	6.058	28,073.190	0.00
9.50	337.63	6.122	28,073.190	0.00

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.00	0.00
0.02	93.60
0.09	187.25
0.19	280.92
0.32	374.63
0.47	468.36
0.66	562.12
0.75	655.79
0.83	749.45
0.90	843.10
0.97	936.74
1.03	1,030.38
1.09	1,124.02
1.15	1,217.65
1.20	1,311.29
1.26	1,404.92

Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
1.31	1,498.54
1.35	1,592.17
1.40	1,685.79
1.44	1,779.41
1.49	1,873.03
1.53	1,966.65
1.57	2,060.27
1.61	2,153.89
1.65	2,247.50
1.69	2,341.12
1.72	2,416.01
1.73	2,434.74
1.83	2,528.41
2.01	2,622.18
2.28	2,716.02
2.63	2,809.95
3.06	2,903.95
3.55	2,998.02
4.11	3,092.17
4.74	3,186.37
5.43	3,280.64
6.17	3,374.95
6.96	3,469.32
7.79	3,563.73
8.66	3,658.17
9.38	3,733.75
9.58	3,752.67
10.64	3,847.31
11.92	3,942.17
13.42	4,037.24
16.51	4,133.91
18.03	4,229.00
19.68	4,324.23
21.45	4,419.58
23.36	4,515.07
25.37	4,610.66
27.49	4,706.36
29.71	4,802.15
32.05	4,898.07
34.43	4,994.03
36.94	5,090.12
39.47	5,186.22
42.12	5,282.44

Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
44.75	5,378.66
47.48	5,474.96
50.23	5,571.29
57.43	5,672.07
59.49	5,767.70
61.46	5,863.26
63.37	5,958.74
65.22	6,054.17
67.01	6,149.53
68.74	6,244.85
70.44	6,340.11
72.08	6,435.34
73.69	6,530.52
75.26	6,625.67
76.80	6,720.79
78.30	6,815.87
79.77	6,910.92
81.22	7,005.94
82.64	7,100.94
84.03	7,195.91
85.40	7,290.85
86.75	7,385.78
88.07	7,480.68
89.38	7,575.56
94.64	7,674.40
103.16	7,776.50
113.81	7,880.72
126.17	7,986.66
140.01	8,094.08
155.17	8,202.82
171.53	8,312.76
189.01	8,423.81
207.52	8,535.90
227.02	8,648.97
247.44	8,762.98
268.75	8,877.86
290.91	8,993.60
313.88	9,110.14
337.63	9,227.48

Vault

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)

Return Event: 0 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	2.54 ft
Volume (Initial)	1.637 ac-ft
Flow (Initial Outlet)	1.70 ft^3/s
Flow (Initial Infiltration)	0.00 ft^3/s
Flow (Initial, Total)	1.70 ft^3/s
Time Increment	1 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	215.60 ft^3/s	Time to Peak (Flow, In)	253 min
Flow (Peak Outlet)	101.31 ft^3/s	Time to Peak (Flow, Outlet)	260 min

Elevation (Water Surface, Peak)	8.18 ft
Volume (Peak)	5.271 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	1.637 ac-ft
Volume (Total Inflow)	10.870 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	12.441 ac-ft
Volume (Retained)	0.065 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

Peak Discharge	101.31 ft³/s
Time to Peak	260 min
Hydrograph Volume	12.441 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0	1.70	1.70	1.70	1.70
5	1.70	1.70	1.71	1.71
10	1.72	1.72	1.73	1.74
15	1.77	1.78	1.80	1.81
20	1.84	1.87	1.89	1.92
25	1.96	1.99	2.01	2.05
30	2.12	2.15	2.19	2.22
35	2.30	2.34	2.39	2.43
40	2.52	2.57	2.61	2.66
45	2.76	2.82	2.87	2.92
50	3.02	3.08	3.14	3.20
55	3.32	3.37	3.43	3.49
60	3.61	3.68	3.74	3.80
65	3.93	3.99	4.05	4.11
70	4.25	4.32	4.38	4.45
75	4.58	4.65	4.71	4.78
80	4.92	4.99	5.06	5.13
85	5.27	5.33	5.40	5.47
90	5.61	5.68	5.75	5.82
95	5.95	6.02	6.09	6.16
100	6.30	6.37	6.44	6.51
105	6.65	6.71	6.78	6.85
110	6.98	7.05	7.11	7.18
115	7.32	7.39	7.46	7.52
120	7.66	7.73	7.80	7.87
125	8.01	8.08	8.15	8.22
130	8.36	8.42	8.49	8.56
135	8.69	8.77	8.84	8.91
140	9.05	9.13	9.20	9.27
145	9.42	9.50	9.58	9.67
150	9.84	9.92	10.00	10.08
155	10.24	10.32	10.41	10.49
160	10.67	10.78	10.88	10.99
165	11.21	11.32	11.43	11.53
170	11.75	11.86	11.97	12.09
175	12.34	12.46	12.58	12.70
180	12.96	13.09	13.22	13.36

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
185	13.86	14.14	14.41	14.68
190	15.19	15.43	15.67	15.90
195	16.35	16.54	16.64	16.75
200	16.99	17.12	17.26	17.41
205	17.73	17.90	18.08	18.28
210	18.71	18.92	19.14	19.37
215	19.84	20.09	20.34	20.60
220	21.11	21.39	21.72	22.09
225	22.93	23.40	23.92	24.47
230	25.65	26.31	26.99	27.67
235	29.10	29.82	30.58	31.33
240	32.87	33.64	34.42	35.60
245	40.17	43.59	47.74	56.12
250	64.96	69.13	73.41	77.79
255	84.96	87.49	89.53	95.19
260	101.31	99.60	95.39	91.12
265	86.90	85.32	83.73	82.13
270	78.88	77.24	75.57	73.89
275	70.48	68.75	67.02	65.29
280	61.83	60.09	58.36	54.85
285	48.15	46.41	44.75	43.22
290	40.35	39.04	37.81	36.65
295	34.46	33.48	32.54	31.64
300	29.97	29.21	28.49	27.80
305	26.52	25.92	25.34	24.81
310	23.80	23.32	22.87	22.43
315	21.60	21.22	20.86	20.51
320	19.83	19.51	19.22	18.93
325	18.37	18.10	17.85	17.62
330	17.16	16.93	16.72	16.50
335	15.68	15.30	14.95	14.61
340	13.98	13.69	13.42	13.29
345	13.03	12.91	12.79	12.67
350	12.44	12.32	12.21	12.10
355	11.89	11.79	11.70	11.61
360	11.44	11.35	11.27	11.18
365	10.98	10.85	10.71	10.56
370	10.26	10.08	9.90	9.70
375	9.30	9.13	8.95	8.78
380	8.46	8.30	8.15	8.00
385	7.71	7.58	7.44	7.31
390	7.05	6.93	6.82	6.70

Vault

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYOROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
395	6.48	6.37	6.27	6.16
400	5.97	5.88	5.79	5.69
405	5.52	5.43	5.35	5.27
410	5.12	5.04	4.97	4.90
415	4.75	4.69	4.63	4.57
420	4.45	4.39	4.33	4.27
425	4.16	4.11	4.06	4.01
430	3.91	3.87	3.82	3.77
435	3.68	3.64	3.60	3.55
440	3.48	3.44	3.41	3.37
445	3.30	3.26	3.23	3.20
450	3.13	3.10	3.06	3.04
455	2.98	2.95	2.93	2.90
460	2.85	2.82	2.80	2.77
465	2.72	2.70	2.67	2.65
470	2.61	2.59	2.57	2.55
475	2.51	2.49	2.47	2.46
480	2.42	2.40	2.38	2.36
485	2.33	2.31	2.29	2.28
490	2.25	2.24	2.23	2.21
495	2.19	2.18	2.16	2.15
500	2.13	2.11	2.10	2.09
505	2.07	2.05	2.04	2.03
510	2.01	2.00	1.99	1.99
515	1.97	1.96	1.95	1.95
520	1.93	1.92	1.92	1.91
525	1.89	1.88	1.88	1.87
530	1.86	1.85	1.84	1.83
535	1.82	1.82	1.81	1.81
540	1.80	1.80	1.79	1.79
545	1.78	1.78	1.78	1.77
550	1.76	1.76	1.76	1.75
555	1.75	1.74	1.74	1.73
560	1.73	1.73	1.72	1.72
565	1.72	1.72	1.72	1.71
570	1.71	1.71	1.71	1.71
575	1.70	1.70	1.70	1.70
580	1.70	1.70	1.69	1.69
585	1.69	1.69	1.69	1.69
590	1.68	1.68	1.68	1.68
595	1.68	1.68	1.67	1.67
600	1.67	1.67	1.67	1.67

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
605	1.66	1.66	1.66	1.66
610	1.66	1.66	1.65	1.65
615	1.65	1.65	1.65	1.65
620	1.64	1.64	1.64	1.64
625	1.64	1.64	1.63	1.63
630	1.63	1.63	1.63	1.63
635	1.62	1.62	1.62	1.62
640	1.62	1.61	1.61	1.61
645	1.61	1.61	1.61	1.61
650	1.60	1.60	1.60	1.60
655	1.60	1.59	1.59	1.59
660	1.59	1.59	1.59	1.58
665	1.58	1.58	1.58	1.58
670	1.58	1.57	1.57	1.57
675	1.57	1.57	1.57	1.56
680	1.56	1.56	1.56	1.56
685	1.56	1.55	1.55	1.55
690	1.55	1.55	1.55	1.54
695	1.54	1.54	1.54	1.54
700	1.53	1.53	1.53	1.53
705	1.53	1.53	1.53	1.52
710	1.52	1.52	1.52	1.52
715	1.51	1.51	1.51	1.51
720	1.51	1.51	1.50	1.50
725	1.50	1.50	1.50	1.50
730	1.49	1.49	1.49	1.49
735	1.49	1.49	1.48	1.48
740	1.48	1.48	1.48	1.48
745	1.47	1.47	1.47	1.47
750	1.47	1.47	1.46	1.46
755	1.46	1.46	1.46	1.46
760	1.45	1.45	1.45	1.45
765	1.45	1.45	1.44	1.44
770	1.44	1.44	1.44	1.44
775	1.43	1.43	1.43	1.43
780	1.43	1.42	1.42	1.42
785	1.42	1.42	1.42	1.42
790	1.41	1.41	1.41	1.41
795	1.41	1.40	1.40	1.40
800	1.40	1.40	1.40	1.40
805	1.39	1.39	1.39	1.39
810	1.39	1.38	1.38	1.38

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
815	1.38	1.38	1.38	1.37
820	1.37	1.37	1.37	1.37
825	1.37	1.36	1.36	1.36
830	1.36	1.36	1.36	1.35
835	1.35	1.35	1.35	1.35
840	1.34	1.34	1.34	1.34
845	1.34	1.34	1.34	1.33
850	1.33	1.33	1.33	1.33
855	1.32	1.32	1.32	1.32
860	1.32	1.32	1.31	1.31
865	1.31	1.31	1.31	1.31
870	1.30	1.30	1.30	1.30
875	1.30	1.30	1.29	1.29
880	1.29	1.29	1.29	1.29
885	1.28	1.28	1.28	1.28
890	1.28	1.28	1.27	1.27
895	1.27	1.27	1.27	1.27
900	1.26	1.26	1.26	1.26
905	1.26	1.26	1.25	1.25
910	1.25	1.25	1.25	1.25
915	1.24	1.24	1.24	1.24
920	1.24	1.23	1.23	1.23
925	1.23	1.23	1.23	1.23
930	1.22	1.22	1.22	1.22
935	1.22	1.21	1.21	1.21
940	1.21	1.21	1.21	1.21
945	1.20	1.20	1.20	1.20
950	1.20	1.19	1.19	1.19
955	1.19	1.19	1.19	1.18
960	1.18	1.18	1.18	1.18
965	1.18	1.17	1.17	1.17
970	1.17	1.17	1.17	1.16
975	1.16	1.16	1.16	1.16
980	1.15	1.15	1.15	1.15
985	1.15	1.15	1.15	1.14
990	1.14	1.14	1.14	1.14
995	1.13	1.13	1.13	1.13
1,000	1.13	1.13	1.12	1.12
1,005	1.12	1.12	1.12	1.12
1,010	1.11	1.11	1.11	1.11
1,015	1.11	1.11	1.10	1.10
1,020	1.10	1.10	1.10	1.10

Vault

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,025	1.09	1.09	1.09	1.09
1,030	1.09	1.09	1.08	1.08
1,035	1.08	1.08	1.08	1.08
1,040	1.07	1.07	1.07	1.07
1,045	1.07	1.07	1.06	1.06
1,050	1.06	1.06	1.06	1.06
1,055	1.05	1.05	1.05	1.05
1,060	1.05	1.04	1.04	1.04
1,065	1.04	1.04	1.04	1.04
1,070	1.03	1.03	1.03	1.03
1,075	1.03	1.02	1.02	1.02
1,080	1.02	1.02	1.02	1.01
1,085	1.01	1.01	1.01	1.01
1,090	1.01	1.00	1.00	1.00
1,095	1.00	1.00	1.00	0.99
1,100	0.99	0.99	0.99	0.99
1,105	0.99	0.98	0.98	0.98
1,110	0.98	0.98	0.98	0.97
1,115	0.97	0.97	0.97	0.97
1,120	0.96	0.96	0.96	0.96
1,125	0.96	0.96	0.96	0.95
1,130	0.95	0.95	0.95	0.95
1,135	0.94	0.94	0.94	0.94
1,140	0.94	0.94	0.93	0.93
1,145	0.93	0.93	0.93	0.93
1,150	0.92	0.92	0.92	0.92
1,155	0.92	0.92	0.91	0.91
1,160	0.91	0.91	0.91	0.91
1,165	0.90	0.90	0.90	0.90
1,170	0.90	0.90	0.89	0.89
1,175	0.89	0.89	0.89	0.89
1,180	0.88	0.88	0.88	0.88
1,185	0.88	0.87	0.87	0.87
1,190	0.87	0.87	0.87	0.87
1,195	0.86	0.86	0.86	0.86
1,200	0.86	0.85	0.85	0.85
1,205	0.85	0.85	0.85	0.85
1,210	0.84	0.84	0.84	0.84
1,215	0.84	0.83	0.83	0.83
1,220	0.83	0.83	0.83	0.83
1,225	0.82	0.82	0.82	0.82
1,230	0.82	0.81	0.81	0.81

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,235	0.81	0.81	0.81	0.80
1,240	0.80	0.80	0.80	0.80
1,245	0.79	0.79	0.79	0.79
1,250	0.79	0.79	0.79	0.78
1,255	0.78	0.78	0.78	0.78
1,260	0.77	0.77	0.77	0.77
1,265	0.77	0.77	0.77	0.76
1,270	0.76	0.76	0.76	0.76
1,275	0.75	0.75	0.75	0.75
1,280	0.75	0.75	0.75	0.74
1,285	0.74	0.74	0.74	0.74
1,290	0.73	0.73	0.73	0.73
1,295	0.73	0.73	0.72	0.72
1,300	0.72	0.72	0.72	0.72
1,305	0.71	0.71	0.71	0.71
1,310	0.71	0.70	0.70	0.70
1,315	0.70	0.70	0.70	0.70
1,320	0.69	0.69	0.69	0.69
1,325	0.69	0.68	0.68	0.68
1,330	0.68	0.68	0.68	0.68
1,335	0.67	0.67	0.67	0.67
1,340	0.67	0.67	0.66	0.66
1,345	0.66	0.66	0.66	0.65
1,350	0.65	0.65	0.64	0.64
1,355	0.64	0.63	0.63	0.63
1,360	0.62	0.62	0.62	0.62
1,365	0.61	0.61	0.61	0.60
1,370	0.60	0.60	0.59	0.59
1,375	0.59	0.58	0.58	0.58
1,380	0.57	0.57	0.57	0.57
1,385	0.56	0.56	0.56	0.56
1,390	0.55	0.55	0.55	0.54
1,395	0.54	0.54	0.54	0.53
1,400	0.53	0.53	0.53	0.52
1,405	0.52	0.52	0.51	0.51
1,410	0.51	0.51	0.50	0.50
1,415	0.50	0.50	0.49	0.49
1,420	0.49	0.49	0.48	0.48
1,425	0.48	0.48	0.48	0.47
1,430	0.47	0.47	0.47	0.47
1,435	0.46	0.46	0.46	0.46
1,440	0.45	0.45	0.45	0.45

Vault

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,445	0.45	0.45	0.44	0.44
1,450	0.44	0.44	0.44	0.44
1,455	0.43	0.43	0.43	0.43
1,460	0.43	0.43	0.42	0.42
1,465	0.42	0.42	0.42	0.42
1,470	0.41	0.41	0.41	0.41
1,475	0.41	0.41	0.40	0.40
1,480	0.40	0.40	0.40	0.40
1,485	0.39	0.39	0.39	0.39
1,490	0.39	0.39	0.39	0.38
1,495	0.38	0.38	0.38	0.38
1,500	0.38	0.38	0.37	0.37
1,505	0.37	0.37	0.37	0.37
1,510	0.36	0.36	0.36	0.36
1,515	0.36	0.36	0.36	0.36
1,520	0.35	0.35	0.35	0.35
1,525	0.35	0.35	0.35	0.34
1,530	0.34	0.34	0.34	0.34
1,535	0.34	0.34	0.33	0.33
1,540	0.33	0.33	0.33	0.33
1,545	0.33	0.33	0.32	0.32
1,550	0.32	0.32	0.32	0.32
1,555	0.32	0.32	0.32	0.31
1,560	0.31	0.31	0.31	0.31
1,565	0.31	0.31	0.31	0.31
1,570	0.30	0.30	0.30	0.30
1,575	0.30	0.30	0.30	0.30
1,580	0.30	0.30	0.29	0.29
1,585	0.29	0.29	0.29	0.29
1,590	0.29	0.29	0.29	0.29
1,595	0.28	0.28	0.28	0.28
1,600	0.28	0.28	0.28	0.28
1,605	0.28	0.28	0.27	0.27
1,610	0.27	0.27	0.27	0.27
1,615	0.27	0.27	0.27	0.27
1,620	0.26	0.26	0.26	0.26
1,625	0.26	0.26	0.26	0.26
1,630	0.26	0.26	0.26	0.26
1,635	0.25	0.25	0.25	0.25
1,640	0.25	0.25	0.25	0.25
1,645	0.25	0.25	0.25	0.25
1,650	0.24	0.24	0.24	0.24

