Appendix F-2

Preliminary Hydrology-Hydraulics Study For Iron Lofts Apartments, 3093 Mission Inn Avenue, Riverside, California

KHR Associates

December 6, 2024

Preliminary Hydrology-Hydraulics Study
For
Iron Lofts Apartments
3093 Mission Inn Avenue
Riverside, California

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Date: 08/31/2023
Revised Dates: 11/27/2023; 08/09/2024; 12/06/2024

PREPARER'S CERTIFICATION

This report has been prepared under the direction of a duly Registered Civil Engineer in the State of California. The civil engineer signing below approves of the technical information included within this report along with recommendations and conclusions made.

_____

James H. Kawamura, P.E.
Registered Civil Engineer No. C30560
Exp. 3/31/26

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Appendix 2.3 Post-Development Hydrology Calculations: On-Site plus Off-Site Street Runoff

1.0 Introduction

1.1 Project Description

The proposed *Iron Lofts* multi-family residential project will consist of 300 residential dwelling units within a 4-story apartment building and 2-story townhome building with a 390-space parking lot on a 6.94 acres site, including a portion of a public street (6th Street) to be vacated, in the City of Riverside, California. As part of the proposed project, public street improvements, including new curb, gutter, sidewalks, and landscaping will be constructed along Commerce Street, Mission Inn Avenue, and 5th Street frontages.

1.2 Project Location

The project site is bounded by 5th Street to the north; Commerce Street to the west; Mission Inn Avenue to the south; and a residential neighborhood to the east. The project site currently consists of vacant land, large asphalt covered parking fields, several industrial buildings, and two historic Riverside Recycling buildings.

Figure 1 shows an aerial perspective of the project site and its environs, while Figure 2 illustrates the most current site plan for the proposed project.

Figure 1 – Aerial View of Project Site

Figure 2 – Site Plan

1.3 Purpose of the Study

This drainage study presents an analysis of the hydrologic effects that may be associated with the proposed *Iron Lofts* multi-family residential project. The study details the general project characteristics, the design, criteria, and methodology applied to the analysis of the area in terms of drainage and associated conveyance facilities.

The plans and specifications in the drainage study are not for construction purposes; the contractor shall refer to final approved construction documents for plans and specifications.

2.0 Pre-Development Condition

2.1 Pre-Development Conditions

2.1.1 Hydrologic Setting

This section summarizes the project's size and location in the context of the larger watershed perspective, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and other relevant hydrologic and environmental factors to be

protected specific to the project area's watershed.

2.1.2 Watershed

The proposed project is located within the 2,650 square miles Santa Ana watershed and drains to the Santa Ana River. The watershed includes portions of Lost Angeles, Riverside Counties, and San Bernardino County.

2.1.3 Existing Topography, Drainage Patterns, and Facilities (Narrative)

Adjacent to the subject property, 5th Street slopes from east to west and Commerce Street slopes from north to east.

The existing site currently comprises vacant land, expansive parking areas, several industrial buildings, and two historic Riverside Recycling structures. Stormwater runoff from the property flows out to all adjacent streets, where it eventually gets collected by existing curb and gutter systems. These discharges flowing out to the street occur without stormwater treatment and are collected by existing catch basins connected to the existing storm drain system.

2.1.4 Flood Zone

The subject property is located within Zone X (unshaded), considered to be a minimal risk area outside the 1% and 0.2% annual chance floodplains, as shown on the Federal Emergency Management's (FEMA) Flood Insurance Rate Map (FIRM) No. 06065C0726G, effective date August 28, 2008.

2.1.5 Adjacent Land Use

The project site is bounded by 5th Street to the north, existing residential uses to the east (within 6th street), Commerce Street to the west and Mission Inn Avenue to the south.

2.1.6 Soil Conditions

According to the geotechnical report prepared by Geotechnical Professionals Inc. (dated May 19, 2021), the site is underlain with predominantly of interbedded layers of sandy silts, silty sands, silts, and sands and is to be medium dense from depths of 20 to 50 feet. The site's soil is considered hydrologic soil group "C" according to the USDA Natural Resources Conservation Service. (See Exhibit A for Soils Group Map.)

2.2 Methodology of Hydrology Study

This section summarizes the design criteria and methodology applied for the drainage study. The design criteria and methodology follows the Riverside County Flood Control and Water Conservation District (RCFC & WCD) Hydrology Manual (April 1978) noted as "Riverside County Hydrology Manual or RCHM."

2.2.1 Design Criteria

Local storm drain facilities have been designed to conform to standards found in the RCHM. Storm drain facilities have been designed to accommodate both the 10-year and 100-year storm events.

2.2.2 Rational Method

Runoff calculations for this study were accomplished using Hydrowin / AES 2016 software, which incorporates the RCFC & WCD Hydrology Manual. This manual uses a method where runoff is assumed to be directly proportional to rainfall and area, less losses for infiltration and depression storage.

$$Q=CIA$$

Where... Q = Peak discharge (cfs);
C = runoff coefficient, based on land use and soil type;
i = Rainfall intensity (in/hr);
A = watershed area (acre)

The runoff coefficient represents the ratio of rainfall that runs off the watershed versus the portion that infiltrates to the soil or is held in depression storage. The runoff coefficient is dependent on the land use coverage and soil type. The RCFC & WCD Hydrology Manual methodology assumes hydrologic Soil Type C" (Exhibit A) for all soils near the project site.

The watershed time of concentration at any given point is defined as the time it would theoretically take runoff to travel from the most upstream point in the watershed to a concentration point, as estimated by the Time of Concentration Nomograph for Initial Subarea.

Intensity for this site was determined by the intensity-duration curves from the RCHM (See Exhibit B). The runoff coefficient represents the ratio of rainfall that runs off the watershed versus the portion that infiltrates to the soil or is held in depression storage. The runoff coefficient (C) is dependent on rainfall intensity (I), and acreage area (A).

A set of peak discharge rates were computed for both the existing and proposed conditions respectively for the project site to facilitate a comparative analysis between the two scenarios.

Rational Method calculations were accomplished using AES Software. Peak discharges for 10-year, and 100-year hypothetical storm return frequencies were computed and can be seen in the hydrology and drainage analysis section of this report.

2.3 Hydrology Calculations

This section summarizes the quantitative hydrologic analysis of the existing conditions of the site.

2.3.1 Summary of Drainage Delineation

Pre-development Analysis:

To analyze the pre-development conditions, the site was broken into two subareas: A and B (See Exhibit C).

Runoff from subarea A sheet flows southwesterly within an existing curb and gutter on 6th Street. Similarly, runoff from subarea B flows northerly and then westerly, discharging onto Commerce Street. The total runoff from Subareas A and B combine which drains into an existing inlet. The runoff eventually enters an existing storm drain culvert on Commerce Street.

In its current state, the project site also receives 13.21 acres of stormwater runoff from 6th street, designated as Subarea O-1. The flow rate for Subarea O-1 is 14.65cfs for the 10-year storm and 22.71cfs for the 100-year storm. (Refer to **Appendix 1**, Subarea O-1 for drainage area and spot elevations & **Appendix 1.2** for pre-development off-site calculations).

2.4 Results of Pre-Development Hydrology Calculations

Pre-development Calculations:

For the 10-year storm event, the existing site contributes 15.23 cfs of runoff on-site. The existing conditions results for the project site are summarized in **Table 1**. (See **Appendix 1.1** for pre-development calculations).

Table 1: Existing Conditions Hydrology

10-Year	A-B	6.94	15.23
	O-1	13.21	14.65
Total	-	**20.15**	**29.88**
100-Year	A-B	6.94	22.74
	O-1	13.21	22.71
Total	-	**20.15**	**45.45**

3.0 Post Development Condition

3.1 Post-Development Conditions

The proposed project will have a net increase in total impervious area compared to the existing condition of the site, increasing the site's overall total imperviousness percentage to 79% and decreases perviousness to 21%.

3.2 Methodology of Hydrology Study

This section summarizes the design criteria and methodology applied for the drainage study. The design criteria and methodology follows the RCFC & WCD Hydrology Manual (April 1978) noted as "Riverside County Hydrology Manual or RCHM."

3.2.1 Design Criteria

Local storm drain facilities have been designed to conform to standards found in the RCFC & WCD Hydrology Manual (April 1978). Storm drain facilities have been designed to accommodate both the 10-year and 100-year storm events.

3.2.2 Rational Method

Runoff calculations for this study were accomplished using AES 2016 software, which incorporates the RCFC & WCD Hydrology Manual. This manual uses a method where runoff is assumed to be directly proportional to rainfall and area, less losses for infiltration and depression storage. See section 2.2 for more information.

3.3 Hydrology Calculations

This section summarizes the quantitative hydrologic analysis of the proposed conditions of the site.

3.3.1 Summary of Drainage Delineation

Post-development Analysis:

The proposed site is broken into two main drainage areas: A and B (see **Appendix 2**). Each drainage area is further subdivided into multiple smaller subareas.

Stormwater runoff from the buildings in Subareas A and B will be collected by multiple inlets and roof drains, where it will then be collected by the proposed catch basins which will channel the stormwater into the proposed storm drain system. Runoff from the surface areas will flow along the curb and gutter, where it will be collected by multiple catch basins distributed throughout the site. All runoff will be routed for pre-treatment, prior to a solid walled CMP for detention and infiltration by drywells. Stormwater flows exceeding the treatment volume

capacity will bypass the treatment system and continue through the private storm drain system, where it will confluence with the existing stormwater runoff from 6th Street.

A proposed 24" storm drain pipe will be provided to collect and redirect all of the existing runoff on 6th Street. Once the flows combine, the on-site storm drain system will connect to the County's existing 72" storm drain pipe located on Mission Inn Avenue via a proposed 36" storm drain pipe. Additionally, there is expected to be on-site runoff coming from the proposed planters, specifically subareas B11 and B12. As water flows through these planters, the natural vegetation and soil will help to capture, treat, and manage runoff from the surrounding areas. This treated runoff will then be directed towards its respective street via the proposed catch basin. (Refer to **Appendix 2.2** for map and **Appendix 2.3** for calculations). For catch basins and storm pipes in the public right of way, sizing will be provided during the final design phase.

The project site in its post-development condition will intercept stormwater from 6th street and adjacent properties towards the east (Refer to Subarea O-1 from **Appendix 2**; and Section 3.4 for flow rates). This stormwater will not negatively impact the new development as it will be directed in a City-owned catch basin and storm drain pipe (with a maintenance easement), discharging south towards Mission Avenue through a new RCP pipe, which will connect to the existing 72-inch storm pipe (See **Appendix 2.1** for the addition of subarea O-1 to the development).

3.4 Results of Post-Development Hydrology Calculations

Post-development Calculations:

Under post-development conditions, the site will produce 23.64 cfs of stormwater runoff, which will be collected by the private storm drain system and will be routed to the proposed tanks for detention prior to infiltration by means of drywells. The proposed conditions results for the project site are summarized in **Table 2.** (See **Appendices 2.1** and **2.3** for post-development calculations).

Table 2: Proposed Conditions Hydrology

Storm Event	Subareas	Area (acres)	Q (cfs)
10-Year	A1-A12, B1-B10, O-1	19.6	23.64
	B11, B12	0.6	1.16
Total	-	**20.2**	**24.08**
100-Year	A1-A11, B1-B10, O-1	19.6	36.04
	B11, B12	0.6	1.75
Total	-	**20.2**	**37.79**

4.0 Comparison of Post-Development and Pre-Development Hydrologic Conditions

4.1 Conclusion

Site Analysis Results:

Table 3: Hydrology Comparative Analysis

Storm Event	Pre-development Condition (Q)	Post-development Condition (Q)
10-Year	29.88 cfs	23.64 cfs
100-Year	45.45 cfs	36.04 cfs

The results from the AES calculations show that the post-development condition will generate a lower peak flow rate compared to the pre-development condition (See Table 1 above). This reduction in runoff is attributed to the extended drainage flow path and the utilization of underground storm drain piping. Furthermore, the existing site land-use is industrial/commercial; whereas, the proposed development is for multi-family residential use.

The post-development condition results do not account the additional reduction in runoff volume due to the infiltration of the required stormwater quality design volume. Therefore, the proposed development will not negatively impact the downstream storm drain system or receiving waters.

4.2 Proposed Runoff Management Facilities

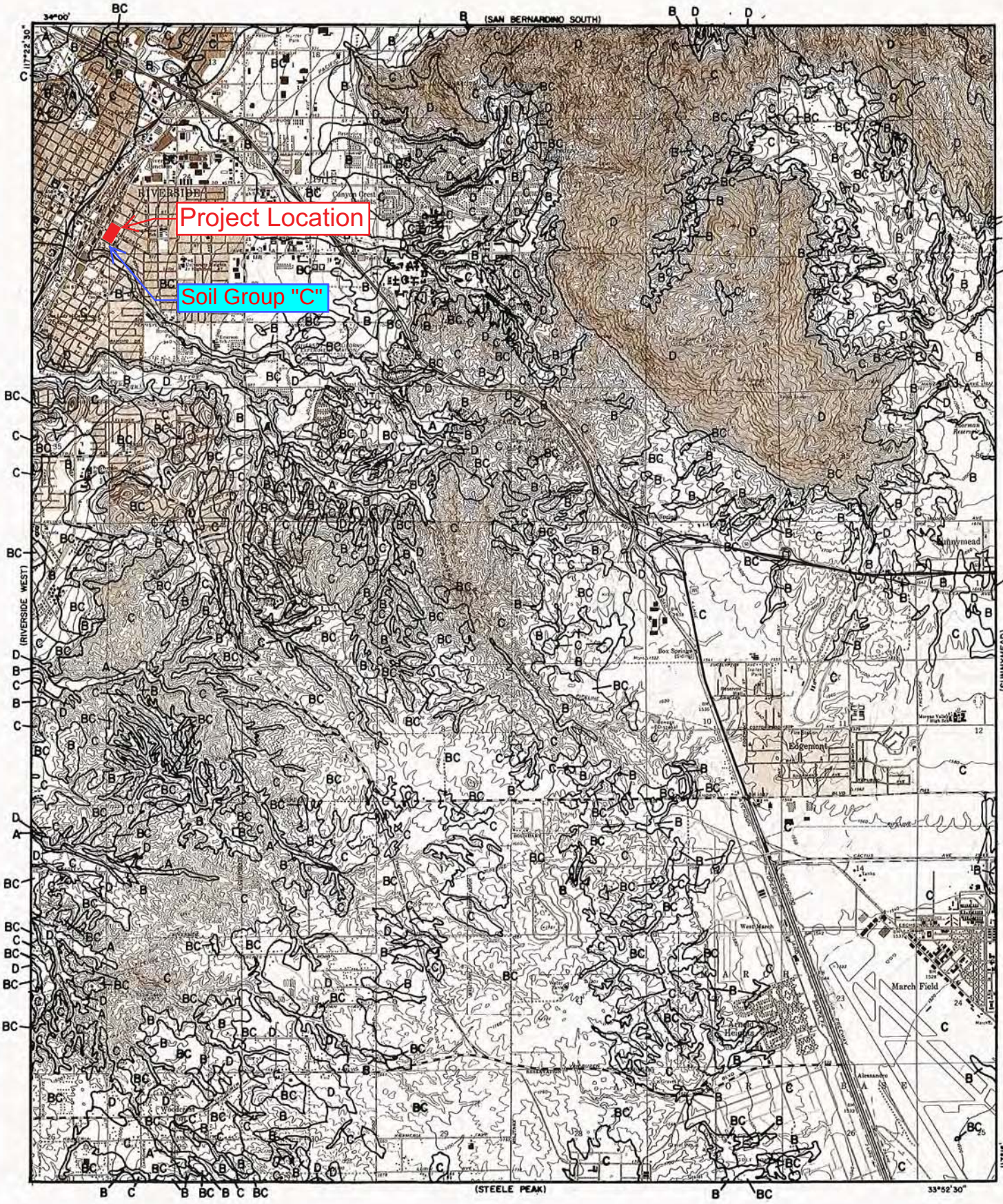
The proposed facilities managing runoff from the area include:

- ❑ Water quality treatment control Best Management Practices (BMPs); specifically, Aqua Swirl Hydrodynamic Separator Treatment device and Drywell Systems.
- ❑ Proposed perforated corrugated steel infiltration tanks will be placed on the project site.

EXHIBITS

EXHIBIT A

Hydrologic Soils Group Map



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE-EAST

PLATE C-1.16

EXHIBIT B

Precipitation Maps

RAINFALL INTENSITY—INCHES PER HOUR

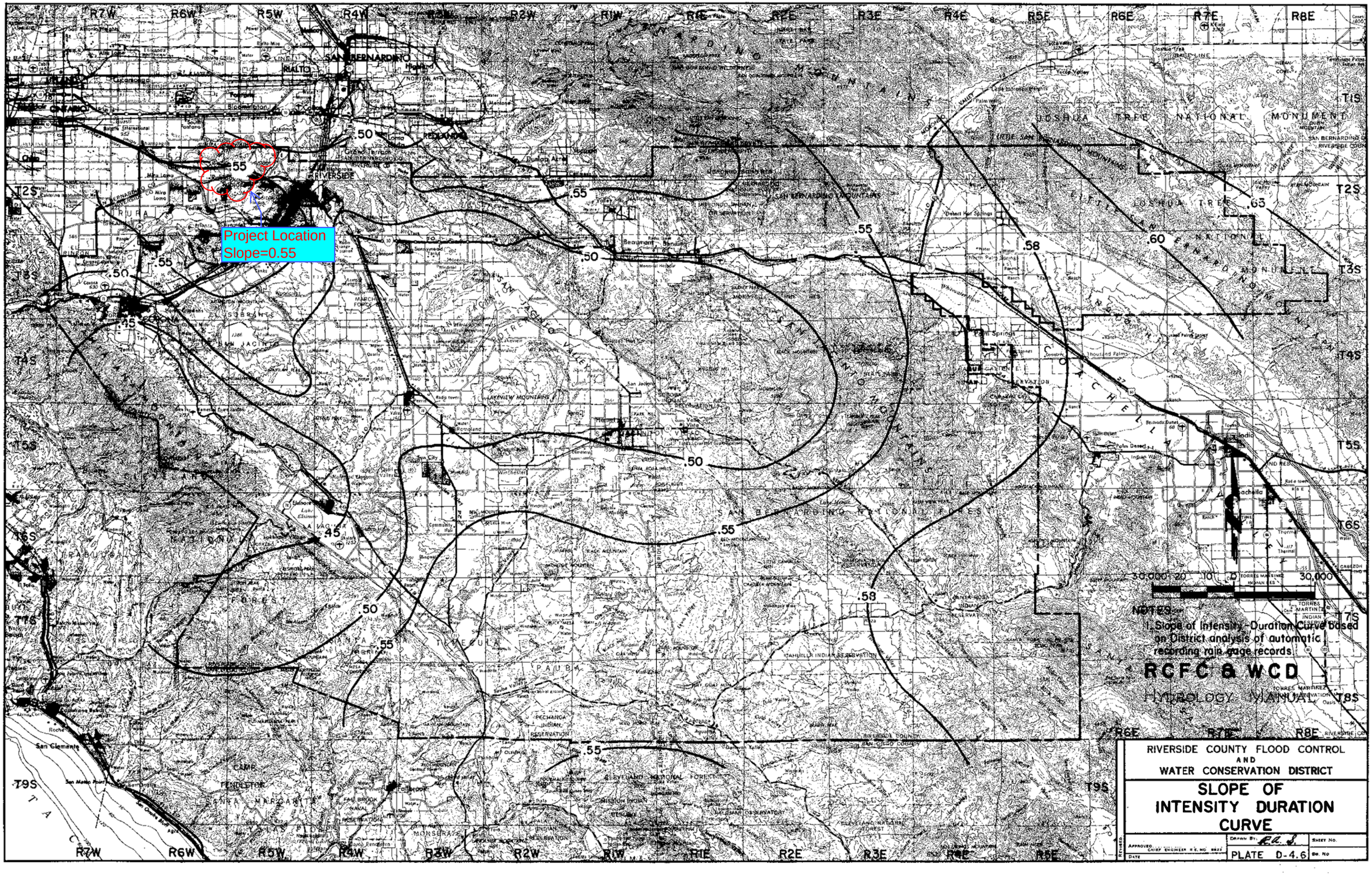
RIVERSIDE			RIVERSIDE (FOOTHILL AREAS)			RUBIDOUX			SAN JACINTO			SUN CITY		
DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR
5	2.75	3.92	5	3.14	4.71	5	3.18	4.71	5	2.81	4.16	5	3.25	4.85
6	2.48	3.55	6	2.84	4.26	6	2.87	4.26	6	2.56	3.79	6	2.95	4.40
7	2.28	3.26	7	2.61	3.91	7	2.64	3.91	7	2.37	3.51	7	2.72	4.06
8	2.12	3.03	8	2.42	3.63	8	2.45	3.63	8	2.22	3.29	8	2.53	3.78
9	1.99	2.84	9	2.27	3.41	9	2.30	3.41	9	2.09	3.10	9	2.38	3.55
10	1.88	2.68	10	2.14	3.21	10	2.17	3.21	10	1.98	2.94	10	2.25	3.36
11	1.78	2.54	11	2.03	3.05	11	2.06	3.05	11	1.89	2.80	11	2.14	3.19
12	1.70	2.42	12	1.94	2.91	12	1.96	2.91	12	1.81	2.68	12	2.04	3.05
13	1.62	2.32	13	1.86	2.78	13	1.88	2.78	13	1.74	2.58	13	1.96	2.92
14	1.56	2.23	14	1.78	2.67	14	1.80	2.67	14	1.68	2.48	14	1.88	2.81
15	1.50	2.14	15	1.71	2.57	15	1.74	2.57	15	1.62	2.40	15	1.81	2.71
16	1.45	2.07	16	1.66	2.48	16	1.68	2.48	16	1.57	2.32	16	1.75	2.62
17	1.40	2.00	17	1.60	2.40	17	1.62	2.40	17	1.52	2.25	17	1.70	2.54
18	1.36	1.94	18	1.55	2.33	18	1.57	2.33	18	1.48	2.19	18	1.65	2.46
19	1.32	1.88	19	1.51	2.26	19	1.52	2.26	19	1.44	2.13	19	1.60	2.39
20	1.28	1.83	20	1.46	2.20	20	1.48	2.20	20	1.40	2.08	20	1.56	2.33
22	1.22	1.74	22	1.39	2.08	22	1.41	2.08	22	1.34	1.98	22	1.48	2.21
24	1.16	1.66	24	1.32	1.99	24	1.34	1.99	24	1.28	1.90	24	1.41	2.11
26	1.11	1.58	26	1.27	1.90	26	1.28	1.90	26	1.23	1.82	26	1.36	2.03
28	1.06	1.52	28	1.22	1.82	28	1.23	1.82	28	1.19	1.76	28	1.30	1.95
30	1.02	1.46	30	1.17	1.76	30	1.19	1.76	30	1.15	1.70	30	1.26	1.88
32	.99	1.41	32	1.13	1.70	32	1.14	1.70	32	1.11	1.64	32	1.21	1.81
34	.96	1.37	34	1.09	1.64	34	1.11	1.64	34	1.08	1.59	34	1.18	1.76
36	.93	1.32	36	1.06	1.59	36	1.07	1.59	36	1.05	1.55	36	1.14	1.70
38	.90	1.29	38	1.03	1.54	38	1.04	1.54	38	1.02	1.51	38	1.11	1.66
40	.87	1.25	40	1.00	1.50	40	1.01	1.50	40	.99	1.47	40	1.08	1.61
45	.82	1.17	45	.94	1.41	45	.95	1.41	45	.94	1.39	45	1.01	1.51
50	.77	1.11	50	.88	1.33	50	.90	1.33	50	.89	1.31	50	.96	1.43
55	.73	1.05	55	.84	1.26	55	.85	1.26	55	.85	1.25	55	.91	1.36
60	.70	1.00	60	.80	1.20	60	.81	1.20	60	.81	1.20	60	.87	1.30
65	.67	.96	65	.77	1.15	65	.78	1.15	65	.78	1.15	65	.83	1.25
70	.64	.92	70	.73	1.10	70	.74	1.10	70	.75	1.11	70	.80	1.20
75	.62	.88	75	.71	1.06	75	.72	1.06	75	.72	1.07	75	.77	1.15
80	.60	.85	80	.68	1.02	80	.69	1.02	80	.70	1.04	80	.75	1.12
85	.58	.83	85	.66	.99	85	.67	.99	85	.68	1.01	85	.72	1.08
SLOPE = .550			SLOPE = .550			SLOPE = .550			SLOPE = .500			SLOPE = .530		

RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY-DURATION CURVES DATA

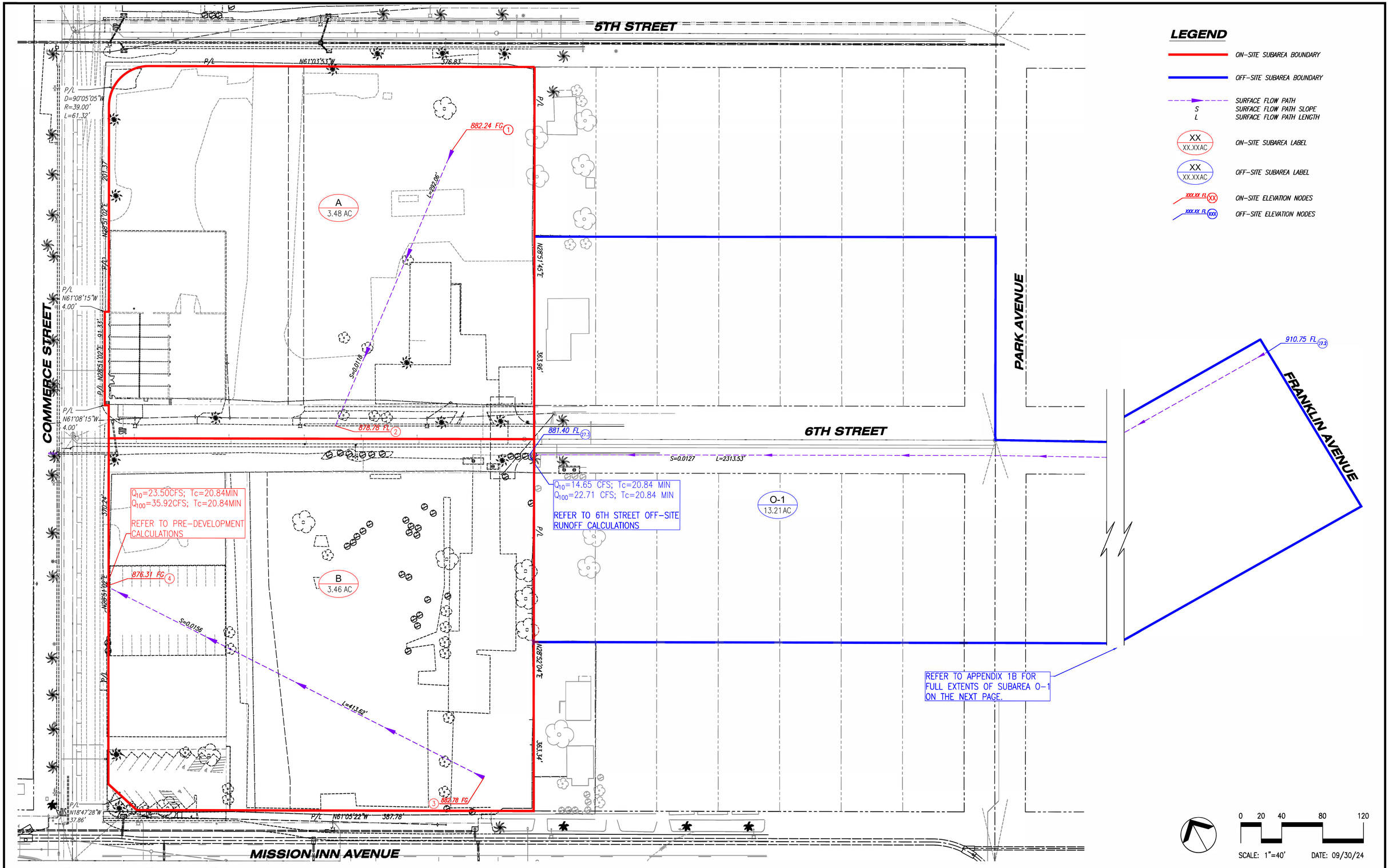
PLATE D-4.1(5 of 6)


Project Location
Slope=0.55
.55
.50
.45
.58
.60
.63
NOTES
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SLOPE OF INTENSITY DURATION CURVE
PLATE D-4.6

APPENDICES

Appendix 1

Pre-Development Hydrology Map



IRON LOFTS

IRON LOFTS, LLC

PRE-DEVELOPMENT HYDROLOGY MAP

RIVERSIDE, CALIFORNIA

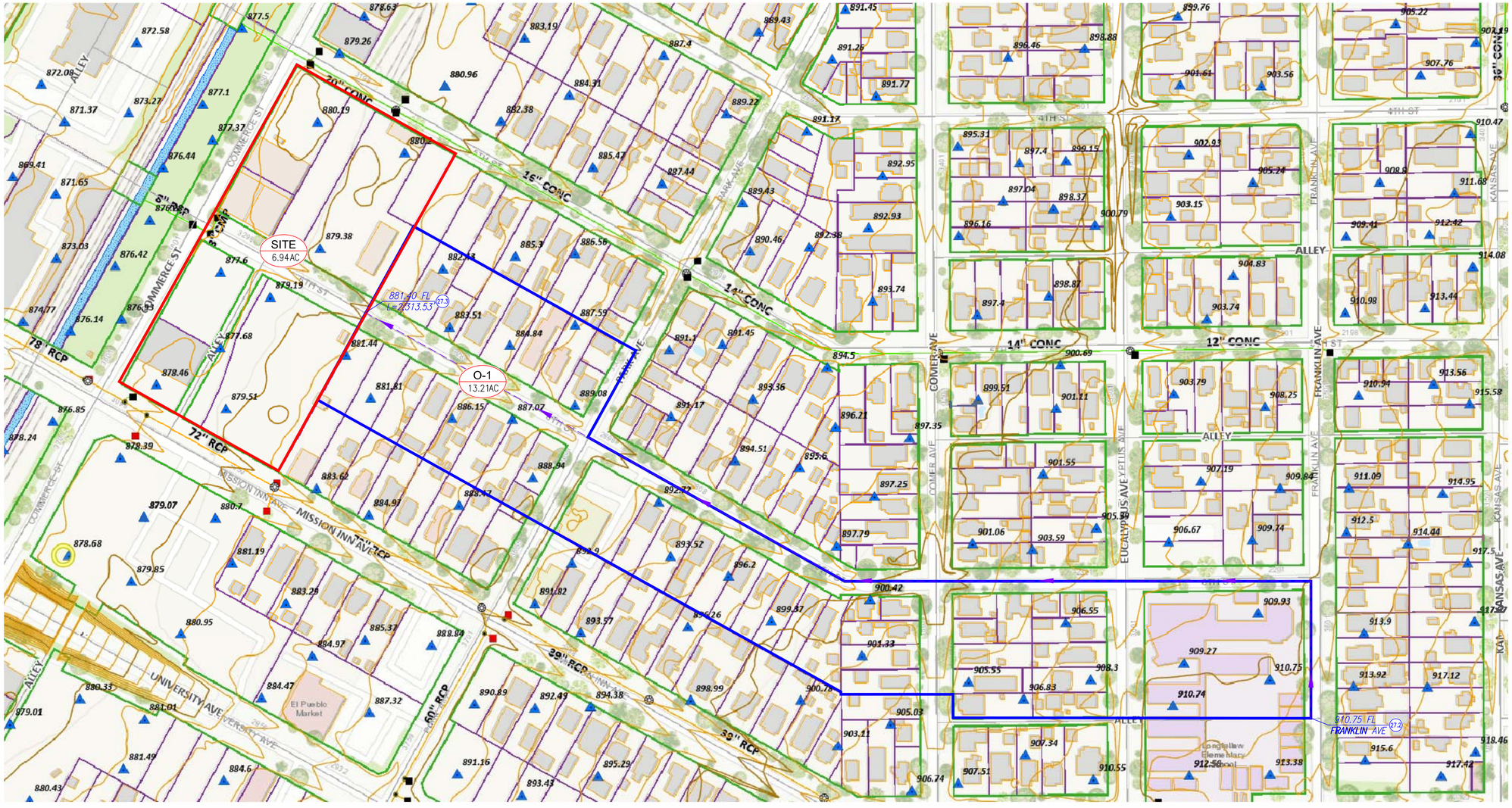
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17530 Von Karman Ave. - Suite 200 Tel (949) 756-6440
Irvine, California 92614

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LEGEND

- ON-SITE SUBAREA BOUNDARY
- OFF-SITE SUBAREA BOUNDARY
- SURFACE FLOW PATH ON-SITE
- X / X.XXAC — SUBAREA LABEL

NOTE: STUDY CONDUCTED FOR THE OFF-SITE DRAINAGE AREA IS BASED ON THE CITY OF RIVERSIDE GIS MAP DATA INCLUDING SPOT ELEVATIONS AND THE CITY DRAINAGE SYSTEM.