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,655	0.24	0.24	0.24	0.24
1,660	0.24	0.24	0.24	0.24
1,665	0.23	0.23	0.23	0.23
1,670	0.23	0.23	0.23	0.23
1,675	0.23	0.23	0.23	0.23
1,680	0.22	0.22	0.22	0.22
1,685	0.22	0.22	0.22	0.22
1,690	0.22	0.22	0.22	0.22
1,695	0.22	0.21	0.21	0.21
1,700	0.21	0.21	0.21	0.21
1,705	0.21	0.21	0.21	0.21
1,710	0.21	0.21	0.21	0.20
1,715	0.20	0.20	0.20	0.20
1,720	0.20	0.20	0.20	0.20
1,725	0.20	0.20	0.20	0.20
1,730	0.20	0.19	0.19	0.19
1,735	0.19	0.19	0.19	0.19
1,740	0.19	0.19	0.19	0.19
1,745	0.19	0.19	0.19	0.19
1,750	0.19	0.19	0.19	0.19
1,755	0.18	0.18	0.18	0.18
1,760	0.18	0.18	0.18	0.18
1,765	0.18	0.18	0.18	0.18
1,770	0.18	0.18	0.18	0.18
1,775	0.18	0.18	0.18	0.18
1,780	0.17	0.17	0.17	0.17
1,785	0.17	0.17	0.17	0.17
1,790	0.17	0.17	0.17	0.17
1,795	0.17	0.17	0.17	0.17
1,800	0.17	0.17	0.17	0.17
1,805	0.17	0.16	0.16	0.16
1,810	0.16	0.16	0.16	0.16
1,815	0.16	0.16	0.16	0.16
1,820	0.16	0.16	0.16	0.16
1,825	0.16	0.16	0.16	0.16
1,830	0.16	0.16	0.16	0.16
1,835	0.15	0.15	0.15	0.15
1,840	0.15	0.15	0.15	0.15
1,845	0.15	0.15	0.15	0.15
1,850	0.15	0.15	0.15	0.15
1,855	0.15	0.15	0.15	0.15
1,860	0.15	0.15	0.15	0.15

Vault

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYOROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,865	0.15	0.14	0.14	0.14
1,870	0.14	0.14	0.14	0.14
1,875	0.14	0.14	0.14	0.14
1,880	0.14	0.14	0.14	0.14
1,885	0.14	0.14	0.14	0.14
1,890	0.14	0.14	0.14	0.14
1,895	0.14	0.14	0.14	0.14
1,900	0.13	0.13	0.13	0.13
1,905	0.13	0.13	0.13	0.13
1,910	0.13	0.13	0.13	0.13
1,915	0.13	0.13	0.13	0.13
1,920	0.13	0.13	0.13	0.13
1,925	0.13	0.13	0.13	0.13
1,930	0.13	0.13	0.13	0.13
1,935	0.12	0.12	0.12	0.12
1,940	0.12	0.12	0.12	0.12
1,945	0.12	0.12	0.12	0.12
1,950	0.12	0.12	0.12	0.12
1,955	0.12	0.12	0.12	0.12
1,960	0.12	0.12	0.12	0.12
1,965	0.12	0.12	0.12	0.12
1,970	0.12	0.12	0.11	0.11
1,975	0.11	0.11	0.11	0.11
1,980	0.11	0.11	0.11	0.11
1,985	0.11	0.11	0.11	0.11
1,990	0.11	0.11	0.11	0.11
1,995	0.11	0.11	0.11	0.11
2,000	0.11	0.11	0.11	0.11
2,005	0.11	0.11	0.11	0.11
2,010	0.11	0.11	0.11	0.11
2,015	0.10	0.10	0.10	0.10
2,020	0.10	0.10	0.10	0.10
2,025	0.10	0.10	0.10	0.10
2,030	0.10	0.10	0.10	0.10
2,035	0.10	0.10	0.10	0.10
2,040	0.10	0.10	0.10	0.10
2,045	0.10	0.10	0.10	0.10
2,050	0.10	0.10	0.10	0.10
2,055	0.10	0.10	0.10	0.10
2,060	0.09	0.09	0.09	0.09
2,065	0.09	0.09	0.09	0.09
2,070	0.09	0.09	0.09	0.09

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,075	0.09	0.09	0.09	0.09
2,080	0.09	0.09	0.09	0.09
2,085	0.09	0.09	0.09	0.09
2,090	0.09	0.09	0.09	0.09
2,095	0.09	0.09	0.09	0.09
2,100	0.09	0.09	0.09	0.09
2,105	0.09	0.09	0.09	0.09
2,110	0.09	0.09	0.09	0.09
2,115	0.09	0.09	0.09	0.09
2,120	0.09	0.09	0.09	0.09
2,125	0.09	0.08	0.08	0.08
2,130	0.08	0.08	0.08	0.08
2,135	0.08	0.08	0.08	0.08
2,140	0.08	0.08	0.08	0.08
2,145	0.08	0.08	0.08	0.08
2,150	0.08	0.08	0.08	0.08
2,155	0.08	0.08	0.08	0.08
2,160	0.08	0.08	0.08	0.08
2,165	0.08	0.08	0.08	0.08
2,170	0.08	0.08	0.08	0.08
2,175	0.08	0.08	0.08	0.08
2,180	0.08	0.08	0.08	0.08
2,185	0.08	0.08	0.08	0.08
2,190	0.08	0.08	0.08	0.08
2,195	0.08	0.08	0.08	0.08
2,200	0.08	0.08	0.08	0.08
2,205	0.08	0.08	0.08	0.08
2,210	0.08	0.08	0.08	0.08
2,215	0.07	0.07	0.07	0.07
2,220	0.07	0.07	0.07	0.07
2,225	0.07	0.07	0.07	0.07
2,230	0.07	0.07	0.07	0.07
2,235	0.07	0.07	0.07	0.07
2,240	0.07	0.07	0.07	0.07
2,245	0.07	0.07	0.07	0.07
2,250	0.07	0.07	0.07	0.07
2,255	0.07	0.07	0.07	0.07
2,260	0.07	0.07	0.07	0.07
2,265	0.07	0.07	0.07	0.07
2,270	0.07	0.07	0.07	0.07
2,275	0.07	0.07	0.07	0.07
2,280	0.07	0.07	0.07	0.07

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,285	0.07	0.07	0.07	0.07
2,290	0.07	0.07	0.07	0.07
2,295	0.07	0.07	0.07	0.07
2,300	0.07	0.07	0.07	0.07
2,305	0.07	0.07	0.07	0.07
2,310	0.07	0.07	0.07	0.06
2,315	0.06	0.06	0.06	0.06
2,320	0.06	0.06	0.06	0.06
2,325	0.06	0.06	0.06	0.06
2,330	0.06	0.06	0.06	0.06
2,335	0.06	0.06	0.06	0.06
2,340	0.06	0.06	0.06	0.06
2,345	0.06	0.06	0.06	0.06
2,350	0.06	0.06	0.06	0.06
2,355	0.06	0.06	0.06	0.06
2,360	0.06	0.06	0.06	0.06
2,365	0.06	0.06	0.06	0.06
2,370	0.06	0.06	0.06	0.06
2,375	0.06	0.06	0.06	0.06
2,380	0.06	0.06	0.06	0.06
2,385	0.06	0.06	0.06	0.06
2,390	0.06	0.06	0.06	0.06
2,395	0.06	0.06	0.06	0.06
2,400	0.06	0.06	0.06	0.06
2,405	0.06	0.06	0.06	0.06
2,410	0.06	0.06	0.06	0.06
2,415	0.06	0.06	0.06	0.06
2,420	0.06	0.06	0.06	0.06
2,425	0.06	0.06	0.06	0.06
2,430	0.05	0.05	0.05	0.05
2,435	0.05	0.05	0.05	0.05
2,440	0.05	0.05	0.05	0.05
2,445	0.05	0.05	0.05	0.05
2,450	0.05	0.05	0.05	0.05
2,455	0.05	0.05	0.05	0.05
2,460	0.05	0.05	0.05	0.05
2,465	0.05	0.05	0.05	0.05
2,470	0.05	0.05	0.05	0.05
2,475	0.05	0.05	0.05	0.05
2,480	0.05	0.05	0.05	0.05
2,485	0.05	0.05	0.05	0.05
2,490	0.05	0.05	0.05	0.05

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,495	0.05	0.05	0.05	0.05
2,500	0.05	0.05	0.05	0.05
2,505	0.05	0.05	0.05	0.05
2,510	0.05	0.05	0.05	0.05
2,515	0.05	0.05	0.05	0.05
2,520	0.05	0.05	0.05	0.05
2,525	0.05	0.05	0.05	0.05
2,530	0.05	0.05	0.05	0.05
2,535	0.05	0.05	0.05	0.05
2,540	0.05	0.05	0.05	0.05
2,545	0.05	0.05	0.05	0.05
2,550	0.05	0.05	0.05	0.05
2,555	0.05	0.05	0.05	0.05
2,560	0.05	0.05	0.05	0.05
2,565	0.05	0.05	0.05	0.05
2,570	0.04	0.04	0.04	0.04
2,575	0.04	0.04	0.04	0.04
2,580	0.04	0.04	0.04	0.04
2,585	0.04	0.04	0.04	0.04
2,590	0.04	0.04	0.04	0.04
2,595	0.04	0.04	0.04	0.04
2,600	0.04	0.04	0.04	0.04
2,605	0.04	0.04	0.04	0.04
2,610	0.04	0.04	0.04	0.04
2,615	0.04	0.04	0.04	0.04
2,620	0.04	0.04	0.04	0.04
2,625	0.04	0.04	0.04	0.04
2,630	0.04	0.04	0.04	0.04
2,635	0.04	0.04	0.04	0.04
2,640	0.04	0.04	0.04	0.04
2,645	0.04	0.04	0.04	0.04
2,650	0.04	0.04	0.04	0.04
2,655	0.04	0.04	0.04	0.04
2,660	0.04	0.04	0.04	0.04
2,665	0.04	0.04	0.04	0.04
2,670	0.04	0.04	0.04	0.04
2,675	0.04	0.04	0.04	0.04
2,680	0.04	0.04	0.04	0.04
2,685	0.04	0.04	0.04	0.04
2,690	0.04	0.04	0.04	0.04
2,695	0.04	0.04	0.04	0.04
2,700	0.04	0.04	0.04	0.04

Vault

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,705	0.04	0.04	0.04	0.04
2,710	0.04	0.04	0.04	0.04
2,715	0.04	0.04	0.04	0.04
2,720	0.04	0.04	0.04	0.04
2,725	0.04	0.04	0.04	0.04
2,730	0.04	0.04	0.04	0.04
2,735	0.04	0.04	0.04	0.04
2,740	0.04	0.04	0.04	0.04
2,745	0.03	0.03	0.03	0.03
2,750	0.03	0.03	0.03	0.03
2,755	0.03	0.03	0.03	0.03
2,760	0.03	0.03	0.03	0.03
2,765	0.03	0.03	0.03	0.03
2,770	0.03	0.03	0.03	0.03
2,775	0.03	0.03	0.03	0.03
2,780	0.03	0.03	0.03	0.03
2,785	0.03	0.03	0.03	0.03
2,790	0.03	0.03	0.03	0.03
2,795	0.03	0.03	0.03	0.03
2,800	0.03	0.03	0.03	0.03
2,805	0.03	0.03	0.03	0.03
2,810	0.03	0.03	0.03	0.03
2,815	0.03	0.03	0.03	0.03
2,820	0.03	0.03	0.03	0.03
2,825	0.03	0.03	0.03	0.03
2,830	0.03	0.03	0.03	0.03
2,835	0.03	0.03	0.03	0.03
2,840	0.03	0.03	0.03	0.03
2,845	0.03	0.03	0.03	0.03
2,850	0.03	0.03	0.03	0.03
2,855	0.03	0.03	0.03	0.03
2,860	0.03	0.03	0.03	0.03
2,865	0.03	0.03	0.03	0.03
2,870	0.03	0.03	0.03	0.03
2,875	0.03	0.03	0.03	0.03
2,880	0.03	0.03	0.03	0.03
2,885	0.03	0.03	0.03	0.03
2,890	0.03	0.03	0.03	0.03
2,895	0.03	0.03	0.03	0.03
2,900	0.03	0.03	0.03	0.03
2,905	0.03	0.03	0.03	0.03
2,910	0.03	0.03	0.03	0.03

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,915	0.03	0.03	0.03	0.03
2,920	0.03	0.03	0.03	0.03
2,925	0.03	0.03	0.03	0.03
2,930	0.03	0.03	0.03	0.03
2,935	0.03	0.03	0.03	0.03
2,940	0.03	0.03	0.03	0.03
2,945	0.03	0.03	0.03	0.03
2,950	0.03	0.03	0.03	0.03
2,955	0.03	0.03	0.03	0.03
2,960	0.03	0.03	0.03	0.03
2,965	0.03	0.03	0.03	0.03
2,970	0.03	0.03	0.03	0.03
2,975	0.03	0.03	0.03	0.03
2,980	0.02	0.02	0.02	0.02
2,985	0.02	0.02	0.02	0.02
2,990	0.02	0.02	0.02	0.02
2,995	0.02	0.02	0.02	0.02
3,000	0.02	(N/A)	(N/A)	(N/A)

Flow (ft³/s)
1.70
1.71
1.76
1.82
1.94
2.08
2.26
2.48
2.71
2.97
3.26
3.55
3.87
4.18
4.51
4.85
5.20
5.54
5.88
6.23
6.58
6.91

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
7.25
7.59
7.94
8.29
8.63
8.98
9.35
9.75
10.16
10.58
11.10
11.64
12.22
12.83
13.58
14.94
16.13
16.87
17.56
18.49
19.60
20.85
22.50
25.04
28.38
32.09
37.52
60.92
81.76
100.05
88.46
80.52
72.20
63.56
49.99
41.75
35.53
30.79
27.14
24.30
22.01
20.16

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH DRDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
18.65
17.39
16.08
14.29
13.16
12.55
11.99
11.53
11.09
10.42
9.50
8.62
7.85
7.18
6.59
6.07
5.61
5.19
4.82
4.51
4.22
3.96
3.73
3.52
3.33
3.16
3.01
2.88
2.75
2.63
2.53
2.44
2.35
2.26
2.20
2.14
2.08
2.02
1.98
1.94
1.90
1.86

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
1.83
1.81
1.79
1.77
1.75
1.73
1.72
1.71
1.71
1.70
1.69
1.69
1.68
1.67
1.67
1.66
1.65
1.64
1.64
1.63
1.62
1.62
1.61
1.60
1.60
1.59
1.58
1.58
1.57
1.56
1.56
1.55
1.54
1.54
1.53
1.52
1.52
1.51
1.50
1.50
1.49
1.48

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYOROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
1.48
1.47
1.46
1.45
1.45
1.44
1.43
1.43
1.42
1.41
1.41
1.40
1.39
1.39
1.38
1.37
1.37
1.36
1.35
1.35
1.34
1.33
1.33
1.32
1.31
1.31
1.30
1.29
1.28
1.28
1.27
1.26
1.26
1.25
1.24
1.24
1.23
1.22
1.22
1.21
1.20
1.20

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
1.19
1.18
1.18
1.17
1.16
1.16
1.15
1.14
1.14
1.13
1.12
1.12
1.11
1.10
1.10
1.09
1.08
1.07
1.07
1.06
1.05
1.05
1.04
1.03
1.03
1.02
1.01
1.01
1.00
0.99
0.99
0.98
0.97
0.97
0.96
0.95
0.95
0.94
0.93
0.93
0.92
0.91

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.91
0.90
0.89
0.88
0.88
0.87
0.86
0.86
0.85
0.84
0.84
0.83
0.82
0.82
0.81
0.80
0.80
0.79
0.78
0.78
0.77
0.76
0.76
0.75
0.74
0.74
0.73
0.72
0.71
0.71
0.70
0.69
0.69
0.68
0.67
0.67
0.66
0.65
0.64
0.63
0.61
0.60

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.59
0.58
0.57
0.55
0.54
0.53
0.52
0.51
0.50
0.49
0.48
0.47
0.46
0.46
0.45
0.44
0.44
0.43
0.42
0.42
0.41
0.40
0.40
0.39
0.38
0.38
0.37
0.37
0.36
0.35
0.35
0.34
0.34
0.33
0.33
0.32
0.32
0.31
0.31
0.31
0.30
0.30

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.29
0.29
0.28
0.28
0.28
0.27
0.27
0.27
0.26
0.26
0.25
0.25
0.25
0.24
0.24
0.24
0.23
0.23
0.23
0.22
0.22
0.22
0.22
0.21
0.21
0.21
0.20
0.20
0.20
0.20
0.19
0.19
0.19
0.19
0.18
0.18
0.18
0.18
0.18
0.17
0.17
0.17

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.17
0.17
0.17
0.16
0.16
0.16
0.16
0.16
0.16
0.15
0.15
0.15
0.15
0.15
0.15
0.14
0.14
0.14
0.14
0.14
0.14
0.13
0.13
0.13
0.13
0.13
0.13
0.13
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.11
0.11
0.11
0.11
0.11
0.11

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.11
0.11
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08

Vault

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.06
0.06
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03

Vault

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.02
0.02
0.02
0.02
0.02
(N/A)

Vault

Subsection: Pond Inflow Summary
Label: 1 (IN)

Return Event: 0 years
Storm Event:

Summary for Hydrograph Addition at '1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

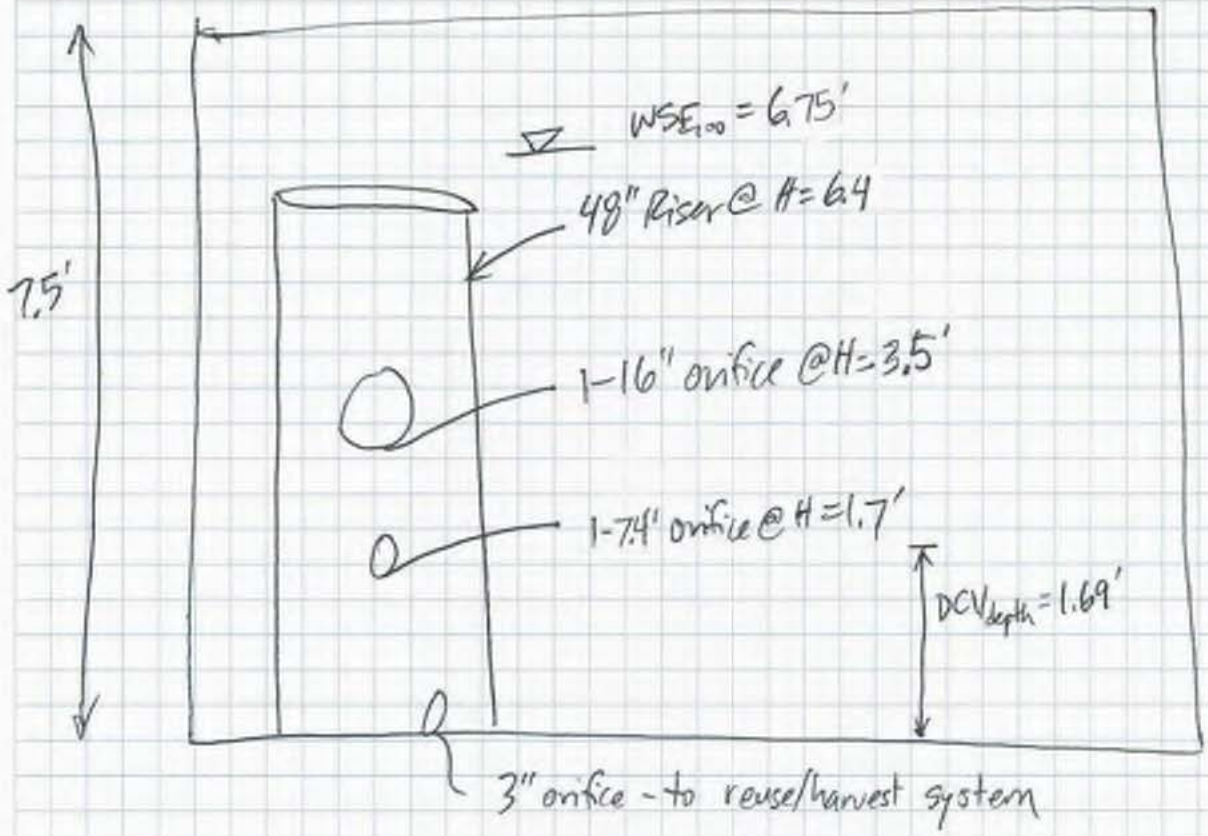
Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	CM-1	10.870	253	215.60
Flow (In)	1	10.870	253	215.60

PROJECT DESIGN CONSULTANTS

PLANNING | LANDSCAPE ARCHITECTURE
ENGINEERING | SURVEY

WWW.PROJECTDESIGN.COM

PROJECT HGVS
SUBJECT Detention Vault Cross Section
PAGE: 1 OF 1 JOB NO.: 4095.01
DRAWN BY: cf DATE: 1/16/16
CHECKED BY: DATE:



SOUTH BASIN

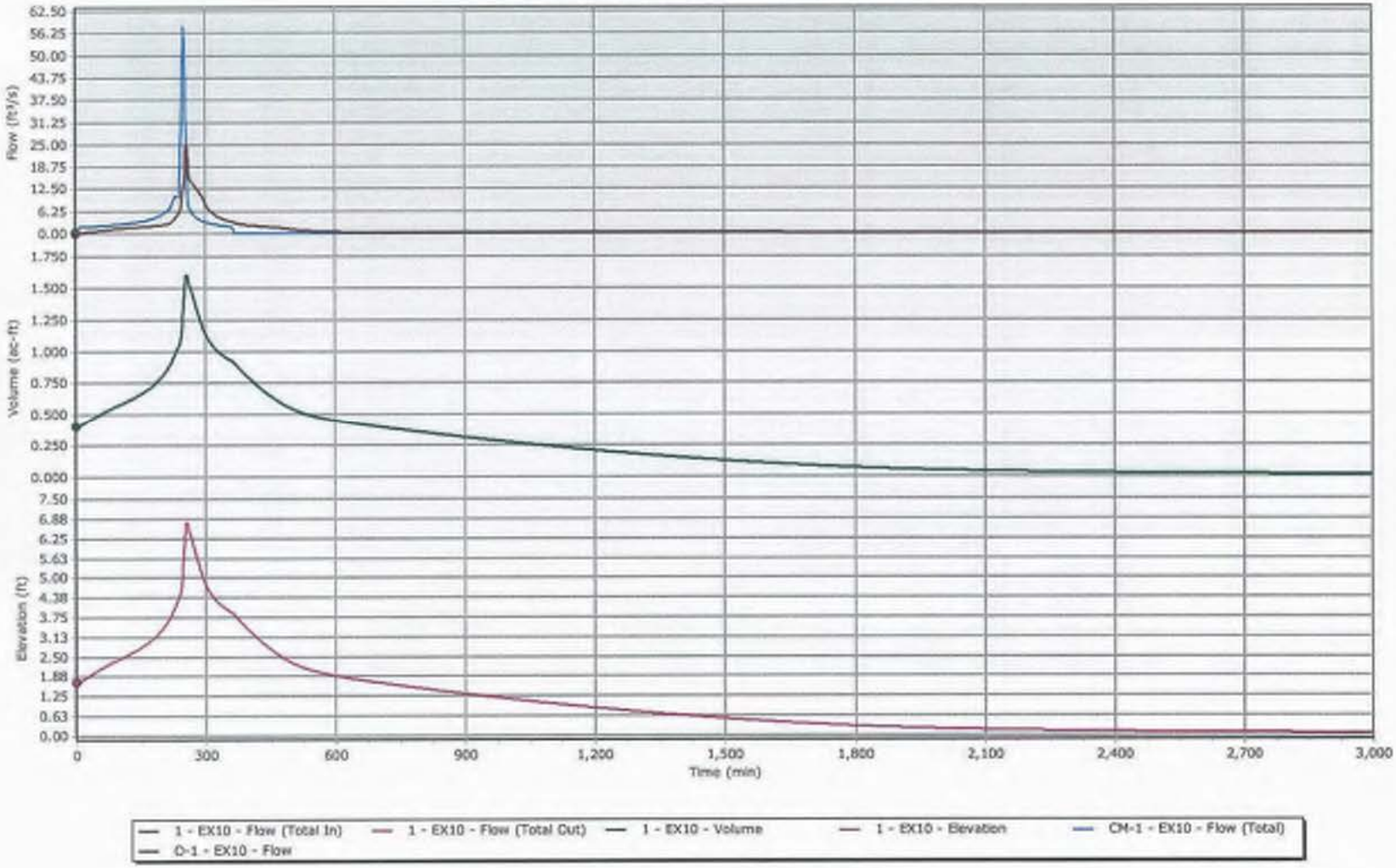
NTS

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 11/17/2015
HYDROGRAPH FILE NAME **S300P100.txt**
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 3.3 INCHES
BASIN AREA 14.1 ACRES
RUNOFF COEFFICIENT 0.6807
PEAK DISCHARGE 58.2 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 1.9
TIME (MIN) = 20	DISCHARGE (CFS) = 1.9
TIME (MIN) = 30	DISCHARGE (CFS) = 2
TIME (MIN) = 40	DISCHARGE (CFS) = 2
TIME (MIN) = 50	DISCHARGE (CFS) = 2.1
TIME (MIN) = 60	DISCHARGE (CFS) = 2.2
TIME (MIN) = 70	DISCHARGE (CFS) = 2.3
TIME (MIN) = 80	DISCHARGE (CFS) = 2.3
TIME (MIN) = 90	DISCHARGE (CFS) = 2.5
TIME (MIN) = 100	DISCHARGE (CFS) = 2.5
TIME (MIN) = 110	DISCHARGE (CFS) = 2.7
TIME (MIN) = 120	DISCHARGE (CFS) = 2.8
TIME (MIN) = 130	DISCHARGE (CFS) = 3
TIME (MIN) = 140	DISCHARGE (CFS) = 3.1
TIME (MIN) = 150	DISCHARGE (CFS) = 3.4
TIME (MIN) = 160	DISCHARGE (CFS) = 3.5
TIME (MIN) = 170	DISCHARGE (CFS) = 3.9
TIME (MIN) = 180	DISCHARGE (CFS) = 4.2
TIME (MIN) = 190	DISCHARGE (CFS) = 4.8
TIME (MIN) = 200	DISCHARGE (CFS) = 5.2
TIME (MIN) = 210	DISCHARGE (CFS) = 6.3
TIME (MIN) = 220	DISCHARGE (CFS) = 7.2
TIME (MIN) = 230	DISCHARGE (CFS) = 10.6
TIME (MIN) = 240	DISCHARGE (CFS) = 10.1
TIME (MIN) = 250	DISCHARGE (CFS) = 58.2
TIME (MIN) = 260	DISCHARGE (CFS) = 8.5
TIME (MIN) = 270	DISCHARGE (CFS) = 5.7
TIME (MIN) = 280	DISCHARGE (CFS) = 4.4
TIME (MIN) = 290	DISCHARGE (CFS) = 3.7
TIME (MIN) = 300	DISCHARGE (CFS) = 3.2
TIME (MIN) = 310	DISCHARGE (CFS) = 2.9
TIME (MIN) = 320	DISCHARGE (CFS) = 2.6
TIME (MIN) = 330	DISCHARGE (CFS) = 2.4
TIME (MIN) = 340	DISCHARGE (CFS) = 2.2
TIME (MIN) = 350	DISCHARGE (CFS) = 2.1
TIME (MIN) = 360	DISCHARGE (CFS) = 2
TIME (MIN) = 370	DISCHARGE (CFS) = 0

SYSTEM 300 HYDROGRAPH - 100-YR DETENTION - SOUTH BASIN



Vault-South

Project Summary	
Title	South Basin
Engineer	PDC
Company	PDC
Date	12/29/2016

Notes	WQ volume in basin at time=0 for 100-year hydrograph routing

Vault-South

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)
CM-1	EX10	0	2.623	250	58.20

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)
O-1	EX10	0	3.008	257	25.06

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	2.623	250	58.20	(N/A)	(N/A)
1 (OUT)	EX10	0	3.008	257	25.06	6.75	1.603

Vault-South

Subsection: Read Hydrograph
Label: CM-1

Return Event: 0 years
Storm Event:

Peak Discharge	58.20 ft³/s
Time to Peak	250 min
Hydrograph Volume	2.623 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 10 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0	0.00	1.90	1.90	2.00
50	2.10	2.20	2.30	2.30
100	2.50	2.70	2.80	3.00
150	3.40	3.50	3.90	4.20
200	5.20	6.30	7.20	10.60
250	58.20	8.50	5.70	4.40
300	3.20	2.90	2.60	2.40
350	2.10	2.00	0.00	(N/A)

Flow (ft³/s)
2.00
2.50
3.10
4.80
10.10
3.70
2.20
(N/A)

Vault-South

Subsection: Elevation-Area Volume Curve
Label: 1

Return Event: 0 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr(A1*A2) (ft²)
0.00	0.0	10,339.940	0.000
7.50	0.0	10,339.940	31,019.820

Volume (ac-ft)	Volume (Total) (ac-ft)
0.000	0.000
1.780	1.780

Vault-South

Subsection: Volume Equations
Label: 1

Return Event: 0 years
Storm Event:

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Vault-South

Subsection: Outlet Input Data
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	7.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	1.70	7.5
Orifice-Circular	Orifice - 2	Forward	TW	3.50	7.5
Stand Pipe	Riser - 2	Forward	TW	6.40	7.5
Orifice-Circular	WQ Orifice to reuse	Forward	TW	0.00	7.5
Tailwater Settings	Tailwater			(N/A)	(N/A

Vault-South

Subsection: Outlet Input Data
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Structure ID: Riser - 2 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	6.40 ft
Diameter	48.0 in
Orifice Area	0.0 ft²
Orifice Coefficient	0.670
Weir Length	0.00 ft
Weir Coefficient	3.33 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	1.70 ft
Orifice Diameter	7.4 in
Orifice Coefficient	0.670

Structure ID: Orifice - 2 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	3.50 ft
Orifice Diameter	16.0 in
Orifice Coefficient	0.670

Structure ID: WQ Orifice to reuse Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	3.0 in
Orifice Coefficient	0.670

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30

Vault-South

Subsection: Outlet Input Data
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Convergence Tolerances	
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Vault-South

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
0.00	0.00	(N/A)
0.10	0.02	(N/A)
0.20	0.06	(N/A)
0.30	0.11	(N/A)
0.40	0.14	(N/A)
0.50	0.16	(N/A)
0.60	0.18	(N/A)
0.70	0.20	(N/A)
0.80	0.22	(N/A)
0.90	0.23	(N/A)
1.00	0.25	(N/A)
1.10	0.26	(N/A)
1.20	0.27	(N/A)
1.30	0.29	(N/A)
1.40	0.30	(N/A)
1.50	0.31	(N/A)
1.60	0.32	(N/A)
1.70	0.33	(N/A)
1.80	0.37	(N/A)
1.90	0.45	(N/A)
2.00	0.58	(N/A)
2.10	0.74	(N/A)
2.20	0.92	(N/A)
2.30	1.13	(N/A)
2.40	1.40	(N/A)
2.50	1.53	(N/A)
2.60	1.65	(N/A)
2.70	1.76	(N/A)
2.80	1.86	(N/A)
2.90	1.96	(N/A)
3.00	2.05	(N/A)
3.10	2.13	(N/A)
3.20	2.21	(N/A)
3.30	2.29	(N/A)
3.40	2.37	(N/A)
3.50	2.45	(N/A)
3.60	2.56	(N/A)
3.70	2.74	(N/A)
3.80	3.00	(N/A)
3.90	3.32	(N/A)
4.00	3.70	(N/A)
4.10	4.14	(N/A)
4.20	4.63	(N/A)

Vault-South

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)
4.30	5.16	(N/A)
4.40	5.74	(N/A)
4.50	6.35	(N/A)
4.60	7.00	(N/A)
4.70	7.66	(N/A)
4.80	8.34	(N/A)
4.90	9.73	(N/A)
5.00	10.21	(N/A)
5.10	10.66	(N/A)
5.20	11.09	(N/A)
5.30	11.50	(N/A)
5.40	11.90	(N/A)
5.50	12.28	(N/A)
5.60	12.64	(N/A)
5.70	13.00	(N/A)
5.80	13.34	(N/A)
5.90	13.68	(N/A)
6.00	14.01	(N/A)
6.10	14.33	(N/A)
6.20	14.64	(N/A)
6.30	14.94	(N/A)
6.40	15.24	(N/A)
6.50	16.85	(N/A)
6.60	19.56	(N/A)
6.70	22.97	(N/A)
6.80	26.96	(N/A)
6.90	31.44	(N/A)
7.00	36.36	(N/A)
7.10	41.68	(N/A)
7.20	47.37	(N/A)
7.30	53.41	(N/A)
7.40	59.78	(N/A)
7.50	66.46	(N/A)

Convergence Error (ft)	Contributing Structures
0.00	None Contributing
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse

Vault-South

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse

Vault-South

Subsection: Composite Rating Curve
Label: Outlet#2 - To POC

Return Event: 0 years
Storm Event:

Composite Outflow Summary

Convergence Error (ft)	Contributing Structures
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse
0.00	Orifice - 1 + Orifice - 2 + Riser - 2 + WQ Orifice to reuse

Vault-South

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	1.69 ft
Volume (Initial)	0.401 ac-ft
Flow (Initial Outlet)	0.33 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.33 ft³/s
Time Increment	1 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
0.00	0.00	0.000	10,339.940	0.00
0.10	0.02	0.024	10,339.940	0.00
0.20	0.06	0.047	10,339.940	0.00
0.30	0.11	0.071	10,339.940	0.00
0.40	0.14	0.095	10,339.940	0.00
0.50	0.16	0.119	10,339.940	0.00
0.60	0.18	0.142	10,339.940	0.00
0.70	0.20	0.166	10,339.940	0.00
0.80	0.22	0.190	10,339.940	0.00
0.90	0.23	0.214	10,339.940	0.00
1.00	0.25	0.237	10,339.940	0.00
1.10	0.26	0.261	10,339.940	0.00
1.20	0.27	0.285	10,339.940	0.00
1.30	0.29	0.309	10,339.940	0.00
1.40	0.30	0.332	10,339.940	0.00
1.50	0.31	0.356	10,339.940	0.00
1.60	0.32	0.380	10,339.940	0.00
1.70	0.33	0.404	10,339.940	0.00
1.80	0.37	0.427	10,339.940	0.00
1.90	0.45	0.451	10,339.940	0.00
2.00	0.58	0.475	10,339.940	0.00
2.10	0.74	0.498	10,339.940	0.00
2.20	0.92	0.522	10,339.940	0.00
2.30	1.13	0.546	10,339.940	0.00
2.40	1.40	0.570	10,339.940	0.00
2.50	1.53	0.593	10,339.940	0.00
2.60	1.65	0.617	10,339.940	0.00
2.70	1.76	0.641	10,339.940	0.00
2.80	1.86	0.665	10,339.940	0.00

Vault-South

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
2.90	1.96	0.688	10,339.940	0.00
3.00	2.05	0.712	10,339.940	0.00
3.10	2.13	0.736	10,339.940	0.00
3.20	2.21	0.760	10,339.940	0.00
3.30	2.29	0.783	10,339.940	0.00
3.40	2.37	0.807	10,339.940	0.00
3.50	2.45	0.831	10,339.940	0.00
3.60	2.56	0.855	10,339.940	0.00
3.70	2.74	0.878	10,339.940	0.00
3.80	3.00	0.902	10,339.940	0.00
3.90	3.32	0.926	10,339.940	0.00
4.00	3.70	0.949	10,339.940	0.00
4.10	4.14	0.973	10,339.940	0.00
4.20	4.63	0.997	10,339.940	0.00
4.30	5.16	1.021	10,339.940	0.00
4.40	5.74	1.044	10,339.940	0.00
4.50	6.35	1.068	10,339.940	0.00
4.60	7.00	1.092	10,339.940	0.00
4.70	7.66	1.116	10,339.940	0.00
4.80	8.34	1.139	10,339.940	0.00
4.90	9.73	1.163	10,339.940	0.00
5.00	10.21	1.187	10,339.940	0.00
5.10	10.66	1.211	10,339.940	0.00
5.20	11.09	1.234	10,339.940	0.00
5.30	11.50	1.258	10,339.940	0.00
5.40	11.90	1.282	10,339.940	0.00
5.50	12.28	1.306	10,339.940	0.00
5.60	12.64	1.329	10,339.940	0.00
5.70	13.00	1.353	10,339.940	0.00
5.80	13.34	1.377	10,339.940	0.00
5.90	13.68	1.400	10,339.940	0.00
6.00	14.01	1.424	10,339.940	0.00
6.10	14.33	1.448	10,339.940	0.00
6.20	14.64	1.472	10,339.940	0.00
6.30	14.94	1.495	10,339.940	0.00
6.40	15.24	1.519	10,339.940	0.00
6.50	16.85	1.543	10,339.940	0.00
6.60	19.56	1.567	10,339.940	0.00
6.70	22.97	1.590	10,339.940	0.00
6.80	26.96	1.614	10,339.940	0.00
6.90	31.44	1.638	10,339.940	0.00
7.00	36.36	1.662	10,339.940	0.00
7.10	41.68	1.685	10,339.940	0.00

Vault-South

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)
7.20	47.37	1.709	10,339.940	0.00
7.30	53.41	1.733	10,339.940	0.00
7.40	59.78	1.757	10,339.940	0.00
7.50	66.46	1.780	10,339.940	0.00

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.00	0.00
0.02	34.48
0.06	68.99
0.11	103.51
0.14	138.00
0.16	172.49
0.18	206.98
0.20	241.47
0.22	275.95
0.23	310.43
0.25	344.91
0.26	379.39
0.27	413.87
0.29	448.35
0.30	482.83
0.31	517.31
0.32	551.78
0.33	586.26
0.37	620.76
0.45	655.32
0.58	689.91
0.74	724.53
0.92	759.19
1.13	793.86
1.40	828.60
1.53	863.19
1.65	897.78
1.76	932.35
1.86	966.92
1.96	1,001.48
2.05	1,036.04
2.13	1,070.59
2.21	1,105.14
2.29	1,139.69
2.37	1,174.23
2.45	1,208.77
2.56	1,243.35
2.74	1,278.00

Vault-South

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 0 years
Storm Event:

Flow (Total) (ft³/s)	2S/t + O (ft³/s)
3.00	1,312.72
3.32	1,347.51
3.70	1,382.36
4.14	1,417.27
4.63	1,452.22
5.16	1,487.22
5.74	1,522.26
6.35	1,557.34
7.00	1,592.45
7.66	1,627.59
8.34	1,662.73
9.73	1,698.59
10.21	1,733.53
10.66	1,768.45
11.09	1,803.35
11.50	1,838.22
11.90	1,873.09
12.28	1,907.93
12.64	1,942.77
13.00	1,977.59
13.34	2,012.40
13.68	2,047.20
14.01	2,082.00
14.33	2,116.78
14.64	2,151.56
14.94	2,186.33
15.24	2,221.09
16.85	2,257.17
19.56	2,294.35
22.97	2,332.23
26.96	2,370.68
31.44	2,409.62
36.36	2,449.01
41.68	2,488.80
47.37	2,528.96
53.41	2,569.46
59.78	2,610.30
66.46	2,651.44

Vault-South

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)