0 40 80 120 200

SCALE: 1:2,257 DATE: 08/05/24

IRON LOFTS

IRON LOFTS, LLC

PRE-DEVELOPMENT HYDROLOGY MAP-OFFSTE DRAINAGE AREA

RIVERSIDE, CALIFORNIA

KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
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Irvine, California 92614

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Appendix 1.1

Pre-Development Hydrology Calculations: On-Site plus Off-Site Runoff

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                           Analysis prepared by:

                               KHR Associates
                            17530 Von Karman Avenue
                                Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* PRE-DEVELOPMENT HYDROLOGY - INCLUDING OFF-SITE AREA                   *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: RIL1-E10.DAT
  TIME/DATE OF STUDY: 09:30 08/05/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   292.06
  UPSTREAM ELEVATION(FEET) =    882.24
  DOWNSTREAM ELEVATION(FEET) =    878.78
  ELEVATION DIFFERENCE(FEET) =      3.46
  TC = 0.303*[(  292.06**3)/(     3.46)]**.2 =    7.129
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.603
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8832
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      8.00
  TOTAL AREA(ACRES) =      3.48   TOTAL RUNOFF(CFS) =      8.00

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.20 TO NODE     27.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2313.53
  UPSTREAM ELEVATION(FEET) =    910.75
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =     29.35
  TC = 0.393*[( 2313.53**3)/(    29.35)]**.2 =   20.845
```

```
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.444
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7681
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     14.65
  TOTAL AREA(ACRES) =     13.21   TOTAL RUNOFF(CFS) =     14.65

+---------------------------------------------------------------------------+
| SUBAREA O-1                                                               |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     27.30 TO NODE     27.30 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.30 TO NODE     27.30 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   413.62
  UPSTREAM ELEVATION(FEET) =    882.78
  DOWNSTREAM ELEVATION(FEET) =    876.31
  ELEVATION DIFFERENCE(FEET) =      6.47
  TC = 0.303*[(  413.62**3)/(     6.47)]**.2 =    7.751
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.486
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.59
  TOTAL AREA(ACRES) =      3.46   TOTAL RUNOFF(CFS) =      7.59

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.59     7.75       2.486        3.46
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.00 =     413.62 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.00     7.13       2.603        3.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     292.06 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      14.98       7.13        2.603
      2      15.23       7.75        2.486

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.23   Tc(MIN.) =    7.75
  TOTAL AREA(ACRES) =        6.9

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.98     7.13       2.603        6.94
      2       15.23     7.75       2.486        6.94
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.00 =     413.62 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.65    20.84       1.444       13.21
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE      4.00 =    2313.53 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      19.99       7.13        2.603
      2      20.68       7.75        2.486
      3      23.50      20.84        1.444

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.50   Tc(MIN.) =   20.84
  TOTAL AREA(ACRES) =       20.1
```

```
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       20.1  TC(MIN.) =     20.84
  PEAK FLOW RATE(CFS)   =      23.50
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       19.99       7.13
  2       20.68       7.75
  3       23.50      20.84
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS
```



```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* PRE-DEVELOPMENT HYDROLOGY - INCLUDING OFF-SITE AREA                   *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: RIL1-E10.DAT
  TIME/DATE OF STUDY: 09:30 08/05/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   292.06
  UPSTREAM ELEVATION(FEET) =    882.24
  DOWNSTREAM ELEVATION(FEET) =    878.78
  ELEVATION DIFFERENCE(FEET) =      3.46
  TC = 0.303*[(  292.06**3)/(     3.46)]**.2 =    7.129
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.865
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     11.94
  TOTAL AREA(ACRES) =      3.48   TOTAL RUNOFF(CFS) =     11.94

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.20 TO NODE     27.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2313.53
  UPSTREAM ELEVATION(FEET) =    910.75
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =     29.35
  TC = 0.393*[( 2313.53**3)/(    29.35)]**.2 =   20.845
```

```
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.145
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8017
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     22.71
  TOTAL AREA(ACRES) =     13.21   TOTAL RUNOFF(CFS) =     22.71

+---------------------------------------------------------------------------+
| SUBAREA O-1                                                               |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     27.30 TO NODE     27.30 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.30 TO NODE     27.30 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   413.62
  UPSTREAM ELEVATION(FEET) =    882.78
  DOWNSTREAM ELEVATION(FEET) =    876.31
  ELEVATION DIFFERENCE(FEET) =      6.47
  TC = 0.303*[(  413.62**3)/(     6.47)]**.2 =    7.751
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.692
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8874
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     11.34
  TOTAL AREA(ACRES) =      3.46   TOTAL RUNOFF(CFS) =     11.34

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 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       11.34     7.75       3.692        3.46
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.00 =     413.62 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.94     7.13       3.865        3.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     292.06 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      22.37       7.13        3.865
      2      22.74       7.75        3.692

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.74   Tc(MIN.) =    7.75
  TOTAL AREA(ACRES) =        6.9

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.37     7.13       3.865        6.94
      2       22.74     7.75       3.692        6.94
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.00 =     413.62 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.71    20.84       2.145       13.21
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE      4.00 =    2313.53 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      30.14       7.13        3.865
      2      31.19       7.75        3.692
      3      35.92      20.84        2.145

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.92   Tc(MIN.) =   20.84
  TOTAL AREA(ACRES) =       20.1
```

```
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       20.1  TC(MIN.) =     20.84
  PEAK FLOW RATE(CFS)   =      35.92
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       30.14       7.13
  2       31.19       7.75
  3       35.92      20.84
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```



Appendix 1.2

Pre-Development Hydrology Calculations:

6th Street Off-Site Runoff

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* PRE-DEVELOPMENT HYDROLOGY - 6TH STREET OFF-SITE RUNOFF                *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: 6TH-FR.DAT
  TIME/DATE OF STUDY: 17:26 08/02/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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     26.10 TO NODE     26.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2313.53
  UPSTREAM ELEVATION(FEET) =    910.75
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =     29.35
  TC = 0.393*[( 2313.53**3)/(    29.35)]**.2 =   20.845
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.444
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7681
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     14.65
  TOTAL AREA(ACRES) =     13.21   TOTAL RUNOFF(CFS) =     14.65

+----------------------------------------------------------------------------+
| SUBAREA O-1 TO PROPOSED CITY CATCH BASIN                                   |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       13.2  TC(MIN.) =     20.84
  PEAK FLOW RATE(CFS)   =      14.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* PRE-DEVELOPMENT HYDROLOGY - 6TH STREET OFF-SITE RUNOFF                *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: 6TH-FR.DAT
  TIME/DATE OF STUDY: 17:26 08/02/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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:
```

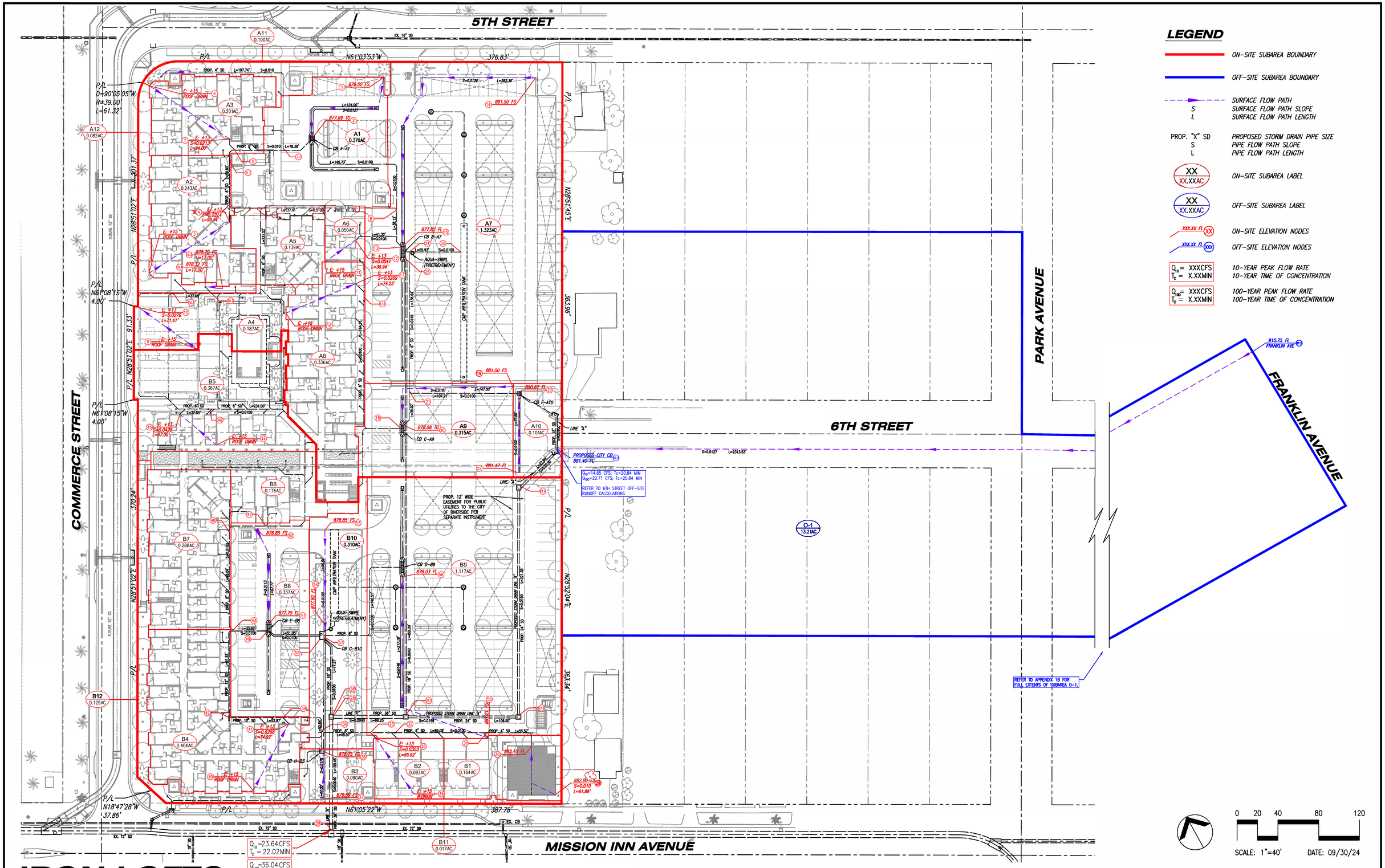
```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     26.10 TO NODE     26.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2313.53
  UPSTREAM ELEVATION(FEET) =    910.75
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =     29.35
  TC = 0.393*[( 2313.53**3)/(    29.35)]**.2 =   20.845
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.145
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8017
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     22.71
  TOTAL AREA(ACRES) =     13.21   TOTAL RUNOFF(CFS) =     22.71

+--------------------------------------------------------------------------+
| SUBAREA O-1 TO PROPOSED CITY CATCH BASIN                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       13.2  TC(MIN.) =     20.84
  PEAK FLOW RATE(CFS)   =      22.71
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix 2

Post-Development Hydrology Map



LEGEND

- ON-SITE SUBAREA BOUNDARY
- OFF-SITE SUBAREA BOUNDARY
- SURFACE FLOW PATH
  - S = SURFACE FLOW PATH SLOPE
  - L = SURFACE FLOW PATH LENGTH
- PROP. "X" SD = PROPOSED STORM DRAIN PIPE SIZE
  - S = PIPE FLOW PATH SLOPE
  - L = PIPE FLOW PATH LENGTH
- XX / XX.XXAC — ON-SITE SUBAREA LABEL
- XX / XX.XXAC — OFF-SITE SUBAREA LABEL
- XXX.XX FL (XX) — ON-SITE ELEVATION NODES
- XXX.XX FL (XX) — OFF-SITE ELEVATION NODES
- Q_{10}= XXX CFS; T_c = X.XX MIN — 10-YEAR PEAK FLOW RATE; 10-YEAR TIME OF CONCENTRATION
- Q_{100}= XXX CFS; T_c = X.XX MIN — 100-YEAR PEAK FLOW RATE; 100-YEAR TIME OF CONCENTRATION

0 20 40 80 120

SCALE: 1"=40' DATE: 09/30/24

IRON LOFTS

IRON LOFTS, LLC

POST-DEVELOPMENT HYDROLOGY MAP

RIVERSIDE, CALIFORNIA

KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
17530 Von Karman Ave. - Suite 200 Tel (949) 756-6440
Irvine, California 92614

R:\Realm-Riverside-Iron Lofts\Documents\Hydrology\Final\Site 1\CAD\XRL1-HYDRO-PROP.dwg Sep 30, 2024 - 2:55pm

Appendix 2.1

Post-Development Hydrology Calculations: On-Site plus Off-Site Runoff

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - ON-SITE PLUS OFF-SITE RUNOFF             *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: RIL1-R10.DAT
  TIME/DATE OF STUDY: 09:51 08/05/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   124.00
  UPSTREAM ELEVATION(FEET) =    879.50
  DOWNSTREAM ELEVATION(FEET) =    877.89
  ELEVATION DIFFERENCE(FEET) =      1.61
  TC = 0.323*[(  124.00**3)/(     1.61)]**.2 =    5.290
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.066
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8706
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.37   TOTAL RUNOFF(CFS) =      0.99

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.44
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   93.44**3)/(     2.00)]**.2 =    4.275
```

```
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    59.80   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.67
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    5.22
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.10 =     153.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    13.79   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.67
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.27
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

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

```
 FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
 UPSTREAM ELEVATION(FEET) =     15.00
 DOWNSTREAM ELEVATION(FEET) =     13.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 TC = 0.323*[(   94.00**3)/(     2.00)]**.2 =    4.290
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    12.57   MANNING'S N =  0.009
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.55
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        0.55     5.03       3.151        0.20
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

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

```
      1        0.67     5.27       3.072        0.24
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.19       5.03        3.151
      2       1.21       5.27        3.072

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.21   Tc(MIN.) =    5.27
  TOTAL AREA(ACRES) =        0.4

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.072
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7531
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.45
  TC(MIN.) =    5.27

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      2.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    78.38   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.45
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.51
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

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

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.44     5.27       3.072        0.55
      2        1.45     5.51       2.998        0.55
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.99     5.29       3.066        0.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =     124.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.42       5.27        3.072
      2       2.42       5.29        3.066
      3       2.41       5.51        2.998

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.42   Tc(MIN.) =    5.29
  TOTAL AREA(ACRES) =        0.9

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

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      8.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   145.73   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    5.68
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
------------------------------------------------------------------------------
```

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

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    71.61
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   71.61**3)/(     2.00)]**.2 =    3.644
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    45.35   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.56
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.12
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.10 =     116.96 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.68   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.56
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.30 TO NODE     10.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    17.00
  UPSTREAM ELEVATION(FEET) =    878.70
  DOWNSTREAM ELEVATION(FEET) =    878.32
  ELEVATION DIFFERENCE(FEET) =      0.38
  TC = 0.937*[(   17.00**3)/(     0.38)]**.2 =    6.226
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.804
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7416
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE     10.40 TO NODE     10.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     8.88   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.4 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.20
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.17     6.27       2.792        0.08
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.56     5.26       3.075        0.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       0.71       5.26        3.075
      2       0.68       6.27        2.792

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.71   Tc(MIN.) =    5.26
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.50 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   131.52   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
```

```
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.71
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    5.75
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.50 =     286.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE     10.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.930
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7472
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.92
  TC(MIN.) =    5.75

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   137.41   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.92
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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        0.92     6.20       2.809        0.39
      2        0.88     7.22       2.584        0.39
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.42     5.66       2.955        0.92
      2        2.42     5.68       2.949        0.92
```

```
      3        2.41     5.90       2.889        0.92
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.26       5.66        2.955
      2       3.27       5.68        2.949
      3       3.29       5.90        2.889
      4       3.27       6.20        2.809
      5       3.04       7.22        2.584

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.29   Tc(MIN.) =    5.90
  TOTAL AREA(ACRES) =        1.3

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    38.12   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    36.94
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   36.94**3)/(     2.00)]**.2 =    2.450
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    41.32   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.07
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.14
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    5.22
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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        0.14     5.22       3.087        0.05
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

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

```
     1        3.26     5.77       2.925        1.30
     2        3.27     5.78       2.920        1.30
     3        3.29     6.00       2.861        1.30
     4        3.27     6.31       2.783        1.30
     5        3.04     7.32       2.565        1.30
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       3.10       5.22        3.087
     2       3.39       5.77        2.925
     3       3.40       5.78        2.920
     4       3.42       6.00        2.861
     5       3.39       6.31        2.783
     6       3.15       7.32        2.565

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.42   Tc(MIN.) =    6.00
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   282.36
  UPSTREAM ELEVATION(FEET) =    881.50
  DOWNSTREAM ELEVATION(FEET) =    877.80
```

```
  ELEVATION DIFFERENCE(FEET) =      3.70
  TC = 0.323*[(  282.36**3)/(     3.70)]**.2 =    7.339
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.562
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8659
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      1.32   TOTAL RUNOFF(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.93     7.34       2.562        1.32
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     15.00 =     282.36 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.10     5.22       3.087        1.35
      2        3.39     5.77       2.925        1.35
      3        3.40     5.78       2.920        1.35
      4        3.42     6.00       2.861        1.35
      5        3.39     6.31       2.783        1.35
      6        3.15     7.32       2.565        1.35
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     15.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.18       5.22        3.087
      2       5.70       5.77        2.925
      3       5.71       5.78        2.920
      4       5.82       6.00        2.861
      5       5.92       6.31        2.783
      6       6.08       7.32        2.565
      7       6.08       7.34        2.562

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.08   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        2.7

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

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

**************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  13
--------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.23
 UPSTREAM ELEVATION(FEET) =     15.00
 DOWNSTREAM ELEVATION(FEET) =     13.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 TC = 0.323*[(   74.23**3)/(     2.00)]**.2 =    3.723
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.80

**************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.10 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    15.20   MANNING'S N =  0.009
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.80
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     17.10 =      89.43 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   164.51   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.80
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    5.60
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     253.94 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   147.00
  UPSTREAM ELEVATION(FEET) =    881.00
  DOWNSTREAM ELEVATION(FEET) =    878.08
  ELEVATION DIFFERENCE(FEET) =      2.92
  TC = 0.323*[(  147.00**3)/(     2.92)]**.2 =    5.201
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.095
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8708
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.85     5.20       3.095        0.31
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     20.00 =     147.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.80     5.60       2.972        0.29
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     20.00 =     253.94 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.59       5.20        3.095
      2       1.61       5.60        2.972

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.61   Tc(MIN.) =    5.60
  TOTAL AREA(ACRES) =        0.6

******************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    35.92   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.61
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  10
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
```

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

******************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  13
------------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==============================================================================

******************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
------------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.86
 UPSTREAM ELEVATION(FEET) =    881.47
 DOWNSTREAM ELEVATION(FEET) =    880.67
 ELEVATION DIFFERENCE(FEET) =      0.80
 TC = 0.937*[(   77.86**3)/(     0.80)]**.2 =   13.369
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.843
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6792
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.13

******************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     21.00 IS CODE =  41
------------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   107.21   MANNING'S N =  0.009
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.93
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.13
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   13.98
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

******************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  11
------------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

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

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.13    13.98       1.798        0.10
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.59     5.28       3.071        0.60
      2        1.61     5.67       2.951        0.60
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.64       5.28        3.071
      2       1.66       5.67        2.951
      3       1.11      13.98        1.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.66   Tc(MIN.) =    5.67
  TOTAL AREA(ACRES) =        0.7

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   136.64   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.47
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.66
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    5.94
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.64     5.55       2.987        0.70
      2        1.66     5.94       2.877        0.70
      3        1.11    14.38       1.770        0.70
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.18     5.22       3.087        2.68
      2        5.70     5.77       2.925        2.68
      3        5.71     5.78       2.920        2.68
      4        5.82     6.00       2.861        2.68
      5        5.92     6.31       2.783        2.68
      6        6.08     7.32       2.565        2.68
      7        6.08     7.34       2.562        2.68
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     24.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       6.73       5.22        3.087
      2       7.12       5.55        2.987
      3       7.31       5.77        2.925
      4       7.33       5.78        2.920
      5       7.42       5.94        2.877
      6       7.47       6.00        2.861
      7       7.53       6.31        2.783
      8       7.56       7.32        2.565
      9       7.56       7.34        2.562
     10       5.31      14.38        1.770

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.56   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        3.4

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.93   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.52
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     25.00 =     517.62 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   255.17   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.00 =     772.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   279.97   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.10 =    1052.76 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
```

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

****************************************************************************
  FLOW PROCESS FROM NODE     27.20 TO NODE     27.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2313.53
  UPSTREAM ELEVATION(FEET) =    910.75
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =     29.35
  TC = 0.393*[( 2313.53**3)/(    29.35)]**.2 =   20.845
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.444
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7681
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     14.65
  TOTAL AREA(ACRES) =     13.21   TOTAL RUNOFF(CFS) =     14.65

****************************************************************************
  FLOW PROCESS FROM NODE     27.30 TO NODE     27.40 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0125
  FLOW LENGTH(FEET) =    22.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   20.89
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.40 =    2336.43 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.40 TO NODE     27.50 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   221.35   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   21.31
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.50 =    2557.78 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.50 TO NODE     27.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   106.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   21.51
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.10 =    2664.28 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.65    21.51       1.419       13.21
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.10 =    2664.28 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.73     6.94       2.642        3.38
      2        7.12     7.24       2.580        3.38
      3        7.31     7.45       2.540        3.38
      4        7.33     7.47       2.537        3.38
      5        7.42     7.62       2.509        3.38
      6        7.47     7.68       2.498        3.38
      7        7.53     7.99       2.445        3.38
      8        7.56     9.00       2.290        3.38
      9        7.56     9.02       2.288        3.38
     10        5.31    16.19       1.659        3.38
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.10 =    1052.76 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      11.45       6.94        2.642
      2      12.05       7.24        2.580
      3      12.39       7.45        2.540
      4      12.42       7.47        2.537
```

```
      5      12.61       7.62        2.509
      6      12.70       7.68        2.498
      7      12.97       7.99        2.445
      8      13.69       9.00        2.290
      9      13.70       9.02        2.288
     10      16.33      16.19        1.659
     11      19.34      21.51        1.419

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.34   Tc(MIN.) =   21.51
  TOTAL AREA(ACRES) =       16.6

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    71.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.34
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   21.72
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     28.00 =    2735.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.88
  UPSTREAM ELEVATION(FEET) =    882.80
  DOWNSTREAM ELEVATION(FEET) =    882.10
  ELEVATION DIFFERENCE(FEET) =      0.70
  TC = 0.323*[(   61.88**3)/(     0.70)]**.2 =    4.118
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.57   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.18
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     117.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    89.09   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.16
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    5.54
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =     206.54 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    23.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.09
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   65.92**3)/(     2.00)]**.2 =    3.467
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =     2.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.46
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.26
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.26     5.01       3.159        0.09
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.45     5.63       2.963        0.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       0.66       5.01        3.159
      2       0.69       5.63        2.963

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.69   Tc(MIN.) =    5.63
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.57   MANNING'S N =  0.009
```

```
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.69
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =    879.59
  DOWNSTREAM ELEVATION(FEET) =    878.75
  ELEVATION DIFFERENCE(FEET) =      0.84
  TC = 0.937*[(   47.00**3)/(     0.84)]**.2 =    9.780
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.188
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7066
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    14.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.88
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.14
```

```
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.86
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        0.14     9.86       2.178        0.09
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        0.66     5.19       3.100        0.26
     2        0.69     5.81       2.913        0.26
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       0.73       5.19        3.100
     2       0.77       5.81        2.913
     3       0.66       9.86        2.178

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       0.77   Tc(MIN.) =    5.81
 TOTAL AREA(ACRES) =        0.3

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    52.84   MANNING'S N =  0.009
 DEPTH OF FLOW IN  10.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.72
 GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.77
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.99
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     331.45 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  10
```

```
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================
  ***MEMORY BANK #  3 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   74.92**3)/(     2.00)]**.2 =    3.744
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     7.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.11
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  11
```

```
------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.11     5.01       3.159        0.40
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.66     5.19       3.100        0.26
      2        0.69     5.81       2.913        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.75       5.01        3.159
      2       1.75       5.19        3.100
      3       1.72       5.81        2.913

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.75   Tc(MIN.) =    5.19
  TOTAL AREA(ACRES) =        0.7

************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  12
------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    52.87   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.83
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.75
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.34
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     42.00 =     331.48 FEET.