Return Event: 0 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	1.69 ft
Volume (Initial)	0.401 ac-ft
Flow (Initial Outlet)	0.33 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.33 ft³/s
Time Increment	1 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	58.20 ft³/s	Time to Peak (Flow, In)	250 min
Flow (Peak Outlet)	25.06 ft³/s	Time to Peak (Flow, Outlet)	257 min

Elevation (Water Surface, Peak)	6.75 ft
Volume (Peak)	1.603 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.401 ac-ft
Volume (Total Inflow)	2.623 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	3.008 ac-ft
Volume (Retained)	0.016 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

Peak Discharge	25.06 ft³/s
Time to Peak	257 min
Hydrograph Volume	3.008 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0	0.33	0.33	0.33	0.33
5	0.33	0.33	0.33	0.33
10	0.34	0.34	0.35	0.35
15	0.36	0.36	0.36	0.37
20	0.38	0.39	0.40	0.40
25	0.42	0.43	0.43	0.44
30	0.46	0.47	0.48	0.49
35	0.51	0.52	0.53	0.54
40	0.57	0.58	0.59	0.60
45	0.63	0.64	0.66	0.67
50	0.69	0.71	0.72	0.73
55	0.76	0.78	0.79	0.81
60	0.84	0.85	0.87	0.88
65	0.91	0.92	0.94	0.96
70	0.99	1.00	1.02	1.03
75	1.06	1.08	1.09	1.11
80	1.14	1.15	1.17	1.19
85	1.23	1.25	1.27	1.29
90	1.32	1.34	1.36	1.38
95	1.41	1.42	1.42	1.43
100	1.45	1.46	1.46	1.47
105	1.49	1.50	1.51	1.51
110	1.53	1.54	1.55	1.56
115	1.57	1.58	1.59	1.60
120	1.61	1.62	1.63	1.64
125	1.65	1.66	1.67	1.68
130	1.69	1.70	1.71	1.72
135	1.73	1.74	1.75	1.76
140	1.78	1.78	1.79	1.80
145	1.82	1.82	1.83	1.84
150	1.86	1.87	1.88	1.89
155	1.90	1.91	1.92	1.93
160	1.95	1.95	1.96	1.97
165	1.99	2.00	2.01	2.02
170	2.04	2.05	2.06	2.06
175	2.08	2.09	2.10	2.11
180	2.13	2.14	2.15	2.17

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYOROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
185	2.19	2.20	2.21	2.22
190	2.24	2.26	2.27	2.28
195	2.30	2.32	2.33	2.34
200	2.37	2.38	2.39	2.40
205	2.43	2.45	2.47	2.49
210	2.54	2.57	2.61	2.65
215	2.74	2.80	2.86	2.92
220	3.05	3.13	3.22	3.31
225	3.53	3.65	3.79	3.94
230	4.27	4.44	4.61	4.79
235	5.12	5.29	5.46	5.62
240	5.92	6.15	6.55	7.13
245	9.27	10.31	11.09	11.90
250	13.59	14.37	15.01	16.82
255	23.27	24.84	25.06	24.20
260	20.47	18.53	17.01	16.13
265	15.12	14.98	14.84	14.69
270	14.38	14.22	14.06	13.90
275	13.57	13.41	13.24	13.07
280	12.73	12.56	12.38	12.21
285	11.86	11.68	11.50	11.32
290	10.97	10.79	10.61	10.43
295	10.06	9.88	9.66	9.16
300	8.31	8.11	7.92	7.74
305	7.39	7.22	7.06	6.91
310	6.63	6.49	6.36	6.23
315	5.99	5.88	5.77	5.67
320	5.47	5.37	5.28	5.19
325	5.03	4.95	4.87	4.80
330	4.66	4.59	4.53	4.47
335	4.35	4.29	4.24	4.18
340	4.08	4.03	3.99	3.94
345	3.85	3.81	3.77	3.73
350	3.65	3.62	3.58	3.55
355	3.49	3.46	3.42	3.39
360	3.33	3.31	3.28	3.24
365	3.17	3.12	3.08	3.03
370	2.94	2.90	2.86	2.82
375	2.74	2.71	2.68	2.65
380	2.59	2.56	2.54	2.53
385	2.50	2.48	2.46	2.45
390	2.43	2.42	2.41	2.40

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDRDGRAPH DRDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
395	2.37	2.36	2.35	2.34
400	2.32	2.31	2.30	2.29
405	2.27	2.26	2.25	2.24
410	2.22	2.21	2.20	2.19
415	2.17	2.16	2.15	2.14
420	2.11	2.10	2.09	2.08
425	2.06	2.05	2.04	2.03
430	2.01	2.00	1.99	1.98
435	1.96	1.95	1.94	1.92
440	1.90	1.89	1.88	1.87
445	1.85	1.84	1.83	1.82
450	1.80	1.79	1.78	1.77
455	1.74	1.73	1.72	1.71
460	1.69	1.68	1.67	1.66
465	1.64	1.63	1.61	1.60
470	1.58	1.57	1.56	1.55
475	1.53	1.52	1.51	1.49
480	1.47	1.46	1.45	1.44
485	1.42	1.41	1.39	1.37
490	1.33	1.30	1.28	1.26
495	1.22	1.20	1.18	1.17
500	1.13	1.12	1.10	1.09
505	1.06	1.05	1.04	1.03
510	1.00	0.99	0.98	0.97
515	0.95	0.93	0.92	0.91
520	0.89	0.88	0.87	0.87
525	0.85	0.84	0.83	0.82
530	0.80	0.79	0.79	0.78
535	0.76	0.75	0.74	0.74
540	0.72	0.72	0.71	0.70
545	0.69	0.68	0.68	0.67
550	0.66	0.65	0.65	0.64
555	0.63	0.62	0.62	0.61
560	0.60	0.59	0.59	0.58
565	0.57	0.57	0.57	0.56
570	0.55	0.55	0.55	0.54
575	0.53	0.53	0.53	0.52
580	0.51	0.51	0.51	0.50
585	0.50	0.49	0.49	0.49
590	0.48	0.48	0.47	0.47
595	0.46	0.46	0.46	0.45
600	0.45	0.45	0.44	0.44

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
605	0.44	0.43	0.43	0.43
610	0.43	0.42	0.42	0.42
615	0.42	0.41	0.41	0.41
620	0.41	0.40	0.40	0.40
625	0.40	0.39	0.39	0.39
630	0.39	0.38	0.38	0.38
635	0.38	0.37	0.37	0.37
640	0.37	0.37	0.37	0.37
645	0.36	0.36	0.36	0.36
650	0.36	0.36	0.36	0.36
655	0.36	0.36	0.35	0.35
660	0.35	0.35	0.35	0.35
665	0.35	0.35	0.35	0.35
670	0.34	0.34	0.34	0.34
675	0.34	0.34	0.34	0.34
680	0.34	0.34	0.34	0.34
685	0.33	0.33	0.33	0.33
690	0.33	0.33	0.33	0.33
695	0.33	0.33	0.33	0.33
700	0.33	0.33	0.33	0.33
705	0.33	0.33	0.33	0.33
710	0.33	0.33	0.33	0.33
715	0.33	0.33	0.33	0.33
720	0.32	0.32	0.32	0.32
725	0.32	0.32	0.32	0.32
730	0.32	0.32	0.32	0.32
735	0.32	0.32	0.32	0.32
740	0.32	0.32	0.32	0.32
745	0.32	0.32	0.32	0.32
750	0.32	0.32	0.32	0.32
755	0.32	0.32	0.32	0.32
760	0.32	0.32	0.32	0.32
765	0.32	0.32	0.32	0.32
770	0.31	0.31	0.31	0.31
775	0.31	0.31	0.31	0.31
780	0.31	0.31	0.31	0.31
785	0.31	0.31	0.31	0.31
790	0.31	0.31	0.31	0.31
795	0.31	0.31	0.31	0.31
800	0.31	0.31	0.31	0.31
805	0.31	0.31	0.31	0.31
810	0.31	0.31	0.31	0.31

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
815	0.31	0.31	0.31	0.31
820	0.30	0.30	0.30	0.30
825	0.30	0.30	0.30	0.30
830	0.30	0.30	0.30	0.30
835	0.30	0.30	0.30	0.30
840	0.30	0.30	0.30	0.30
845	0.30	0.30	0.30	0.30
850	0.30	0.30	0.30	0.30
855	0.30	0.30	0.30	0.30
860	0.30	0.30	0.30	0.30
865	0.30	0.30	0.30	0.29
870	0.29	0.29	0.29	0.29
875	0.29	0.29	0.29	0.29
880	0.29	0.29	0.29	0.29
885	0.29	0.29	0.29	0.29
890	0.29	0.29	0.29	0.29
895	0.29	0.29	0.29	0.29
900	0.29	0.29	0.29	0.29
905	0.29	0.29	0.29	0.29
910	0.29	0.29	0.29	0.29
915	0.29	0.29	0.29	0.28
920	0.28	0.28	0.28	0.28
925	0.28	0.28	0.28	0.28
930	0.28	0.28	0.28	0.28
935	0.28	0.28	0.28	0.28
940	0.28	0.28	0.28	0.28
945	0.28	0.28	0.28	0.28
950	0.28	0.28	0.28	0.28
955	0.28	0.28	0.28	0.28
960	0.28	0.28	0.28	0.28
965	0.28	0.28	0.28	0.27
970	0.27	0.27	0.27	0.27
975	0.27	0.27	0.27	0.27
980	0.27	0.27	0.27	0.27
985	0.27	0.27	0.27	0.27
990	0.27	0.27	0.27	0.27
995	0.27	0.27	0.27	0.27
1,000	0.27	0.27	0.27	0.27
1,005	0.27	0.27	0.27	0.27
1,010	0.27	0.27	0.27	0.27
1,015	0.27	0.27	0.26	0.26
1,020	0.26	0.26	0.26	0.26

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,025	0.26	0.26	0.26	0.26
1,030	0.26	0.26	0.26	0.26
1,035	0.26	0.26	0.26	0.26
1,040	0.26	0.26	0.26	0.26
1,045	0.26	0.26	0.26	0.26
1,050	0.26	0.26	0.26	0.26
1,055	0.26	0.26	0.26	0.26
1,060	0.26	0.26	0.26	0.26
1,065	0.26	0.25	0.25	0.25
1,070	0.25	0.25	0.25	0.25
1,075	0.25	0.25	0.25	0.25
1,080	0.25	0.25	0.25	0.25
1,085	0.25	0.25	0.25	0.25
1,090	0.25	0.25	0.25	0.25
1,095	0.25	0.25	0.25	0.25
1,100	0.25	0.25	0.25	0.25
1,105	0.25	0.25	0.25	0.25
1,110	0.25	0.25	0.25	0.25
1,115	0.25	0.24	0.24	0.24
1,120	0.24	0.24	0.24	0.24
1,125	0.24	0.24	0.24	0.24
1,130	0.24	0.24	0.24	0.24
1,135	0.24	0.24	0.24	0.24
1,140	0.24	0.24	0.24	0.24
1,145	0.24	0.24	0.24	0.24
1,150	0.24	0.24	0.24	0.24
1,155	0.24	0.24	0.24	0.24
1,160	0.24	0.24	0.24	0.24
1,165	0.23	0.23	0.23	0.23
1,170	0.23	0.23	0.23	0.23
1,175	0.23	0.23	0.23	0.23
1,180	0.23	0.23	0.23	0.23
1,185	0.23	0.23	0.23	0.23
1,190	0.23	0.23	0.23	0.23
1,195	0.23	0.23	0.23	0.23
1,200	0.23	0.23	0.23	0.23
1,205	0.23	0.23	0.23	0.23
1,210	0.23	0.23	0.23	0.23
1,215	0.22	0.22	0.22	0.22
1,220	0.22	0.22	0.22	0.22
1,225	0.22	0.22	0.22	0.22
1,230	0.22	0.22	0.22	0.22

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,235	0.22	0.22	0.22	0.22
1,240	0.22	0.22	0.22	0.22
1,245	0.22	0.22	0.22	0.22
1,250	0.22	0.22	0.22	0.22
1,255	0.22	0.22	0.22	0.22
1,260	0.22	0.22	0.22	0.22
1,265	0.21	0.21	0.21	0.21
1,270	0.21	0.21	0.21	0.21
1,275	0.21	0.21	0.21	0.21
1,280	0.21	0.21	0.21	0.21
1,285	0.21	0.21	0.21	0.21
1,290	0.21	0.21	0.21	0.21
1,295	0.21	0.21	0.21	0.21
1,300	0.21	0.21	0.21	0.21
1,305	0.21	0.21	0.21	0.21
1,310	0.21	0.21	0.21	0.21
1,315	0.20	0.20	0.20	0.20
1,320	0.20	0.20	0.20	0.20
1,325	0.20	0.20	0.20	0.20
1,330	0.20	0.20	0.20	0.20
1,335	0.20	0.20	0.20	0.20
1,340	0.20	0.20	0.20	0.20
1,345	0.20	0.20	0.20	0.20
1,350	0.20	0.20	0.20	0.20
1,355	0.20	0.20	0.20	0.20
1,360	0.20	0.20	0.20	0.19
1,365	0.19	0.19	0.19	0.19
1,370	0.19	0.19	0.19	0.19
1,375	0.19	0.19	0.19	0.19
1,380	0.19	0.19	0.19	0.19
1,385	0.19	0.19	0.19	0.19
1,390	0.19	0.19	0.19	0.19
1,395	0.19	0.19	0.19	0.19
1,400	0.19	0.19	0.19	0.19
1,405	0.19	0.19	0.19	0.19
1,410	0.19	0.19	0.19	0.18
1,415	0.18	0.18	0.18	0.18
1,420	0.18	0.18	0.18	0.18
1,425	0.18	0.18	0.18	0.18
1,430	0.18	0.18	0.18	0.18
1,435	0.18	0.18	0.18	0.18
1,440	0.18	0.18	0.18	0.18

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,445	0.18	0.18	0.18	0.18
1,450	0.18	0.18	0.18	0.18
1,455	0.18	0.18	0.18	0.18
1,460	0.18	0.18	0.17	0.17
1,465	0.17	0.17	0.17	0.17
1,470	0.17	0.17	0.17	0.17
1,475	0.17	0.17	0.17	0.17
1,480	0.17	0.17	0.17	0.17
1,485	0.17	0.17	0.17	0.17
1,490	0.17	0.17	0.17	0.17
1,495	0.17	0.17	0.17	0.17
1,500	0.17	0.17	0.17	0.17
1,505	0.17	0.17	0.17	0.17
1,510	0.17	0.17	0.16	0.16
1,515	0.16	0.16	0.16	0.16
1,520	0.16	0.16	0.16	0.16
1,525	0.16	0.16	0.16	0.16
1,530	0.16	0.16	0.16	0.16
1,535	0.16	0.16	0.16	0.16
1,540	0.16	0.16	0.16	0.16
1,545	0.16	0.16	0.16	0.16
1,550	0.16	0.16	0.16	0.16
1,555	0.16	0.16	0.16	0.16
1,560	0.16	0.15	0.15	0.15
1,565	0.15	0.15	0.15	0.15
1,570	0.15	0.15	0.15	0.15
1,575	0.15	0.15	0.15	0.15
1,580	0.15	0.15	0.15	0.15
1,585	0.15	0.15	0.15	0.15
1,590	0.15	0.15	0.15	0.15
1,595	0.15	0.15	0.15	0.15
1,600	0.15	0.15	0.15	0.15
1,605	0.15	0.15	0.15	0.15
1,610	0.14	0.14	0.14	0.14
1,615	0.14	0.14	0.14	0.14
1,620	0.14	0.14	0.14	0.14
1,625	0.14	0.14	0.14	0.14
1,630	0.14	0.14	0.14	0.14
1,635	0.14	0.14	0.14	0.14
1,640	0.14	0.14	0.14	0.14
1,645	0.14	0.14	0.14	0.14
1,650	0.14	0.14	0.14	0.14

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,655	0.14	0.14	0.14	0.14
1,660	0.13	0.13	0.13	0.13
1,665	0.13	0.13	0.13	0.13
1,670	0.13	0.13	0.13	0.13
1,675	0.13	0.13	0.13	0.13
1,680	0.13	0.13	0.13	0.13
1,685	0.13	0.13	0.13	0.13
1,690	0.13	0.13	0.13	0.13
1,695	0.13	0.13	0.13	0.13
1,700	0.13	0.13	0.13	0.13
1,705	0.13	0.13	0.12	0.12
1,710	0.12	0.12	0.12	0.12
1,715	0.12	0.12	0.12	0.12
1,720	0.12	0.12	0.12	0.12
1,725	0.12	0.12	0.12	0.12
1,730	0.12	0.12	0.12	0.12
1,735	0.12	0.12	0.12	0.12
1,740	0.12	0.12	0.12	0.12
1,745	0.12	0.12	0.12	0.12
1,750	0.12	0.12	0.12	0.12
1,755	0.12	0.12	0.12	0.12
1,760	0.11	0.11	0.11	0.11
1,765	0.11	0.11	0.11	0.11
1,770	0.11	0.11	0.11	0.11
1,775	0.11	0.11	0.11	0.11
1,780	0.11	0.11	0.11	0.11
1,785	0.11	0.11	0.11	0.11
1,790	0.11	0.11	0.11	0.11
1,795	0.11	0.11	0.11	0.11
1,800	0.10	0.10	0.10	0.10
1,805	0.10	0.10	0.10	0.10
1,810	0.10	0.10	0.10	0.10
1,815	0.10	0.10	0.10	0.10
1,820	0.10	0.10	0.10	0.10
1,825	0.10	0.10	0.10	0.10
1,830	0.10	0.09	0.09	0.09
1,835	0.09	0.09	0.09	0.09
1,840	0.09	0.09	0.09	0.09
1,845	0.09	0.09	0.09	0.09
1,850	0.09	0.09	0.09	0.09
1,855	0.09	0.09	0.09	0.09
1,860	0.09	0.09	0.09	0.09

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,865	0.09	0.08	0.08	0.08
1,870	0.08	0.08	0.08	0.08
1,875	0.08	0.08	0.08	0.08
1,880	0.08	0.08	0.08	0.08
1,885	0.08	0.08	0.08	0.08
1,890	0.08	0.08	0.08	0.08
1,895	0.08	0.08	0.08	0.08
1,900	0.08	0.08	0.08	0.08
1,905	0.07	0.07	0.07	0.07
1,910	0.07	0.07	0.07	0.07
1,915	0.07	0.07	0.07	0.07
1,920	0.07	0.07	0.07	0.07
1,925	0.07	0.07	0.07	0.07
1,930	0.07	0.07	0.07	0.07
1,935	0.07	0.07	0.07	0.07
1,940	0.07	0.07	0.07	0.07
1,945	0.07	0.07	0.07	0.07
1,950	0.06	0.06	0.06	0.06
1,955	0.06	0.06	0.06	0.06
1,960	0.06	0.06	0.06	0.06
1,965	0.06	0.06	0.06	0.06
1,970	0.06	0.06	0.06	0.06
1,975	0.06	0.06	0.06	0.06
1,980	0.06	0.06	0.06	0.06
1,985	0.06	0.06	0.06	0.06
1,990	0.06	0.06	0.06	0.06
1,995	0.06	0.06	0.06	0.06
2,000	0.06	0.06	0.06	0.05
2,005	0.05	0.05	0.05	0.05
2,010	0.05	0.05	0.05	0.05
2,015	0.05	0.05	0.05	0.05
2,020	0.05	0.05	0.05	0.05
2,025	0.05	0.05	0.05	0.05
2,030	0.05	0.05	0.05	0.05
2,035	0.05	0.05	0.05	0.05
2,040	0.05	0.05	0.05	0.05
2,045	0.05	0.05	0.05	0.05
2,050	0.05	0.05	0.05	0.05
2,055	0.05	0.05	0.05	0.05
2,060	0.05	0.05	0.05	0.05
2,065	0.05	0.05	0.05	0.05
2,070	0.05	0.05	0.05	0.05

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYOROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,075	0.05	0.05	0.05	0.05
2,080	0.05	0.05	0.05	0.05
2,085	0.05	0.05	0.05	0.05
2,090	0.04	0.04	0.04	0.04
2,095	0.04	0.04	0.04	0.04
2,100	0.04	0.04	0.04	0.04
2,105	0.04	0.04	0.04	0.04
2,110	0.04	0.04	0.04	0.04
2,115	0.04	0.04	0.04	0.04
2,120	0.04	0.04	0.04	0.04
2,125	0.04	0.04	0.04	0.04
2,130	0.04	0.04	0.04	0.04
2,135	0.04	0.04	0.04	0.04
2,140	0.04	0.04	0.04	0.04
2,145	0.04	0.04	0.04	0.04
2,150	0.04	0.04	0.04	0.04
2,155	0.04	0.04	0.04	0.04
2,160	0.04	0.04	0.04	0.04
2,165	0.04	0.04	0.04	0.04
2,170	0.04	0.04	0.04	0.04
2,175	0.04	0.04	0.04	0.04
2,180	0.04	0.04	0.04	0.04
2,185	0.04	0.04	0.04	0.04
2,190	0.04	0.04	0.04	0.04
2,195	0.04	0.04	0.04	0.04
2,200	0.03	0.03	0.03	0.03
2,205	0.03	0.03	0.03	0.03
2,210	0.03	0.03	0.03	0.03
2,215	0.03	0.03	0.03	0.03
2,220	0.03	0.03	0.03	0.03
2,225	0.03	0.03	0.03	0.03
2,230	0.03	0.03	0.03	0.03
2,235	0.03	0.03	0.03	0.03
2,240	0.03	0.03	0.03	0.03
2,245	0.03	0.03	0.03	0.03
2,250	0.03	0.03	0.03	0.03
2,255	0.03	0.03	0.03	0.03
2,260	0.03	0.03	0.03	0.03
2,265	0.03	0.03	0.03	0.03
2,270	0.03	0.03	0.03	0.03
2,275	0.03	0.03	0.03	0.03
2,280	0.03	0.03	0.03	0.03

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,285	0.03	0.03	0.03	0.03
2,290	0.03	0.03	0.03	0.03
2,295	0.03	0.03	0.03	0.03
2,300	0.03	0.03	0.03	0.03
2,305	0.03	0.03	0.03	0.03
2,310	0.03	0.03	0.03	0.03
2,315	0.03	0.03	0.03	0.03
2,320	0.03	0.03	0.03	0.03
2,325	0.03	0.03	0.03	0.03
2,330	0.03	0.03	0.03	0.03
2,335	0.03	0.03	0.03	0.03
2,340	0.03	0.03	0.03	0.03
2,345	0.02	0.02	0.02	0.02
2,350	0.02	0.02	0.02	0.02
2,355	0.02	0.02	0.02	0.02
2,360	0.02	0.02	0.02	0.02
2,365	0.02	0.02	0.02	0.02
2,370	0.02	0.02	0.02	0.02
2,375	0.02	0.02	0.02	0.02
2,380	0.02	0.02	0.02	0.02
2,385	0.02	0.02	0.02	0.02
2,390	0.02	0.02	0.02	0.02
2,395	0.02	0.02	0.02	0.02
2,400	0.02	0.02	0.02	0.02
2,405	0.02	0.02	0.02	0.02
2,410	0.02	0.02	0.02	0.02
2,415	0.02	0.02	0.02	0.02
2,420	0.02	0.02	0.02	0.02
2,425	0.02	0.02	0.02	0.02
2,430	0.02	0.02	0.02	0.02
2,435	0.02	0.02	0.02	0.02
2,440	0.02	0.02	0.02	0.02
2,445	0.02	0.02	0.02	0.02
2,450	0.02	0.02	0.02	0.02
2,455	0.02	0.02	0.02	0.02
2,460	0.02	0.02	0.02	0.02
2,465	0.02	0.02	0.02	0.02
2,470	0.02	0.02	0.02	0.02
2,475	0.02	0.02	0.02	0.02
2,480	0.02	0.02	0.02	0.02
2,485	0.02	0.02	0.02	0.02
2,490	0.02	0.02	0.02	0.02

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,495	0.02	0.02	0.02	0.02
2,500	0.02	0.02	0.02	0.02
2,505	0.02	0.02	0.02	0.02
2,510	0.02	0.02	0.02	0.02
2,515	0.02	0.02	0.02	0.02
2,520	0.02	0.02	0.02	0.02
2,525	0.02	0.02	0.02	0.02
2,530	0.02	0.02	0.02	0.02
2,535	0.02	0.02	0.02	0.02
2,540	0.02	0.02	0.02	0.02
2,545	0.02	0.02	0.02	0.02
2,550	0.02	0.02	0.02	0.02
2,555	0.02	0.02	0.02	0.02
2,560	0.02	0.02	0.02	0.02
2,565	0.02	0.02	0.02	0.02
2,570	0.02	0.02	0.02	0.02
2,575	0.02	0.02	0.02	0.02
2,580	0.02	0.02	0.02	0.02
2,585	0.02	0.02	0.02	0.02
2,590	0.02	0.02	0.02	0.02
2,595	0.02	0.01	0.01	0.01
2,600	0.01	0.01	0.01	0.01
2,605	0.01	0.01	0.01	0.01
2,610	0.01	0.01	0.01	0.01
2,615	0.01	0.01	0.01	0.01
2,620	0.01	0.01	0.01	0.01
2,625	0.01	0.01	0.01	0.01
2,630	0.01	0.01	0.01	0.01
2,635	0.01	0.01	0.01	0.01
2,640	0.01	0.01	0.01	0.01
2,645	0.01	0.01	0.01	0.01
2,650	0.01	0.01	0.01	0.01
2,655	0.01	0.01	0.01	0.01
2,660	0.01	0.01	0.01	0.01
2,665	0.01	0.01	0.01	0.01
2,670	0.01	0.01	0.01	0.01
2,675	0.01	0.01	0.01	0.01
2,680	0.01	0.01	0.01	0.01
2,685	0.01	0.01	0.01	0.01
2,690	0.01	0.01	0.01	0.01
2,695	0.01	0.01	0.01	0.01
2,700	0.01	0.01	0.01	0.01

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,705	0.01	0.01	0.01	0.01
2,710	0.01	0.01	0.01	0.01
2,715	0.01	0.01	0.01	0.01
2,720	0.01	0.01	0.01	0.01
2,725	0.01	0.01	0.01	0.01
2,730	0.01	0.01	0.01	0.01
2,735	0.01	0.01	0.01	0.01
2,740	0.01	0.01	0.01	0.01
2,745	0.01	0.01	0.01	0.01
2,750	0.01	0.01	0.01	0.01
2,755	0.01	0.01	0.01	0.01
2,760	0.01	0.01	0.01	0.01
2,765	0.01	0.01	0.01	0.01
2,770	0.01	0.01	0.01	0.01
2,775	0.01	0.01	0.01	0.01
2,780	0.01	0.01	0.01	0.01
2,785	0.01	0.01	0.01	0.01
2,790	0.01	0.01	0.01	0.01
2,795	0.01	0.01	0.01	0.01
2,800	0.01	0.01	0.01	0.01
2,805	0.01	0.01	0.01	0.01
2,810	0.01	0.01	0.01	0.01
2,815	0.01	0.01	0.01	0.01
2,820	0.01	0.01	0.01	0.01
2,825	0.01	0.01	0.01	0.01
2,830	0.01	0.01	0.01	0.01
2,835	0.01	0.01	0.01	0.01
2,840	0.01	0.01	0.01	0.01
2,845	0.01	0.01	0.01	0.01
2,850	0.01	0.01	0.01	0.01
2,855	0.01	0.01	0.01	0.01
2,860	0.01	0.01	0.01	0.01
2,865	0.01	0.01	0.01	0.01
2,870	0.01	0.01	0.01	0.01
2,875	0.01	0.01	0.01	0.01
2,880	0.01	0.01	0.01	0.01
2,885	0.01	0.01	0.01	0.01
2,890	0.01	0.01	0.01	0.01
2,895	0.01	0.01	0.01	0.01
2,900	0.01	0.01	0.01	0.01
2,905	0.01	0.01	0.01	0.01
2,910	0.01	0.01	0.01	0.01

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2,915	0.01	0.01	0.01	0.01
2,920	0.01	0.01	0.01	0.01
2,925	0.01	0.01	0.01	0.01
2,930	0.01	0.01	0.01	0.01
2,935	0.01	0.01	0.01	0.01
2,940	0.01	0.01	0.01	0.01
2,945	0.01	0.01	0.01	0.01
2,950	0.01	0.01	0.01	0.01
2,955	0.01	0.01	0.01	0.01
2,960	0.01	0.01	0.01	0.01
2,965	0.01	0.01	0.01	0.01
2,970	0.01	0.01	0.01	0.01
2,975	0.01	0.01	0.01	0.01
2,980	0.01	0.01	0.01	0.01
2,985	0.01	0.01	0.01	0.01
2,990	0.01	0.01	0.01	0.01
2,995	0.01	0.01	0.01	0.01
3,000	0.01	(N/A)	(N/A)	(N/A)

Flow (ft³/s)
0.33
0.34
0.35
0.37
0.41
0.45
0.50
0.55
0.62
0.68
0.75
0.82
0.90
0.97
1.05
1.12
1.21
1.30
1.40
1.44
1.48
1.52

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH OROINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
1.56
1.60
1.64
1.69
1.73
1.77
1.81
1.85
1.89
1.94
1.98
2.03
2.07
2.12
2.18
2.23
2.29
2.35
2.42
2.52
2.70
2.98
3.41
4.09
4.96
5.77
7.88
12.74
20.46
22.56
15.36
14.54
13.74
12.90
12.03
11.15
10.25
8.71
7.56
6.77
6.11
5.57

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDRDGRAPH DRDINATES (ft^3/s)
Dutput Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
5.11
4.73
4.41
4.13
3.90
3.69
3.52
3.36
3.21
2.98
2.77
2.62
2.51
2.44
2.38
2.33
2.28
2.23
2.18
2.12
2.07
2.02
1.97
1.91
1.86
1.81
1.76
1.70
1.65
1.59
1.54
1.48
1.43
1.35
1.24
1.15
1.08
1.01
0.96
0.90
0.86
0.81

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.77
0.73
0.70
0.66
0.63
0.61
0.58
0.56
0.54
0.52
0.50
0.48
0.47
0.45
0.44
0.43
0.42
0.41
0.40
0.39
0.38
0.37
0.36
0.36
0.36
0.35
0.35
0.35
0.34
0.34
0.33
0.33
0.33
0.33
0.33
0.33
0.33
0.33
0.32
0.32
0.32
0.32

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.32
0.32
0.32
0.32
0.32
0.31
0.31
0.31
0.31
0.31
0.31
0.31
0.31
0.31
0.31
0.30
0.30
0.30
0.30
0.30
0.30
0.30
0.30
0.30
0.30
0.29
0.29
0.29
0.29
0.29
0.29
0.29
0.29
0.29
0.29
0.28
0.28
0.28
0.28
0.28
0.28
0.28

Vault-South

Subsection: Pond Routed Hydrograph (total out) | Return Event: 0 years
Label: 1 (OUT) | Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.28
0.28
0.28
0.27
0.27
0.27
0.27
0.27
0.27
0.27
0.27
0.27
0.27
0.26
0.26
0.26
0.26
0.26
0.26
0.26
0.26
0.26
0.26
0.26
0.25
0.25
0.25
0.25
0.25
0.25
0.25
0.25
0.25
0.25
0.25
0.24
0.24
0.24
0.24
0.24
0.24
0.24
0.24
0.24

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYOROGRAPH OROINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.24
0.23
0.23
0.23
0.23
0.23
0.23
0.23
0.23
0.23
0.23
0.22
0.22
0.22
0.22
0.22
0.22
0.22
0.22
0.22
0.22
0.21
0.21
0.21
0.21
0.21
0.21
0.21
0.21
0.21
0.20
0.20
0.20
0.20
0.20
0.20
0.20
0.20
0.20
0.20
0.20
0.19
0.19

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.19
0.19
0.19
0.19
0.19
0.19
0.19
0.19
0.18
0.18
0.18
0.18
0.18
0.18
0.18
0.18
0.18
0.18
0.18
0.17
0.17
0.17
0.17
0.17
0.17
0.17
0.17
0.17
0.17
0.17
0.16
0.16
0.16
0.16
0.16
0.16
0.16
0.16
0.16
0.16
0.16
0.15
0.15
0.15
0.15

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.15
0.15
0.15
0.15
0.15
0.15
0.14
0.14
0.14
0.14
0.14
0.14
0.14
0.14
0.14
0.14
0.14
0.13
0.13
0.13
0.13
0.13
0.13
0.13
0.13
0.13
0.13
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.12
0.11
0.11
0.11
0.11
0.11
0.11
0.11

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.11
0.11
0.10
0.10
0.10
0.10
0.10
0.10
0.09
0.09
0.09
0.09
0.09
0.09
0.09
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.08
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.07
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06
0.06

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.05
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.04
0.03
0.03
0.03

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft³/s)
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.03
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH OROINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.02
0.01
0.01
0.01
0.01
0.01
0.01
0.01

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.01
0.01
0.01

Vault-South

Subsection: Pond Routed Hydrograph (total out)
Label: 1 (OUT)

Return Event: 0 years
Storm Event:

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 1 min
Time on left represents time for first value in each row.

Flow (ft^3/s)
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
0.01
(N/A)

Vault-South

Subsection: Pond Inflow Summary
Label: 1 (IN)

Return Event: 0 years
Storm Event:

Summary for Hydrograph Addition at '1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	CM-1	2.623	250	58.20
Flow (In)	1	2.623	250	58.20

Cross Section for Section A-exist

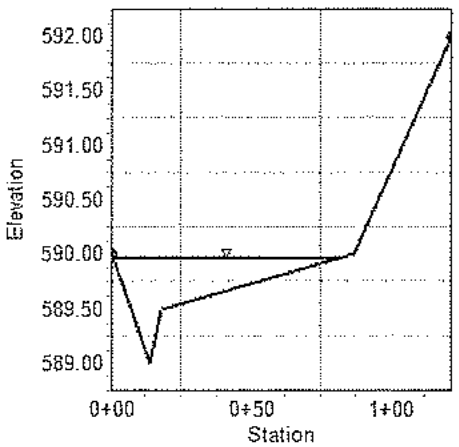
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04800	ft/ft
Normal Depth	0.96	ft
Discharge	116.00	ft³/s

Cross Section Image



Worksheet for Section A-exist

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04800	ft/ft
Discharge	116.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	590.00
0+14	589.00
0+18	589.50
0+87	590.00
1+22	592.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 590.00)	(1+22, 592.00)	0.030

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.96	ft
Elevation Range	589.00 to 592.00 ft	
Flow Area	24.05	ft^2
Wetted Perimeter	81.24	ft
Hydraulic Radius	0.30	ft
Top Width	81.18	ft
Normal Depth	0.96	ft
Critical Depth	1.07	ft

Worksheet for Section A-exist

Results

Critical Slope	0.01818	ft/ft
Velocity	4.82	ft/s
Velocity Head	0.36	ft
Specific Energy	1.32	ft
Froude Number	1.56	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.96	ft
Critical Depth	1.07	ft
Channel Slope	0.04800	ft/ft
Critical Slope	0.01818	ft/ft

Program Package Serial Number: 1355

WATER SURFACE PROFILE LISTING Date:12-28-2016 Time: 4:31:30

4095 HGVS
PUBLIC LINE A
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
.000	555.500	13.560	569.060	9.60	5.43	.46	569.52	.00	1.20	.00	1.500	.000	.00	1 .0
76.520	.1211					.0084	.64	13.56	.00	.52	.013	.00	.00	PIPE
76.520	564.770	5.053	569.823	9.60	5.43	.46	570.28	.00	1.20	.00	1.500	.000	.00	1 .0
JUNCT STR	.0825					.0084	.03	5.05	.00		.013	.00	.00	PIPE
80.520	565.100	4.757	569.857	9.60	5.43	.46	570.31	.00	1.20	.00	1.500	.000	.00	1 .0
5.240	.0191					.0084	.04	4.76	.00	.89	.013	.00	.00	PIPE
85.760	565.200	4.700	569.900	9.60	5.43	.46	570.36	.00	1.20	.00	1.500	.000	.00	1 .0
JUNCT STR	.0825					.0055	.02	4.70	.00		.013	.00	.00	PIPE
89.760	565.530	4.999	570.529	5.40	3.06	.14	570.67	.00	.90	.00	1.500	.000	.00	1 .0
53.260	.0216					.0026	.14	5.00	.00	.61	.013	.00	.00	PIPE
143.020	566.680	3.990	570.670	5.40	3.06	.14	570.82	.00	.90	.00	1.500	.000	.00	1 .0
WALL	ENTRANCE													
143.020	566.680	4.205	570.885	5.40	.34	.00	570.89	.00	.38	4.00	4.000	4.000	.00	0 .0

```
FILE: LINE_A.WSW                          W S P G W  - EDIT LISTING - Version 14.06              Date:12-28-2016  Time: 4:31:29
                                     WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                          PAGE    1
 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
 CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

 CD      1    4      1             1.500
 CD      2    3      0     .000    4.000    4.000    .000   .000    .00
                                                W S P G W                                                          PAGE NO   1
                            WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                              4095 HGVS
HEADING LINE NO 2 IS -
                              PUBLIC LINE A
HEADING LINE NO 3 IS -
                              100 YEAR Q
                                                W S P G W                                                          PAGE NO   2
                            WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO   1 IS A SYSTEM OUTLET      *         *     *
                     U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                    .000  555.500    1                                      569.060
 ELEMENT NO   2 IS A REACH              *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                                  76.520  564.770    1             .013                           .000     .000    82.000     0
 ELEMENT NO   3 IS A JUNCTION           *         *     *     *                 *                  *                *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                  80.520  565.100    1     0     0  .013      .000      .000      .000      .000    .000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000     .000
 ELEMENT NO   4 IS A REACH              *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                                  85.760  565.200    1             .013                           .000     .000      .000     0
 ELEMENT NO   5 IS A JUNCTION           *         *     *     *                 *                  *                *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                  89.760  565.530    1     2     0  .013     4.200      .000   565.530      .000    .000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000     .000
 ELEMENT NO   6 IS A REACH              *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                                 143.020  566.680    1             .013                           .000     .000      .000     0
 ELEMENT NO   7 IS A  WALL  ENTRANCE                  *
                     U/S DATA   STATION    INVERT  SECT             FP
                                 143.020  566.680    2             .500
 ELEMENT NO   8 IS A SYSTEM HEADWORKS                 *                       *
                     U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                 143.020  566.680    2                                      566.680
```