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

```
 FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    91.61   MANNING'S N =  0.010
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.75
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.62
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
 UPSTREAM ELEVATION(FEET) =     15.00
 DOWNSTREAM ELEVATION(FEET) =     13.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 TC = 0.323*[(   47.00**3)/(     2.00)]**.2 =    2.830
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.97
 TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      0.97

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    32.65   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.97
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.11
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =      79.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.97
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    5.87
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     310.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.895
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8691
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.56
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.53
  TC(MIN.) =    5.87

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    40.21   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.53
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     350.86 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.863
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8689
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.72
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.25
  TC(MIN.) =    6.00

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    98.04   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.25
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.25     6.25       2.798        0.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.75     5.44       3.018        0.66
      2        1.75     5.62       2.966        0.66
      3        1.72     6.24       2.800        0.66
```

```
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.71       5.44        3.018
      2       3.77       5.62        2.966
      3       3.97       6.24        2.800
      4       3.97       6.25        2.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.97   Tc(MIN.) =    6.25
  TOTAL AREA(ACRES) =        1.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    33.92   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.97
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.34
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     482.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.11
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.75
  ELEVATION DIFFERENCE(FEET) =      1.10
  TC = 0.323*[(   97.11**3)/(     1.10)]**.2 =    4.930
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.93
  TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      0.93

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.93     5.00       3.163        0.34
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =      97.11 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.71     5.53       2.992        1.52
      2        3.77     5.71       2.940        1.52
      3        3.97     6.33       2.778        1.52
      4        3.97     6.34       2.777        1.52
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     51.00 =     482.82 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.28       5.00        3.163
      2       4.59       5.53        2.992
      3       4.64       5.71        2.940
      4       4.78       6.33        2.778
      5       4.78       6.34        2.777

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.78   Tc(MIN.) =    6.34
  TOTAL AREA(ACRES) =        1.9
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    51.05   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.78
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     52.00 =     533.87 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.84
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.60
  ELEVATION DIFFERENCE(FEET) =      1.25
  TC = 0.323*[(   96.84**3)/(     1.25)]**.2 =    4.798
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   217.19
  UPSTREAM ELEVATION(FEET) =    881.21
  DOWNSTREAM ELEVATION(FEET) =    878.03
  ELEVATION DIFFERENCE(FEET) =      3.18
  TC = 0.323*[(  217.19**3)/(     3.18)]**.2 =    6.463
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.747
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8678
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      1.12   TOTAL RUNOFF(CFS) =      2.66

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   140.51   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.66
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    6.77
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.66     6.77       2.678        1.12
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.85     5.00       3.163        0.31
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     57.00 =      96.84 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.82       5.00        3.163
      2       3.39       6.77        2.678

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.39   Tc(MIN.) =    6.77
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.82     5.00       3.163        1.43
      2        3.39     6.77       2.678        1.43
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.28     5.13       3.120        1.86
      2        4.59     5.66       2.956        1.86
      3        4.64     5.83       2.906        1.86
      4        4.78     6.45       2.749        1.86
      5        4.78     6.46       2.748        1.86
```

```
 LONGEST FLOWPATH FROM NODE     44.00 TO NODE     57.00 =     533.87 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       7.00       5.00        3.163
     2       7.06       5.13        3.120
     3       7.42       5.66        2.956
     4       7.56       5.83        2.906
     5       8.01       6.45        2.749
     6       8.01       6.46        2.748
     7       8.05       6.77        2.678

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.05   Tc(MIN.) =    6.77
 TOTAL AREA(ACRES) =        3.3

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    77.27   MANNING'S N =  0.010
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.89
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.05
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.93
 LONGEST FLOWPATH FROM NODE     44.00 TO NODE     58.00 =     611.14 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	7.00	5.17	3.105	3.29
2	7.06	5.29	3.065	3.29
3	7.42	5.82	2.909	3.29
4	7.56	6.00	2.862	3.29
5	8.01	6.62	2.712	3.29
6	8.01	6.62	2.710	3.29
7	8.05	6.93	2.643	3.29

LONGEST FLOWPATH FROM NODE 44.00 TO NODE 58.00 = 611.14 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	11.45	7.18	2.594	16.59
2	12.05	7.48	2.535	16.59
3	12.39	7.69	2.497	16.59
4	12.42	7.70	2.494	16.59
5	12.61	7.85	2.468	16.59
6	12.70	7.91	2.458	16.59
7	12.97	8.22	2.407	16.59
8	13.69	9.23	2.259	16.59
9	13.70	9.24	2.257	16.59
10	16.33	16.40	1.647	16.59
11	19.34	21.72	1.412	16.59

LONGEST FLOWPATH FROM NODE 27.20 TO NODE 58.00 = 2735.53 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	15.33	5.17	3.105
2	15.60	5.29	3.065
3	16.80	5.82	2.909
4	17.23	6.00	2.862
5	18.68	6.62	2.712
6	18.69	6.62	2.710
7	19.22	6.93	2.643
8	19.35	7.18	2.594
9	19.77	7.48	2.535
10	19.99	7.69	2.497
11	20.01	7.70	2.494
12	20.13	7.85	2.468
13	20.19	7.91	2.458
14	20.30	8.22	2.407
15	20.57	9.23	2.259
16	20.57	9.24	2.257
17	21.35	16.40	1.647
18	23.64	21.72	1.412

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.64   Tc(MIN.) =   21.72
  TOTAL AREA(ACRES) =       19.9

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   109.46   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.64
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   22.02
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     59.00 =    2844.99 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       19.9  TC(MIN.) =     22.02
  PEAK FLOW RATE(CFS)   =      23.64
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       15.33       5.51
  2       15.60       5.63
  3       16.80       6.15
  4       17.23       6.33
  5       18.68       6.94
  6       18.69       6.94
  7       19.22       7.25
  8       19.35       7.49
  9       19.77       7.79
 10       19.99       8.00
 11       20.01       8.02
 12       20.13       8.17
 13       20.19       8.23
 14       20.30       8.53
 15       20.57       9.54
 16       20.57       9.56
 17       21.35      16.71
 18       23.64      22.02
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS



```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                  (Rational Tabling Version 23.0)
              Release Date: 07/01/2016  License ID 1681

                        Analysis prepared by:

                            KHR Associates
                          17530 Von Karman Avenue
                              Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - ON-SITE PLUS OFF-SITE RUNOFF             *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: RIL1-R10.DAT
  TIME/DATE OF STUDY: 09:52 08/05/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   124.00
  UPSTREAM ELEVATION(FEET) =    879.50
  DOWNSTREAM ELEVATION(FEET) =    877.89
  ELEVATION DIFFERENCE(FEET) =      1.61
  TC = 0.323*[(  124.00**3)/(     1.61)]**.2 =    5.290
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.554
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8791
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.48
  TOTAL AREA(ACRES) =      0.37   TOTAL RUNOFF(CFS) =      1.48

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.44
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   93.44**3)/(     2.00)]**.2 =    4.275
```

```
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    59.80   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.19
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.10 =     153.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    13.79   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   94.00**3)/(     2.00)]**.2 =    4.290
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    12.57   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.83
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.02
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.83     5.02       4.686        0.20
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.24       4.577        0.24
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.79       5.02        4.686
      2       1.82       5.24        4.577

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.82   Tc(MIN.) =    5.24
  TOTAL AREA(ACRES) =        0.4

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.577
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7959
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.19
  TC(MIN.) =    5.24

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      2.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    78.38   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.19
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

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

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.17     5.23       4.582        0.55
      2        2.19     5.45       4.480        0.55
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.48     5.29       4.554        0.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =     124.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.64       5.23        4.582
      2       3.64       5.29        4.554
      3       3.64       5.45        4.480

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.64   Tc(MIN.) =    5.45
  TOTAL AREA(ACRES) =        0.9

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   145.73   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.64
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    71.61
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   71.61**3)/(     2.00)]**.2 =    3.644
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.84
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.84

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    45.35   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.84
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.08
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.10 =     116.96 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.68   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.84
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.30 TO NODE     10.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    17.00
  UPSTREAM ELEVATION(FEET) =    878.70
  DOWNSTREAM ELEVATION(FEET) =    878.32
  ELEVATION DIFFERENCE(FEET) =      0.38
  TC = 0.937*[(   17.00**3)/(     0.38)]**.2 =    6.226
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.164
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7868
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     10.40 TO NODE     10.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     8.88   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.15
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.28     6.27       4.147        0.08
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.84     5.23       4.584        0.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.07       5.23        4.584
      2       1.03       6.27        4.147

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.07   Tc(MIN.) =    5.23
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.50 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   131.52   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.50 =     286.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE     10.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.401
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7922
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.42
  TC(MIN.) =    5.63

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   137.41   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.42
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    6.05
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.42     6.05       4.231        0.39
      2        1.35     7.11       3.870        0.39
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.64     5.60       4.415        0.92
      2        3.64     5.65       4.390        0.92
      3        3.64     5.81       4.324        0.92
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.95       5.60        4.415
      2       4.97       5.65        4.390
      3       5.01       5.81        4.324
      4       4.98       6.05        4.231
      5       4.61       7.11        3.870

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.01   Tc(MIN.) =    5.81
  TOTAL AREA(ACRES) =        1.3

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    38.12   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.01
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.88
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    36.94
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   36.94**3)/(     2.00)]**.2 =    2.450
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    41.32   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.21
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.21
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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        0.21     5.21       4.594        0.05
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.95     5.67       4.385        1.30
      2        4.97     5.72       4.361        1.30
      3        5.01     5.88       4.296        1.30
      4        4.98     6.12       4.205        1.30
      5        4.61     7.19       3.848        1.30
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.75       5.21        4.594
      2       5.15       5.67        4.385
      3       5.16       5.72        4.361
      4       5.20       5.88        4.296
      5       5.17       6.12        4.205
      6       4.78       7.19        3.848

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.20   Tc(MIN.) =    5.88
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
       ASSUMED INITIAL SUBAREA UNIFORM
       DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   282.36
  UPSTREAM ELEVATION(FEET) =    881.50
  DOWNSTREAM ELEVATION(FEET) =    877.80
  ELEVATION DIFFERENCE(FEET) =      3.70
  TC = 0.323*[(  282.36**3)/(     3.70)]**.2 =    7.339
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.804
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8755
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.41
  TOTAL AREA(ACRES) =      1.32   TOTAL RUNOFF(CFS) =      4.41

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.41     7.34       3.804        1.32
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     15.00 =     282.36 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.75     5.21       4.594        1.35
      2        5.15     5.67       4.385        1.35
      3        5.16     5.72       4.361        1.35
      4        5.20     5.88       4.296        1.35
      5        5.17     6.12       4.205        1.35
      6        4.78     7.19       3.848        1.35
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     15.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       7.88       5.21        4.594
      2       8.55       5.67        4.385
      3       8.60       5.72        4.361
      4       8.73       5.88        4.296
      5       8.84       6.12        4.205
      6       9.10       7.19        3.848
      7       9.13       7.34        3.804