Program Package Serial Number: 1355

WATER SURFACE PROFILE LISTING Date:12-29-2016 Time:10:20:30

4095 HGVS
PRIVATE LINE B
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
.000	562.000	7.030	569.030	101.30	8.06	1.01	570.04	.00	3.05	.00	4.000	.000	.00	1 .0
34.081	.0581					.0050	.17	7.03	.00	1.48	.013	.00	.00	PIPE
34.081	563.980	5.218	569.198	101.30	8.06	1.01	570.21	.00	3.05	.00	4.000	.000	.00	1 .0
HYDRAULIC JUMP														
34.081	563.980	1.710	565.689	101.30	19.76	6.07	571.76	.00	3.05	3.96	4.000	.000	.00	1 .0
12.004	.0581					.0332	.40	1.71	3.06	1.48	.013	.00	.00	PIPE
46.086	564.677	1.746	566.423	101.30	19.21	5.73	572.16	.00	3.05	3.97	4.000	.000	.00	1 .0
16.212	.0581					.0300	.49	1.75	2.94	1.48	.013	.00	.00	PIPE
62.298	565.619	1.811	567.430	101.30	18.32	5.21	572.64	.00	3.05	3.98	4.000	.000	.00	1 .0
12.778	.0581					.0263	.34	1.81	2.74	1.48	.013	.00	.00	PIPE
75.076	566.361	1.879	568.240	101.30	17.47	4.74	572.98	.00	3.05	3.99	4.000	.000	.00	1 .0
10.327	.0581					.0232	.24	1.88	2.55	1.48	.013	.00	.00	PIPE
85.403	566.961	1.949	568.910	101.30	16.65	4.31	573.22	.00	3.05	4.00	4.000	.000	.00	1 .0
8.395	.0581					.0204	.17	1.95	2.38	1.48	.013	.00	.00	PIPE
93.798	567.449	2.024	569.473	101.30	15.88	3.92	573.39	.00	3.05	4.00	4.000	.000	.00	1 .0
6.926	.0581					.0180	.12	2.02	2.22	1.48	.013	.00	.00	PIPE
100.724	567.851	2.102	569.953	101.30	15.14	3.56	573.51	.00	3.05	3.99	4.000	.000	.00	1 .0
5.740	.0581					.0158	.09	2.10	2.06	1.48	.013	.00	.00	PIPE

Program Package Serial Number: 1355

WATER SURFACE PROFILE LISTING Date:12-29-2016 Time:10:20:30

4095 HGVS
PRIVATE LINE B
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
106.464	568.185	2.183	570.368	101.30	14.43	3.24	573.60	.00	3.05	3.98	4.000	.000	.00	1 .0
4.695	.0581					.0140	.07	2.18	1.92	1.48	.013	.00	.00	PIPE
111.160	568.458	2.270	570.728	101.30	13.76	2.94	573.67	.00	3.05	3.96	4.000	.000	.00	1 .0
3.856	.0581					.0123	.05	2.27	1.78	1.48	.013	.00	.00	PIPE
115.016	568.682	2.361	571.043	101.30	13.12	2.67	573.72	.00	3.05	3.93	4.000	.000	.00	1 .0
3.118	.0581					.0109	.03	2.36	1.65	1.48	.013	.00	.00	PIPE
118.134	568.863	2.457	571.320	101.30	12.51	2.43	573.75	.00	3.05	3.89	4.000	.000	.00	1 .0
2.458	.0581					.0097	.02	2.46	1.53	1.48	.013	.00	.00	PIPE
120.592	569.005	2.559	571.565	101.30	11.93	2.21	573.77	.00	3.05	3.84	4.000	.000	.00	1 .0
1.856	.0581					.0086	.02	2.56	1.41	1.48	.013	.00	.00	PIPE
122.448	569.113	2.668	571.781	101.30	11.37	2.01	573.79	.00	3.05	3.77	4.000	.000	.00	1 .0
1.321	.0581					.0076	.01	2.67	1.30	1.48	.013	.00	.00	PIPE
123.769	569.190	2.784	571.974	101.30	10.85	1.83	573.80	.00	3.05	3.68	4.000	.000	.00	1 .0
.781	.0581					.0068	.01	2.78	1.20	1.48	.013	.00	.00	PIPE
124.549	569.235	2.910	572.146	101.30	10.34	1.66	573.81	.00	3.05	3.56	4.000	.000	.00	1 .0
.251	.0581					.0061	.00	2.91	1.10	1.48	.013	.00	.00	PIPE
124.800	569.250	3.049	572.299	101.30	9.86	1.51	573.81	4.00	3.05	3.41	4.000	.000	.00	1 .0
JUNCT STR	.0825							4.00	1.00		.013	.00	.00	PIPE

4095 HGVS
PRIVATE LINE B
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
128.800	569.580	2.502	572.082	101.30	12.25	2.33	574.41	.00	3.05	3.87	4.000	.000	.00	1 .0
104.275	.0100					.0094	.98	2.50	1.48	2.48	.013	.00	.00	PIPE
233.075	570.624	2.559	573.183	101.30	11.93	2.21	575.39	.00	3.05	3.84	4.000	.000	.00	1 .0
64.602	.0100					.0086	.55	2.56	1.41	2.48	.013	.00	.00	PIPE
297.677	571.270	2.668	573.938	101.30	11.37	2.01	575.95	.00	3.05	3.77	4.000	.000	.00	1 .0
28.086	.0100					.0076	.21	2.67	1.30	2.48	.013	.00	.00	PIPE
325.763	571.551	2.784	574.336	101.30	10.85	1.83	576.16	.00	3.05	3.68	4.000	.000	.00	1 .0
12.516	.0100					.0068	.09	2.78	1.20	2.48	.013	.00	.00	PIPE
338.279	571.677	2.910	574.587	101.30	10.34	1.66	576.25	.00	3.05	3.56	4.000	.000	.00	1 .0
3.331	.0100					.0061	.02	2.91	1.10	2.48	.013	.00	.00	PIPE
341.610	571.710	3.049	574.759	101.30	9.86	1.51	576.27	4.00	3.05	3.41	4.000	.000	.00	1 .0
JUNCT STR	.0825							4.00	1.00		.013	.00	.00	PIPE
345.610	572.040	2.543	574.583	101.30	12.02	2.24	576.83	.00	3.05	3.85	4.000	.000	.00	1 .0
45.500	.0099					.0091	.41	2.54	1.43	2.49	.013	.00	.00	PIPE
391.110	572.490	2.580	575.070	101.30	11.82	2.17	577.24	.00	3.05	3.83	4.000	.000	.00	1 .0

```
FILE: LINE_B.WSW                          W S P G W  - EDIT LISTING - Version 14.06              Date:12-29-2016  Time:10:20:28
                                     WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                PAGE    1
 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
 CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

 CD      1    4      1             4.000
                                          W S P G W                                                          PAGE NO   1
                         WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                           4095 HGVS
HEADING LINE NO 2 IS -
                           PRIVATE LINE B
HEADING LINE NO 3 IS -
                           100 YEAR Q
                                          W S P G W                                                          PAGE NO   2
                         WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                    U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                                  .000  562.000    1                                     569.030
 ELEMENT NO   2 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT              N                       RADIUS    ANGLE     ANG PT  MAN H
                                124.800  569.250    1             .013                        .000     .000      .000     0
 ELEMENT NO   3 IS A JUNCTION          *         *     *     *               *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                128.800  569.580    1     0     0   .013      .000      .000      .000      .000     .000     .000
                                                                                                RADIUS    ANGLE
                                                                                                 4.324  53.000
 ELEMENT NO   4 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT              N                       RADIUS    ANGLE     ANG PT  MAN H
                                341.610  571.710    1             .013                        .000     .000      .000     0
 ELEMENT NO   5 IS A JUNCTION          *         *     *     *               *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                345.610  572.040    1     0     0   .013      .000      .000      .000      .000     .000     .000
                                                                                                RADIUS    ANGLE
                                                                                                 2.546 -90.000
 ELEMENT NO   6 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT              N                       RADIUS    ANGLE     ANG PT  MAN H
                                391.110  572.490    1             .013                        .000     .000      .000     0
 ELEMENT NO   7 IS A SYSTEM HEADWORKS                *                     *
                    U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                                391.110  572.490    1                                     575.070
```

Program Package Serial Number: 1355

WATER SURFACE PROFILE LISTING Date:12-28-2016 Time: 4: 6:42

4095 HGVS
PRIVATE LINE C
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
.000	572.500	8.150	580.650	199.50	15.88	3.91	584.56	.00	3.85	.00	4.000	.000	.00	1 .0
7.380	.0298					.0193	.14	8.15	.00	2.72	.013	.00	.00	PIPE
7.380	572.720	8.072	580.792	199.50	15.88	3.91	584.71	.00	3.85	.00	4.000	.000	.00	1 .0
28.172	.0301					.0193	.54	.00	.00	2.71	.013	.00	.00	PIPE
35.552	573.567	8.059	581.627	199.50	15.88	3.91	585.54	.00	3.85	.00	4.000	.000	.00	1 .0
HYDRAULIC JUMP														
35.552	573.567	2.277	575.844	199.50	27.01	11.33	587.17	4.00	3.85	3.96	4.000	.000	.00	1 .0
.757	.0301					.0504	.04	4.00	3.49	2.71	.013	.00	.00	PIPE
36.309	573.590	2.276	575.866	199.50	27.02	11.33	587.20	4.00	3.85	3.96	4.000	.000	.00	1 .0
44.221	.0301					.0538	2.38	4.00	3.49	2.71	.013	.00	.00	PIPE
80.530	574.920	2.190	577.110	199.50	28.33	12.47	589.58	.00	3.85	3.98	4.000	.000	.00	1 .0
8.190	.0293					.0579	.47	2.19	3.76	2.73	.013	.00	.00	PIPE
88.720	575.160	2.172	577.332	199.50	28.63	12.72	590.06	.00	3.85	3.99	4.000	.000	.00	1 .0
JUNCT STR	.0825					.0583	.23	2.17	3.81		.013	.00	.00	PIPE
92.720	575.490	2.179	577.669	199.50	28.51	12.62	590.29	.00	3.85	3.98	4.000	.000	.00	1 .0
1.045	.0671					.0580	.06	2.18	3.79	2.08	.013	.00	.00	PIPE
93.765	575.560	2.179	577.739	199.50	28.51	12.62	590.36	.00	3.85	3.98	4.000	.000	.00	1 .0
84.814	.0671					.0546	4.63	2.18	3.79	2.08	.013	.00	.00	PIPE

Program Package Serial Number: 1355

WATER SURFACE PROFILE LISTING Date:12-28-2016 Time: 4: 6:42

4095 HGVS
PRIVATE LINE C
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
178.578	581.252	2.265	583.517	199.50	27.18	11.47	594.99	.00	3.85	3.96	4.000	.000	.00	1 .0
50.452	.0671					.0482	2.43	2.27	3.52	2.08	.013	.00	.00	PIPE
229.030	584.638	2.355	586.993	199.50	25.91	10.43	597.42	.00	3.85	3.94	4.000	.000	.00	1 .0
34.829	.0671					.0427	1.49	2.36	3.27	2.08	.013	.00	.00	PIPE
263.859	586.976	2.451	589.427	199.50	24.71	9.48	598.91	.00	3.85	3.90	4.000	.000	.00	1 .0
25.904	.0671					.0378	.98	2.45	3.03	2.08	.013	.00	.00	PIPE
289.764	588.714	2.553	591.267	199.50	23.56	8.62	599.89	.00	3.85	3.84	4.000	.000	.00	1 .0
20.110	.0671					.0335	.67	2.55	2.80	2.08	.013	.00	.00	PIPE
309.874	590.064	2.661	592.725	199.50	22.46	7.83	600.56	.00	3.85	3.78	4.000	.000	.00	1 .0
15.959	.0671					.0298	.48	2.66	2.58	2.08	.013	.00	.00	PIPE
325.833	591.135	2.778	593.913	199.50	21.42	7.12	601.04	.00	3.85	3.68	4.000	.000	.00	1 .0
12.887	.0671					.0266	.34	2.78	2.37	2.08	.013	.00	.00	PIPE
338.720	592.000	2.903	594.903	199.50	20.42	6.47	601.38	.00	3.85	3.57	4.000	.000	.00	1 .0
JUNCT STR	.0825					.0256	.10	2.90	2.17		.013	.00	.00	PIPE
342.720	592.330	2.813	595.143	195.10	20.66	6.63	601.77	.00	3.83	3.65	4.000	.000	.00	1 .0
70.587	.0298					.0250	1.77	2.81	2.27	2.68	.013	.00	.00	PIPE
413.307	594.430	2.899	597.329	195.10	20.00	6.21	603.54	.00	3.83	3.57	4.000	.000	.00	1 .0
61.829	.0298					.0228	1.41	2.90	2.13	2.68	.013	.00	.00	PIPE

4095 HGVS
PRIVATE LINE C
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
475.136	596.270	3.035	599.305	195.10	19.07	5.64	604.95	.00	3.83	3.42	4.000	.000	.00	1 .0
39.254	.0298					.0205	.81	3.04	1.94	2.68	.013	.00	.00	PIPE
514.390	597.438	3.186	600.624	195.10	18.18	5.13	605.76	.00	3.83	3.22	4.000	.000	.00	1 .0
26.669	.0298					.0186	.50	3.19	1.75	2.68	.013	.00	.00	PIPE
541.059	598.231	3.355	601.587	195.10	17.33	4.66	606.25	.00	3.83	2.94	4.000	.000	.00	1 .0
17.587	.0298					.0171	.30	3.36	1.56	2.68	.013	.00	.00	PIPE
558.645	598.755	3.556	602.311	195.10	16.53	4.24	606.55	.00	3.83	2.51	4.000	.000	.00	1 .0
8.245	.0298					.0162	.13	3.56	1.34	2.68	.013	.00	.00	PIPE
566.890	599.000	3.831	602.831	195.10	15.75	3.85	606.69	.00	3.83	1.61	4.000	.000	.00	1 .0
JUNCT STR	.0825					.0084	.03	3.83	1.00		.013	.00	.00	PIPE
570.890	599.330	10.884	610.214	39.10	3.11	.15	610.36	.00	1.87	.00	4.000	.000	.00	1 .0
59.663	.1161					.0007	.04	10.88	.00	.76	.013	.00	.00	PIPE
630.553	606.258	4.000	610.258	39.10	3.11	.15	610.41	.00	1.87	.00	4.000	.000	.00	1 .0
3.074	.1161					.0007	.00	4.00	.00	.76	.013	.00	.00	PIPE
633.628	606.615	3.629	610.244	39.10	3.26	.17	610.41	.00	1.87	2.32	4.000	.000	.00	1 .0
1.728	.1161					.0007	.00	3.63	.25	.76	.013	.00	.00	PIPE
635.356	606.816	3.413	610.229	39.10	3.42	.18	610.41	.00	1.87	2.83	4.000	.000	.00	1 .0
.867	.1161					.0007	.00	3.41	.30	.76	.013	.00	.00	PIPE

4095 HGVS
PRIVATE LINE C
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
636.222	606.916	3.303	610.219	39.10	3.52	.19	610.41	.00	1.87	3.03	4.000	.000	.00	1 .0
HYDRAULIC JUMP														
636.222	606.916	.971	607.887	39.10	16.59	4.28	612.16	.00	1.87	3.43	4.000	.000	.00	1 .0
.378	.1161					.0441	.02	.97	3.53	.76	.013	.00	.00	PIPE
636.600	606.960	.974	607.934	39.10	16.52	4.24	612.17	.00	1.87	3.43	4.000	.000	.00	1 .0
JUNCT STR	.2500					.0470	.19	.97	3.51		.013	.00	.00	PIPE
640.600	607.960	1.050	609.010	33.80	17.29	4.64	613.65	.00	1.98	2.47	2.500	.000	.00	1 .0
48.146	.0502					.0502	2.42	1.05	3.42	1.05	.013	.00	.00	PIPE
688.746	610.375	1.050	611.424	33.80	17.29	4.64	616.06	.00	1.98	2.47	2.500	.000	.00	1 .0
124.985	.0502					.0499	6.23	1.05	3.42	1.05	.013	.00	.00	PIPE
813.730	616.643	1.052	617.695	33.80	17.22	4.60	622.30	.00	1.98	2.47	2.500	.000	.00	1 .0
106.810	.0502					.0466	4.98	1.05	3.40	1.05	.013	.00	.00	PIPE
920.540	622.000	1.091	623.091	33.80	16.42	4.19	627.28	.00	1.98	2.48	2.500	.000	.00	1 .0
JUNCT STR	.0825					.0423	.17	1.09	3.18		.013	.00	.00	PIPE
924.540	622.330	1.110	623.440	33.80	16.06	4.00	627.44	.00	1.98	2.48	2.500	.000	.00	1 .0
100.820	.0413					.0403	4.06	1.11	3.07	1.11	.013	.00	.00	PIPE
1025.360	626.494	1.122	627.616	33.80	15.83	3.89	631.51	.00	1.98	2.49	2.500	.000	.00	1 .0
74.158	.0413					.0371	2.75	1.12	3.01	1.11	.013	.00	.00	PIPE

4095 HGVS
PRIVATE LINE C
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1099.519	629.557	1.164	630.721	33.80	15.09	3.54	634.26	.00	1.98	2.49	2.500	.000	.00	1 .0
32.088	.0413					.0326	1.05	1.16	2.81	1.11	.013	.00	.00	PIPE
1131.607	630.882	1.207	632.089	33.80	14.39	3.21	635.30	.00	1.98	2.50	2.500	.000	.00	1 .0
19.548	.0413					.0287	.56	1.21	2.62	1.11	.013	.00	.00	PIPE
1151.155	631.689	1.253	632.942	33.80	13.72	2.92	635.87	.00	1.98	2.50	2.500	.000	.00	1 .0
13.588	.0413					.0253	.34	1.25	2.44	1.11	.013	.00	.00	PIPE
1164.743	632.250	1.301	633.552	33.80	13.08	2.66	636.21	.00	1.98	2.50	2.500	.000	.00	1 .0
10.020	.0413					.0223	.22	1.30	2.27	1.11	.013	.00	.00	PIPE
1174.763	632.664	1.352	634.016	33.80	12.47	2.42	636.43	.00	1.98	2.49	2.500	.000	.00	1 .0
7.698	.0413					.0197	.15	1.35	2.11	1.11	.013	.00	.00	PIPE
1182.461	632.982	1.405	634.387	33.80	11.89	2.20	636.58	.00	1.98	2.48	2.500	.000	.00	1 .0
6.000	.0413					.0174	.10	1.41	1.96	1.11	.013	.00	.00	PIPE
1188.461	633.230	1.461	634.691	33.80	11.34	2.00	636.69	.00	1.98	2.46	2.500	.000	.00	1 .0
4.682	.0413					.0154	.07	1.46	1.82	1.11	.013	.00	.00	PIPE
1193.143	633.423	1.521	634.945	33.80	10.81	1.81	636.76	.00	1.98	2.44	2.500	.000	.00	1 .0
3.717	.0413					.0136	.05	1.52	1.68	1.11	.013	.00	.00	PIPE
1196.860	633.577	1.583	635.160	33.80	10.31	1.65	636.81	.00	1.98	2.41	2.500	.000	.00	1 .0
2.838	.0413					.0121	.03	1.58	1.56	1.11	.013	.00	.00	PIPE

4095 HGVS
PRIVATE LINE C
100 YEAR Q

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1199.698	633.694	1.650	635.344	33.80	9.83	1.50	636.84	.00	1.98	2.37	2.500	.000	.00	1 .0
2.104	.0413					.0107	.02	1.65	1.44	1.11	.013	.00	.00	PIPE
1201.802	633.781	1.722	635.503	33.80	9.37	1.36	636.87	.00	1.98	2.31	2.500	.000	.00	1 .0
1.479	.0413					.0096	.01	1.72	1.32	1.11	.013	.00	.00	PIPE
1203.281	633.842	1.799	635.641	33.80	8.93	1.24	636.88	.00	1.98	2.25	2.500	.000	.00	1 .0
.876	.0413					.0085	.01	1.80	1.21	1.11	.013	.00	.00	PIPE
1204.156	633.878	1.883	635.761	33.80	8.52	1.13	636.89	.00	1.98	2.16	2.500	.000	.00	1 .0
.283	.0413					.0077	.00	1.88	1.11	1.11	.013	.00	.00	PIPE
1204.440	633.890	1.977	635.867	33.80	8.12	1.02	636.89	.00	1.98	2.03	2.500	.000	.00	1 .0
JUNCT STR	.1250					.0036	.01	1.98	1.00		.013	.00	.00	PIPE
1208.440	634.390	4.364	638.754	.50	.28	.00	638.76	.00	.26	.00	1.500	.000	.00	1 .0
160.680	.0100					.0000	.00	4.36	.00	.22	.013	.00	.00	PIPE
1369.120	636.000	2.758	638.758	.50	.28	.00	638.76	.00	.26	.00	1.500	.000	.00	1 .0
JUNCT STR	.0825					.0000	.00	2.76	.00		.013	.00	.00	PIPE
1373.120	636.330	2.428	638.758	.50	.28	.00	638.76	.00	.26	.00	1.500	.000	.00	1 .0
29.970	.0100					.0000	.00	2.43	.00	.22	.013	.00	.00	PIPE
1403.090	636.630	2.128	638.758	.50	.28	.00	638.76	.00	.26	.00	1.500	.000	.00	1 .0

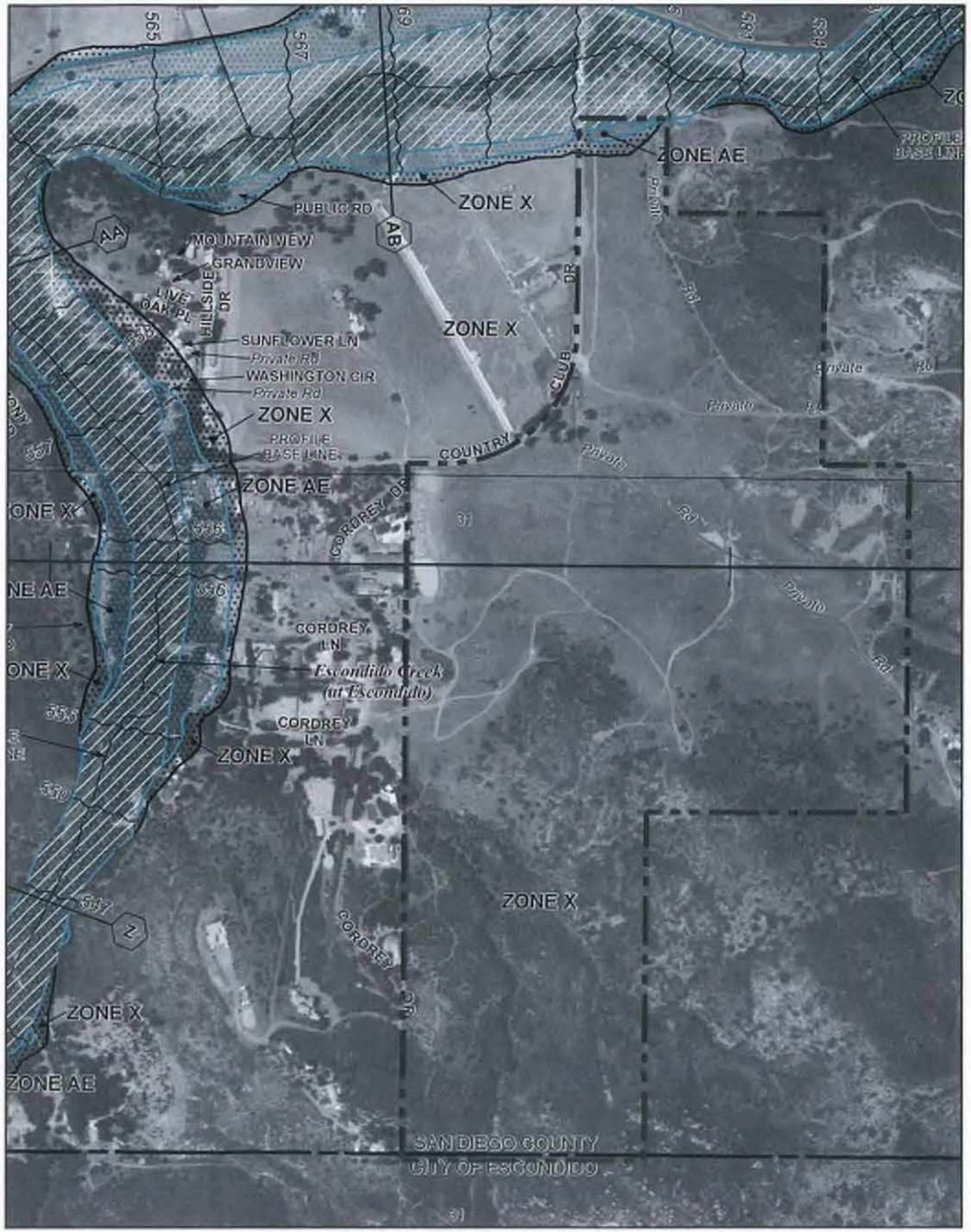
```
FILE: LINE_C.WSW                          W S P G W  - EDIT LISTING - Version 14.06              Date:12-28-2016  Time: 4: 6:40
                                     WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                PAGE    1
 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
 CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

 CD      1    4      1             4.000
 CD      2    4      1             1.500
 CD      3    4      1             3.000
 CD      4    4      1             2.500
 CD      5    4      1             2.000
                                                W S P G W                                                          PAGE NO   1
                              WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                                4095 HGVS
HEADING LINE NO 2 IS -
                                PRIVATE LINE C
HEADING LINE NO 3 IS -
                                100 YEAR Q
                                                W S P G W                                                          PAGE NO   2
                              WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                     U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                    .000  572.500    1                                      580.650
 ELEMENT NO   2 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                         RADIUS    ANGLE     ANG PT  MAN H
                                   7.380  572.720    1             .013                          .000     .000      .000     0
 ELEMENT NO   3 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                         RADIUS    ANGLE     ANG PT  MAN H
                                  80.530  574.920    1             .013                        50.000   83.824      .000     0
 ELEMENT NO   4 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                         RADIUS    ANGLE     ANG PT  MAN H
                                  88.720  575.160    1             .013                          .000     .000      .000     0
 ELEMENT NO   5 IS A JUNCTION          *         *     *     *                 *                  *                 *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                  92.720  575.490    1     0     0   .013      .000      .000      .000      .000    .000     .000
                                                                                                RADIUS    ANGLE
                                                                                                 .000     .000
 ELEMENT NO   6 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                         RADIUS    ANGLE     ANG PT  MAN H
                                 338.720  592.000    1             .013                          .000     .000      .000     0
 ELEMENT NO   7 IS A JUNCTION          *         *     *     *                 *                  *                 *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                                 342.720  592.330    1     2     2   .013     1.800     2.600   594.330   594.330 -90.000   90.000
                                                                                                RADIUS    ANGLE
                                                                                                 .000     .000
 ELEMENT NO   8 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                         RADIUS    ANGLE     ANG PT  MAN H
                                 566.890  599.000    1             .013                          .000     .000      .000     0
 ELEMENT NO   9 IS A JUNCTION          *         *     *     *                 *                  *                 *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
```

```
                    570.890  599.330    1     1     0   .013   156.000      .000   599.660      .000 -90.000     .000
                                                                                     RADIUS    ANGLE
                                                                                       .000     .000
                                                W S P G W                                                   PAGE NO   3
                        WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  10 IS A REACH          *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           636.600  606.960    1              .013                           .000     .000      .000     0
ELEMENT NO  11 IS A JUNCTION       *         *     *     *              *                     *              *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           640.600  607.960    4     2     2   .013    3.100     2.200   608.960  608.960 -90.000   90.000
                                                                                     RADIUS    ANGLE
                                                                                       .000     .000
ELEMENT NO  12 IS A REACH          *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           920.540  622.000    4              .013                           .000     .000      .000     0
ELEMENT NO  13 IS A JUNCTION       *         *     *     *              *                     *              *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           924.540  622.330    4     0     0   .013     .000      .000      .000     .000     .000     .000
                                                                                     RADIUS    ANGLE
                                                                                       .000     .000
ELEMENT NO  14 IS A REACH          *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1204.440 633.890    4              .013                           .000     .000      .000     0
ELEMENT NO  15 IS A JUNCTION       *         *     *     *              *                     *              *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           1208.440 634.390    2     5     0   .013   33.300      .000   634.890      .000 -90.000     .000
                                                                                     RADIUS    ANGLE
                                                                                       .000     .000
ELEMENT NO  16 IS A REACH          *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1369.120 636.000    2              .013                           .000     .000      .000     0
ELEMENT NO  17 IS A JUNCTION       *         *     *     *              *                     *              *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           1373.120 636.330    2     0     0   .013     .000      .000      .000     .000     .000     .000
                                                                                     RADIUS    ANGLE
                                                                                       .000     .000
                                                W S P G W                                                   PAGE NO   4
                        WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  18 IS A REACH          *         *     *
                U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                           1403.090 636.630    2              .013                           .000     .000      .000     0
ELEMENT NO  19 IS A SYSTEM HEADWORKS                *                    *
                U/S DATA   STATION    INVERT  SECT                                W S ELEV
                           1403.090 636.630    2                                   636.630
```

APPENDIX 6

Drainage Exhibits



PROJECT BOUNDARY

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23)- - - - -(23)	Transect line
87°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE	1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 FT	5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
DX5510 X	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1057G

FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1057 OF 2375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ESCONDIDO, CITY OF	060290	1057	G
SAN DIEGO COUNTY	060284	1057	G
SAN MARCOS, CITY OF	060296	1057	G

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

MAP NUMBER
06073C1057G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1059G

FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1059 OF 2375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ESCONDIDO, CITY OF	060290	1059	G
SAN DIEGO COUNTY	060284	1059	G

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

MAP NUMBER
06073C1059G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

SCALE: 1"=500'

N

0 250 500 1000 1500

GRAPHICAL SCALE
SCALE: 1" = 500'

SCALE:	1"=500'
JOB #:	4095
CREATED:	2/10/15

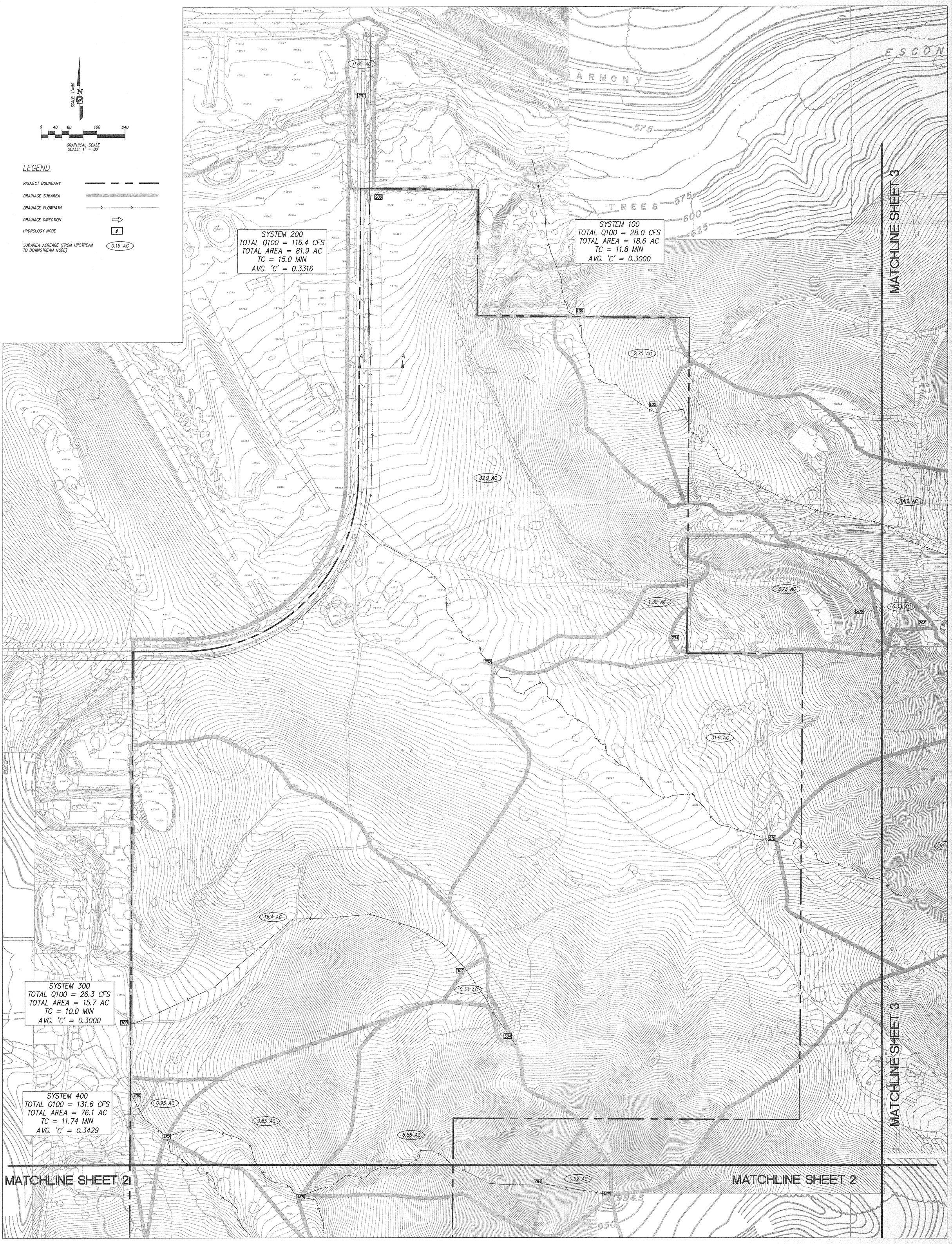
PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Engineering | Survey

COUNTY OF SAN DIEGO
HARMONY GROVE VILLAGE SOUTH

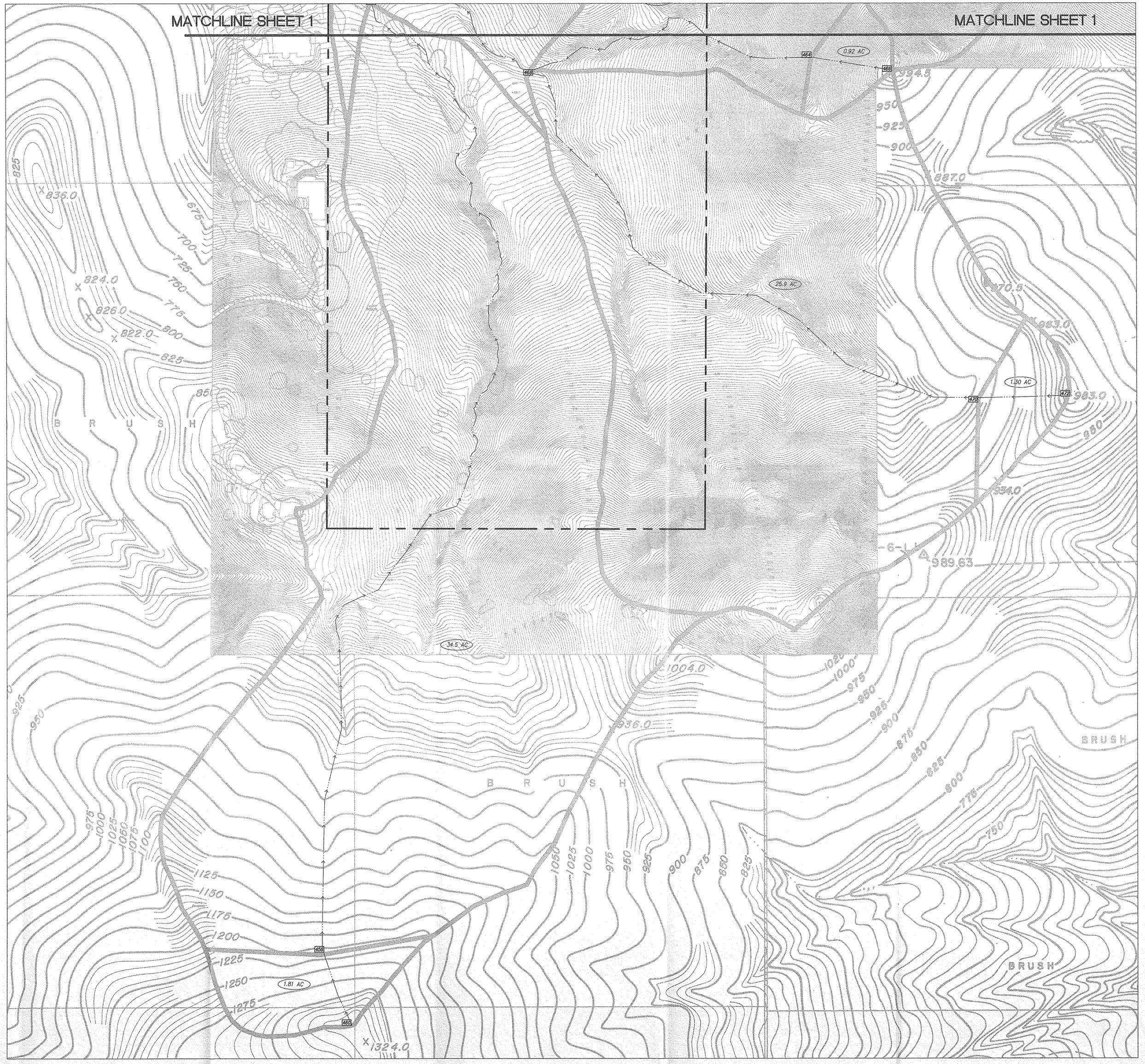
FEMA FLOODPLAIN MAP
FIRM PANELS 0673C1057G AND 0673C1059G
EXHIBIT A

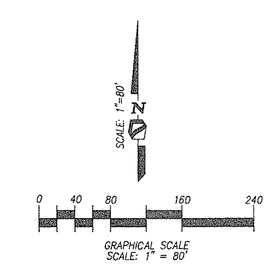
P:\4095\Engr\Reports\Drainage\Exh\4095floodplain.dwg 2/10/2015 10:29:32 AM



SCALE: 1"=80'	PREPARED BY:		COUNTY TO SAN DIEGO
JOB #: 4095	PROJECT DESIGN CONSULTANTS Planning I Landscape Architecture I Engineering I Survey	701 B Street, Suite 800 San Diego, CA 92101 619.235.6471 Tel 619.234.0349 Fax	HARMONY GROVE VILLAGE SOUTH
CREATED: 02/10/15			DRAINAGE MAP EXISTING CONDITIONS EXHIBIT B - SHEET 1 OF 3