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.13   Tc(MIN.) =    7.34
```

```
  TOTAL AREA(ACRES) =        2.7

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.23
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   74.23**3)/(     2.00)]**.2 =    3.723
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    15.20   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.68
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.02
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     17.10 =      89.43 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   164.51   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.54
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     253.94 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   147.00
  UPSTREAM ELEVATION(FEET) =    881.00
  DOWNSTREAM ELEVATION(FEET) =    878.08
  ELEVATION DIFFERENCE(FEET) =      2.92
  TC = 0.323*[(  147.00**3)/(     2.92)]**.2 =    5.201
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.596
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8792
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.27
```

```
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.27     5.20       4.596        0.31
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     20.00 =     147.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.19     5.54       4.440        0.29
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     20.00 =     253.94 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.39       5.20        4.596
      2       2.42       5.54        4.440

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.42   Tc(MIN.) =    5.54
  TOTAL AREA(ACRES) =        0.6

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    35.92   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.34
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.59
```

```
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.86
  UPSTREAM ELEVATION(FEET) =    881.47
  DOWNSTREAM ELEVATION(FEET) =    880.67
  ELEVATION DIFFERENCE(FEET) =      0.80
  TC = 0.937*[(   77.86**3)/(     0.80)]**.2 =   13.369
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.737
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7384
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     21.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   107.21   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.40
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.20
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   13.90
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  11
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.20    13.90       2.679        0.10
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.39     5.25       4.573        0.60
      2        2.42     5.59       4.419        0.60
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.47       5.25        4.573
      2       2.51       5.59        4.419
      3       1.67      13.90        2.679

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.51   Tc(MIN.) =    5.59
  TOTAL AREA(ACRES) =        0.7

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  12
------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     24.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   136.64   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.51
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.77
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.47     5.43       4.488        0.70
      2        2.51     5.77       4.344        0.70
      3        1.67    14.16       2.652        0.70
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.88     5.21       4.594        2.68
      2        8.55     5.67       4.385        2.68
      3        8.60     5.72       4.361        2.68
      4        8.73     5.88       4.296        2.68
      5        8.84     6.12       4.205        2.68
      6        9.10     7.19       3.848        2.68
      7        9.13     7.34       3.804        2.68
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     24.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.25       5.21        4.594
      2      10.67       5.43        4.488
      3      11.01       5.67        4.385
      4      11.09       5.72        4.361
      5      11.07       5.77        4.344
      6      11.21       5.88        4.296
      7      11.27       6.12        4.205
      8      11.32       7.19        3.848
      9      11.33       7.34        3.804
     10       8.04      14.16        2.652

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.33   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        3.4

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.93   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  57.70
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     25.00 =     517.62 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   255.17   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.00 =     772.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   279.97   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    8.75
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.10 =    1052.76 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  10
```

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

************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  13
------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE     27.20 TO NODE     27.30 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2313.53
  UPSTREAM ELEVATION(FEET) =    910.75
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =     29.35
  TC = 0.393*[( 2313.53**3)/(    29.35)]**.2 =   20.845
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.145
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8017
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     22.71
  TOTAL AREA(ACRES) =     13.21   TOTAL RUNOFF(CFS) =     22.71

************************************************************************
  FLOW PROCESS FROM NODE     27.30 TO NODE     27.40 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0125
  FLOW LENGTH(FEET) =    22.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.90
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.71
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   20.89
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.40 =    2336.43 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     27.40 TO NODE     27.50 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   221.35   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.71
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   21.27
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.50 =    2557.78 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.50 TO NODE     27.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   106.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.71
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   21.45
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.10 =    2664.28 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 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       22.71    21.45       2.111       13.21
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     27.10 =    2664.28 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.25     6.76       3.980        3.38
      2       10.67     6.93       3.927        3.38
      3       11.01     7.11       3.870        3.38
      4       11.09     7.16       3.856        3.38
      5       11.07     7.21       3.843        3.38
      6       11.21     7.30       3.814        3.38
      7       11.27     7.53       3.751        3.38
      8       11.32     8.60       3.488        3.38
      9       11.33     8.75       3.455        3.38
     10        8.04    15.83       2.494        3.38
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.10 =    1052.76 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      17.41       6.76        3.980
      2      18.00       6.93        3.927
      3      18.54       7.11        3.870
      4      18.67       7.16        3.856
      5      18.70       7.21        3.843
      6      18.94       7.30        3.814
      7      19.24       7.53        3.751
      8      20.42       8.60        3.488
      9      20.59       8.75        3.455
     10      24.80      15.83        2.494
     11      29.63      21.45        2.111

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.63   Tc(MIN.) =   21.45
  TOTAL AREA(ACRES) =       16.6

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    71.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.33
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.63
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   21.64
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     28.00 =    2735.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  13
----------------------------------------------------------------------------
```

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

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.88
  UPSTREAM ELEVATION(FEET) =    882.80
  DOWNSTREAM ELEVATION(FEET) =    882.10
  ELEVATION DIFFERENCE(FEET) =      0.70
  TC = 0.323*[(   61.88**3)/(     0.70)]**.2 =    4.118
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.57   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.12
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     117.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    89.09   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =     206.54 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    23.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.53
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   65.92**3)/(     2.00)]**.2 =    3.467
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.38
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     2.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.40
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.38
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.38     5.01       4.693        0.09
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.68     5.53       4.442        0.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.00       5.01        4.693
      2       1.04       5.53        4.442

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.04   Tc(MIN.) =    5.53
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.57   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.04
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.69
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =    879.59
  DOWNSTREAM ELEVATION(FEET) =    878.75
  ELEVATION DIFFERENCE(FEET) =      0.84
  TC = 0.937*[(   47.00**3)/(     0.84)]**.2 =    9.780
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.250
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7599
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    14.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.25
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.22     9.85       3.236        0.09
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.17       4.613        0.26
      2        1.04     5.69       4.374        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.11       5.17        4.613
      2       1.17       5.69        4.374
      3       0.99       9.85        3.236

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.17   Tc(MIN.) =    5.69
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    52.84   MANNING'S N =  0.009
```

```
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    5.86
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     331.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================
  ***MEMORY BANK #  3 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   74.92**3)/(     2.00)]**.2 =    3.744
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     7.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.13
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.67
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.67     5.01       4.694        0.40
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.17       4.613        0.26
      2        1.04     5.69       4.374        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.64       5.01        4.694
      2       2.64       5.17        4.613
      3       2.60       5.69        4.374

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.64   Tc(MIN.) =    5.17
  TOTAL AREA(ACRES) =        0.7

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     42.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =    52.87   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     42.00 =     331.48 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    91.61   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.97
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   47.00**3)/(     2.00)]**.2 =    2.830
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
```

```
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.46
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.46

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    32.65   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.43
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.46
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.07
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =      79.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.46
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    5.77
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     310.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.340
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8782
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.85
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.31
  TC(MIN.) =    5.77

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    40.21   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.31
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.88
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     350.86 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.298
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8780
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.09
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.40
  TC(MIN.) =    5.88

************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     43.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    98.04   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.73
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.40
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.04
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

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

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.40     6.04       4.232        0.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.64     5.40       4.502        0.66
      2        2.64     5.56       4.430        0.66
      3        2.60     6.09       4.215        0.66
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.67       5.40        4.502
      2       5.76       5.56        4.430
      3       5.97       6.04        4.232
      4       5.98       6.09        4.215

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.98   Tc(MIN.) =    6.09
  TOTAL AREA(ACRES) =        1.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    33.92   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.98
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.16
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     482.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
```

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

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.11
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.75
  ELEVATION DIFFERENCE(FEET) =      1.10
  TC = 0.323*[(   97.11**3)/(     1.10)]**.2 =    4.930
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.39
  TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.39     5.00       4.697        0.34
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =      97.11 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.67     5.48       4.467        1.52
      2        5.76     5.64       4.397        1.52
      3        5.97     6.12       4.204        1.52
      4        5.98     6.16       4.187        1.52
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     51.00 =     482.82 FEET.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       6.57       5.00        4.697
      2       6.99       5.48        4.467
      3       7.07       5.64        4.397
      4       7.22       6.12        4.204
      5       7.22       6.16        4.187

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.22   Tc(MIN.) =    6.16
  TOTAL AREA(ACRES) =        1.9

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    51.05   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.22
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.28
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     52.00 =     533.87 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.84
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.60
  ELEVATION DIFFERENCE(FEET) =      1.25
  TC = 0.323*[(   96.84**3)/(     1.25)]**.2 =    4.798
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   217.19
  UPSTREAM ELEVATION(FEET) =    881.21
  DOWNSTREAM ELEVATION(FEET) =    878.03
  ELEVATION DIFFERENCE(FEET) =      3.18
  TC = 0.323*[(  217.19**3)/(     3.18)]**.2 =    6.463
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.080
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8770
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.00
  TOTAL AREA(ACRES) =      1.12   TOTAL RUNOFF(CFS) =      4.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   140.51   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.00
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    6.67
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.00     6.67       4.010        1.12
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.28     5.00       4.697        0.31
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     57.00 =      96.84 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.28       5.00        4.697
      2       5.09       6.67        4.010

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.09   Tc(MIN.) =    6.67
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.28     5.00       4.697        1.43
```

```
    2        5.09     6.67       4.010        1.43
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.57     5.11       4.639        1.86
      2        6.99     5.59       4.417        1.86
      3        7.07     5.75       4.349        1.86
      4        7.22     6.23       4.162        1.86
      5        7.22     6.28       4.146        1.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     57.00 =     533.87 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.70       5.00        4.697
      2      10.79       5.11        4.639
      3      11.26       5.59        4.417
      4      11.46       5.75        4.349
      5      11.98       6.23        4.162
      6      12.01       6.28        4.146
      7      12.07       6.67        4.010

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.07   Tc(MIN.) =    6.67
  TOTAL AREA(ACRES) =        3.3

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    77.27   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
```

```
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.07
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.82
 LONGEST FLOWPATH FROM NODE     44.00 TO NODE     58.00 =     611.14 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 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       10.70     5.15       4.619        3.29
     2       10.79     5.27       4.564        3.29
     3       11.26     5.74       4.352        3.29
     4       11.46     5.90       4.287        3.29
     5       11.98     6.38       4.108        3.29
     6       12.01     6.43       4.092        3.29
     7       12.07     6.82       3.961        3.29
 LONGEST FLOWPATH FROM NODE     44.00 TO NODE     58.00 =     611.14 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       17.41     6.97       3.912       16.59
     2       18.00     7.14       3.863       16.59
     3       18.54     7.32       3.809       16.59
     4       18.67     7.37       3.795       16.59
     5       18.70     7.41       3.783       16.59
     6       18.94     7.51       3.756       16.59
     7       19.24     7.74       3.695       16.59
     8       20.42     8.80       3.443       16.59
     9       20.59     8.95       3.412       16.59
    10       24.80    16.02       2.478       16.59
    11       29.63    21.64       2.101       16.59
 LONGEST FLOWPATH FROM NODE     27.20 TO NODE     58.00 =    2735.53 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      23.75       5.15        4.619
     2      24.13       5.27        4.564
     3      25.81       5.74        4.352
     4      26.41       5.90        4.287
     5      28.14       6.38        4.108
     6      28.29       6.43        4.092
     7      29.34       6.82        3.961
     8      29.33       6.97        3.912
```

```
      9      29.77       7.14        3.863
     10      30.15       7.32        3.809
     11      30.24       7.37        3.795
     12      30.23       7.41        3.783
     13      30.39       7.51        3.756
     14      30.51       7.74        3.695
     15      30.91       8.80        3.443
     16      30.99       8.95        3.412
     17      32.35      16.02        2.478
     18      36.04      21.64        2.101

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.04   Tc(MIN.) =   21.64
  TOTAL AREA(ACRES) =       19.9

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   109.46   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.04
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   21.92
  LONGEST FLOWPATH FROM NODE     27.20 TO NODE     59.00 =    2844.99 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       19.9  TC(MIN.) =     21.92
  PEAK FLOW RATE(CFS)   =      36.04
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       23.75       5.46
  2       24.13       5.57
  3       25.81       6.04
  4       26.41       6.20
  5       28.14       6.67
  6       28.29       6.72
  7       29.34       7.11
  8       29.33       7.26
  9       29.77       7.43
```