P:\4095\Engr\Reports\Drainage\Exh\Exh8_EXIST_HYD.dwg 12/29/2016 11:29:27 AM





LEGEND

PROJECT BOUNDARY	
DRAINAGE SUBAREA	
DRAINAGE FLOWPATH	
DRAINAGE DIRECTION	
HYDROLOGY NODE	
SUBAREA ACREAGE (FROM UPSTREAM TO DOWNSTREAM NODE)	0.15 AC

SCALE: 1"=80'

JOB #: 4095

CREATED: 02/10/15

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

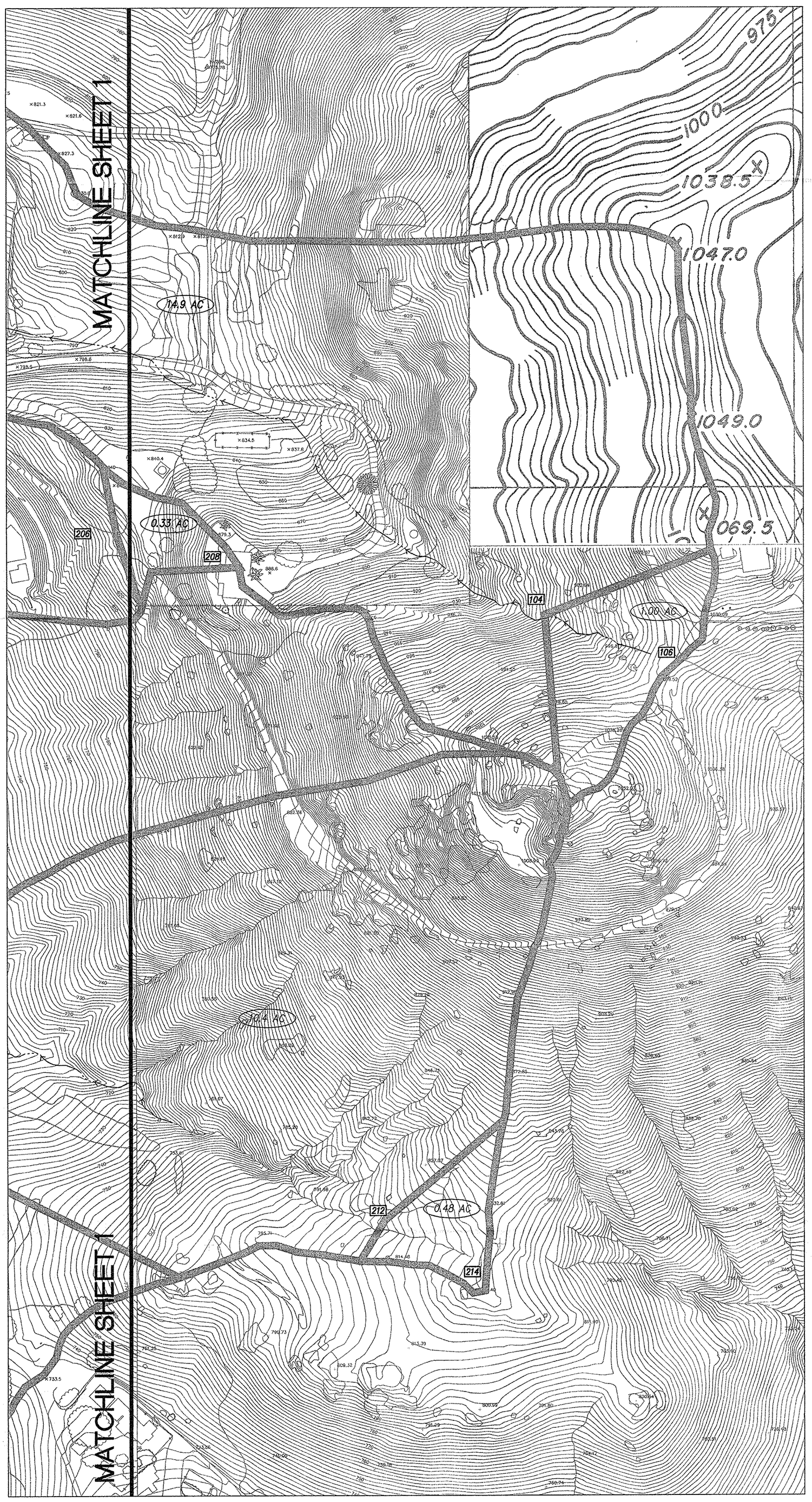
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

HARMONY GROVE VILLAGE SOUTH

DRAINAGE MAP
EXISTING CONDITIONS
EXHIBIT B - SHEET 2 OF 3

P:\4095\Eng\Reports\Drainage\Exh\Exhib_EXIST_HYD.dwg 10/29/2015 11:31:14 AM



SCALE: 1"=80'

0 40 80 160 240

GRAPHICAL SCALE
SCALE: 1" = 80'

LEGEND

PROJECT BOUNDARY	
DRAINAGE SUBAREA	
DRAINAGE FLOWPATH	
DRAINAGE DIRECTION	
HYDROLOGY NODE	#
SUBAREA ACREAGE (FROM UPSTREAM TO DOWNSTREAM NODE)	0.15 AC

SCALE: 1"=80'

JOB #: 4095

CREATED: 02/10/15

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

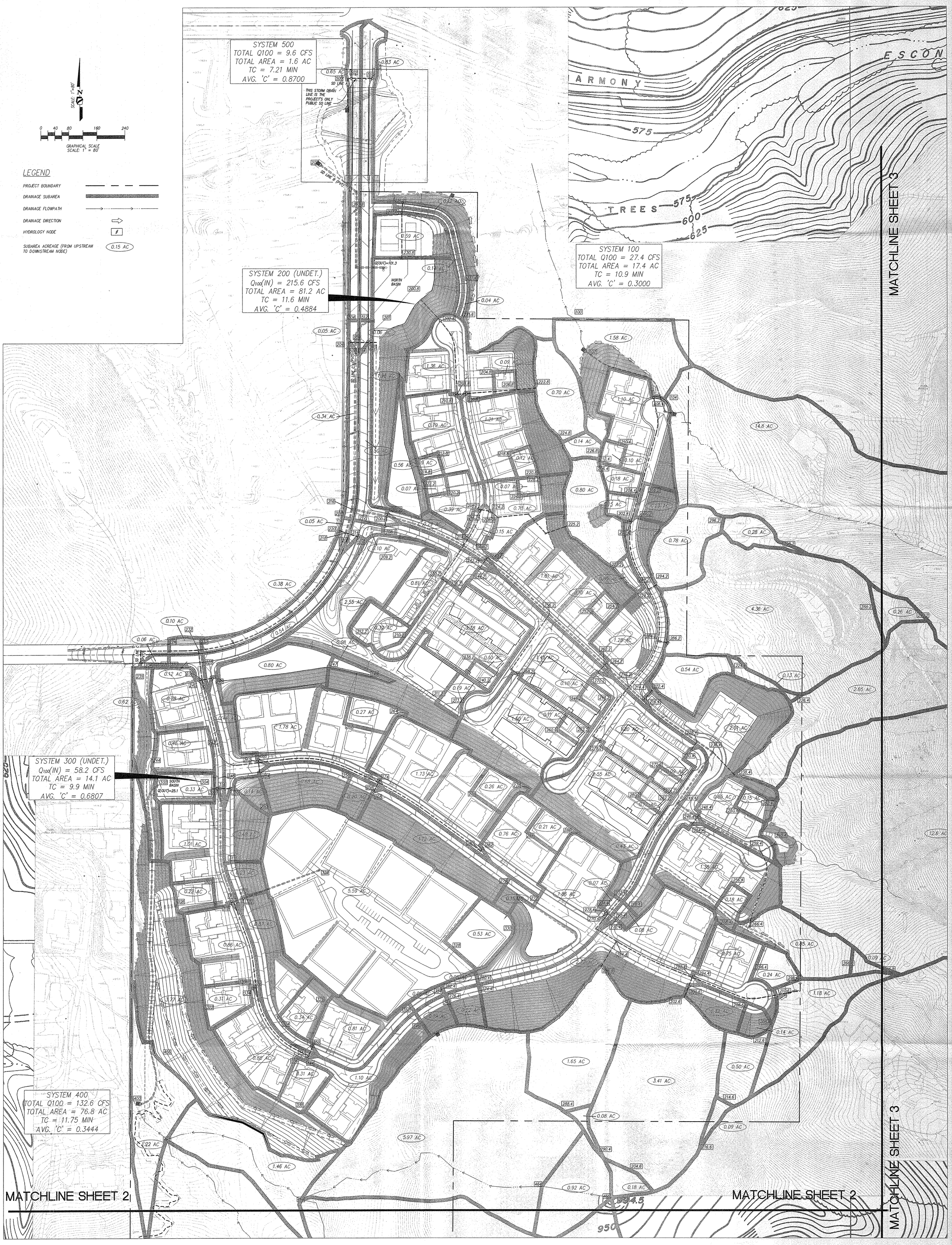
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

HARMONY GROVE VILLAGE SOUTH

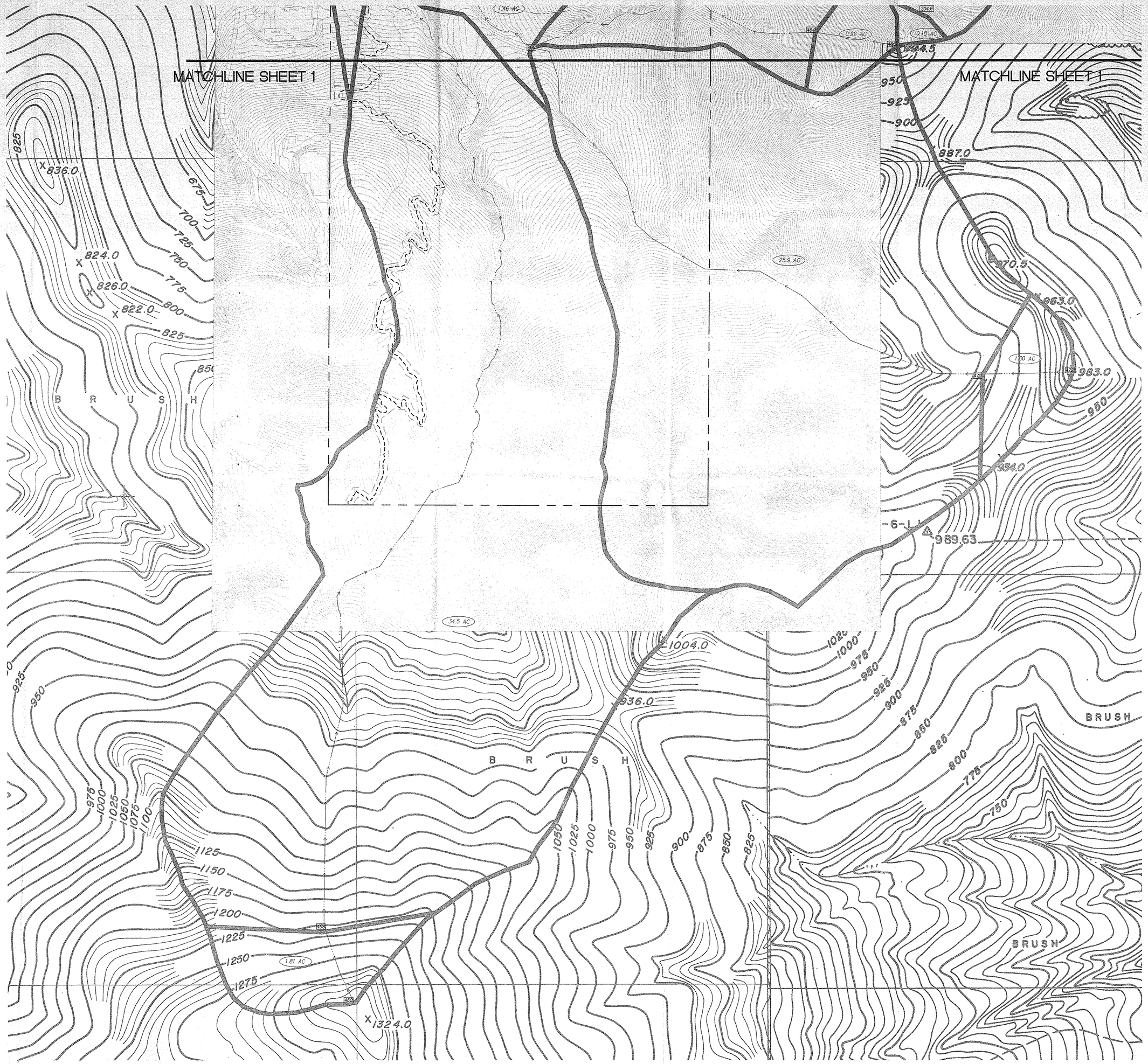
DRAINAGE MAP
EXISTING CONDITIONS
EXHIBIT B - SHEET 3 OF 3

P:\4095\Engr\Reports\Drainage\Exh\ExhB_EXIST_HYD.dwg 12/29/2016 11:32:31 AM



SCALE: 1"=80'	PREPARED BY:		COUNTY OF SAN DIEGO
JOB #: 4095	PROJECT DESIGN CONSULTANTS Planning | Landscape Architecture | Engineering | Survey	701 B Street, Suite 800 San Diego, CA 92101 619.235.6471 Tel 619.234.0349 Fax	HARMONY GROVE VILLAGE SOUTH
CREATED: 02/10/15			DRAINAGE MAP PROPOSED CONDITIONS EXHIBIT C - SHEET 1 OF 3

P:\4095\Engr\Reports\Drainage\Exh\ExhC_PROP_HYD.dwg 12/29/2016 11:57:43 AM



SCALE: 1"=80'

N

0 40 80 160 240

GRAPHICAL SCALE
SCALE: 1" = 80'

LEGEND

PROJECT BOUNDARY	
DRAINAGE SUBAREA	
DRAINAGE FLOWPATH	
DRAINAGE DIRECTION	
HYDROLOGY NODE	#
SUBAREA ACREAGE (FROM UPSTREAM TO DOWNSTREAM NODE)	0.15 AC

SCALE: 1"=80'

JOB #: 4095

CREATED: 02/10/15

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

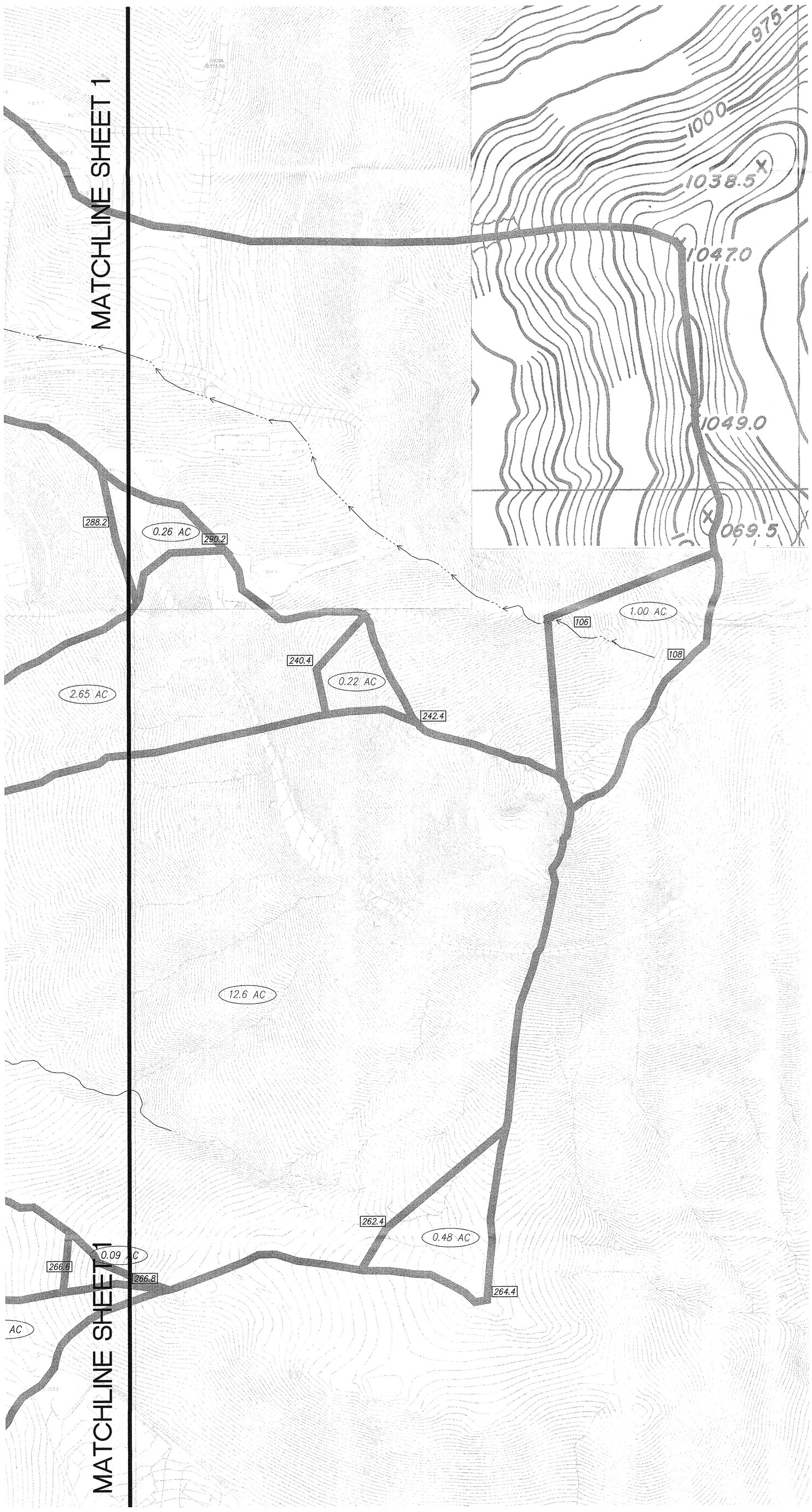
701 B Street, Suite 800
San Diego, CA 92101
619.295.5471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

HARMONY GROVE VILLAGE SOUTH

DRAINAGE MAP
PROPOSED CONDITIONS
EXHIBIT C - SHEET 2 OF 3

P:\4095\Eng\Reports\Drainage\Exh\DAC_PROP_MID.dwg 12/29/2016 12:55:06 PM



SCALE: 1"=80'

N

0 40 80 160 240

GRAPHICAL SCALE
SCALE: 1" = 80'

LEGEND

PROJECT BOUNDARY	
DRAINAGE SUBAREA	
DRAINAGE FLOWPATH	
DRAINAGE DIRECTION	
HYDROLOGY NODE	#
SUBAREA ACREAGE (FROM UPSTREAM TO DOWNSTREAM NODE)	0.15 AC

SCALE: 1"=80'	PREPARED BY:		COUNTY OF SAN DIEGO
JOB #: 4095	PROJECT DESIGN CONSULTANTS Planning I Landscape Architecture I Engineering I Survey	701 B Street, Suite 800 San Diego, CA 92101 619.235.6471 Tel 619.234.0349 Fax	HARMONY GROVE VILLAGE SOUTH
CREATED: 02/10/15			DRAINAGE MAP PROPOSED CONDITIONS EXHIBIT C - SHEET 3 OF 3

P:\4095\Engr\Reports\Drainage\Exh\ExhC_PROP_HYD.dwg 12/29/2016 12:56:14 PM