10	30.15	7.61
11	30.24	7.66
12	30.23	7.70
13	30.39	7.80
14	30.51	8.03
15	30.91	9.09
16	30.99	9.24
17	32.35	16.31
18	36.04	21.92

==========

==========

END OF RATIONAL METHOD ANALYSIS



```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                                Irvine, CA 92626



 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                             *
* POST-DEVELOPMENT HYDROLOGY - 6TH STREET RUNOFF NORTHERN HALF           *
* 10-YEAR STORM EVENT                                                    *
 ************************************************************************

  FILE NAME: 6TH-STU.DAT
  TIME/DATE OF STUDY: 15:24 07/26/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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     26.10 TO NODE     26.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   635.00
  UPSTREAM ELEVATION(FEET) =    888.00
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =      6.60
  TC = 0.393*[(  635.00**3)/(     6.60)]**.2 =   12.933
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.877
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7911
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      2.08   TOTAL RUNOFF(CFS) =      3.09

+--------------------------------------------------------------------------+
| SUBAREA O-2 TO PROPOSED CITY CATCH BASIN                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     26.20 TO NODE     26.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    31.08   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.09
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   13.04
  LONGEST FLOWPATH FROM NODE     26.10 TO NODE     26.30 =     666.08 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =     13.04
  PEAK FLOW RATE(CFS)   =       3.09
```

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



```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                            Analysis prepared by:

                                KHR Associates
                              17530 Von Karman Avenue
                                  Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - 6TH STREET RUNOFF NORTHERN HALF          *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: 6TH-STU.DAT
  TIME/DATE OF STUDY: 15:23 07/26/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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     26.10 TO NODE     26.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   635.00
  UPSTREAM ELEVATION(FEET) =    888.00
  DOWNSTREAM ELEVATION(FEET) =    881.40
  ELEVATION DIFFERENCE(FEET) =      6.60
  TC = 0.393*[(  635.00**3)/(     6.60)]**.2 =   12.933
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8204
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.76
  TOTAL AREA(ACRES) =      2.08   TOTAL RUNOFF(CFS) =      4.76

+----------------------------------------------------------------------------+
| SUBAREA O-2 TO PROPOSED CITY CATCH BASIN                                   |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     26.20 TO NODE     26.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    31.08   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.76
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   13.02
  LONGEST FLOWPATH FROM NODE     26.10 TO NODE     26.30 =     666.08 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =     13.02
  PEAK FLOW RATE(CFS)   =       4.76
============================================================================
```

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



Program Package Serial Number: 7379

WATER SURFACE PROFILE LISTING Date: 9-26-2024 Time: 5:41:28

Iron Lofts
Hydraulic Grade Line
Line A - 100-Year Storm Event

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
103.000	865.040	2.212	867.252	46.11	8.25	1.06	868.31	.00	2.21	2.64	3.000	.000	.00	1 .0
5.332	.0040					.0057	.03	2.21	1.00	3.00	.013	.00	.00	PIPE
108.332	865.061	2.317	867.378	46.11	7.87	.96	868.34	.00	2.21	2.52	3.000	.000	.00	1 .0
27.375	.0040					.0051	.14	2.32	.91	3.00	.013	.00	.00	PIPE
135.707	865.171	2.435	867.606	46.11	7.50	.87	868.48	.00	2.21	2.35	3.000	.000	.00	1 .0
76.753	.0040					.0047	.36	2.44	.82	3.00	.013	.00	.00	PIPE
212.460	865.478	2.562	868.040	46.11	7.17	.80	868.84	.00	2.21	2.12	3.000	.000	.00	1 .0
JUNCT STR	.0533					.0035	.01	2.56	.73		.013	.00	.00	PIPE
216.210	865.678	3.143	868.821	34.04	4.82	.36	869.18	.00	1.90	.00	3.000	.000	.00	1 .0
69.250	.0040					.0026	.18	3.14	.00	2.04	.013	.00	.00	PIPE
285.460	865.955	3.100	869.055	34.04	4.82	.36	869.42	.00	1.90	.00	3.000	.000	.00	1 .0
JUNCT STR	.0255					.0063	.03	3.10	.00		.013	.00	.00	PIPE
289.460	866.057	3.022	869.079	22.71	7.23	.81	869.89	.00	1.70	.00	2.000	.000	.00	1 .0
106.500	.0169					.0101	1.07	3.02	.00	1.32	.013	.00	.00	PIPE
395.960	867.855	2.378	870.233	22.71	7.23	.81	871.04	.00	1.70	.00	2.000	.000	.00	1 .0
JUNCT STR	.0536					.0101	.04	2.38	.00		.013	.00	.00	PIPE
399.710	868.056	2.215	870.271	22.71	7.23	.81	871.08	.00	1.70	.00	2.000	.000	.00	1 .0
59.444	.0150					.0101	.60	2.22	.00	1.38	.013	.00	.00	PIPE

Iron Lofts
Hydraulic Grade Line
Line A - 100-Year Storm Event

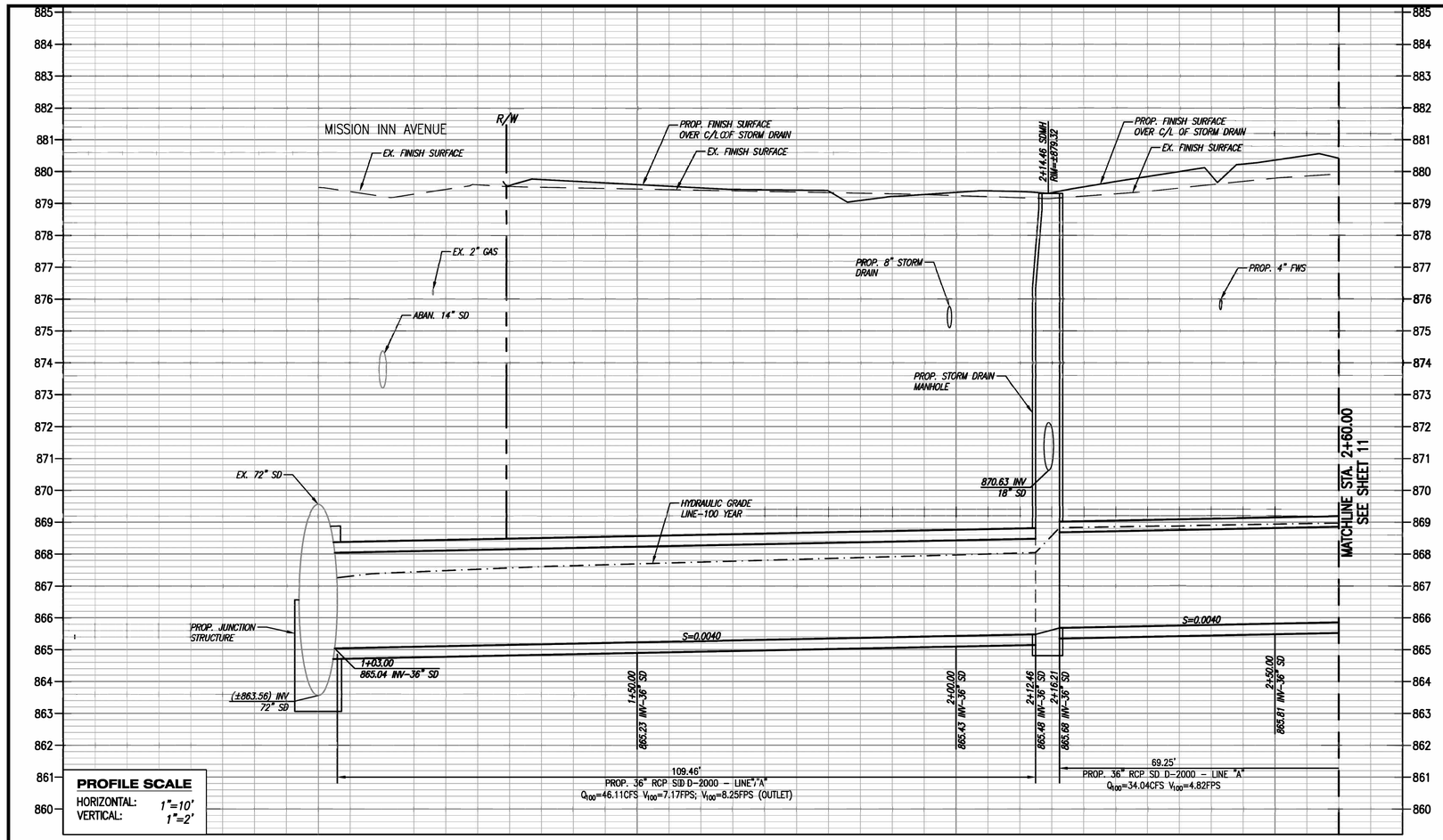
Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/ Dia.-FT / X-Fall	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
459.154	868.950	2.032	870.982	22.71	7.23	.81	871.79	.00	1.70	.00	2.000	.000	.00	1 .0
HYDRAULIC JUMP														
459.154	868.950	1.377	870.326	22.71	9.85	1.51	871.83	.00	1.70	1.85	2.000	.000	.00	1 .0
64.342	.0150				.0150	.97	1.38	1.56	1.38	.013	.00	.00	PIPE	
523.497	869.917	1.377	871.293	22.71	9.85	1.51	872.80	.00	1.70	1.85	2.000	.000	.00	1 .0
97.563	.0150				.0152	1.48	1.38	1.56	1.38	.013	.00	.00	PIPE	
621.060	871.383	1.364	872.747	22.71	9.95	1.54	874.28	.00	1.70	1.86	2.000	.000	.00	1 .0
JUNCT STR	.0736				.0135	.04	1.36	1.58		.013	.00	.00	PIPE	
623.790	871.584	1.528	873.112	22.71	8.82	1.21	874.32	.00	1.70	1.70	2.000	.000	.00	1 .0
6.804	.0120				.0116	.08	1.53	1.26	1.51	.013	.00	.00	PIPE	
630.594	871.666	1.532	873.198	22.71	8.79	1.20	874.40	.00	1.70	1.69	2.000	.000	.00	1 .0
33.037	.0120				.0110	.36	1.53	1.25	1.51	.013	.00	.00	PIPE	
663.631	872.062	1.608	873.670	22.71	8.38	1.09	874.76	.00	1.70	1.59	2.000	.000	.00	1 .0
5.519	.0120				.0100	.06	1.61	1.13	1.51	.013	.00	.00	PIPE	
669.150	872.128	1.697	873.825	22.71	7.99	.99	874.82	.00	1.70	1.43	2.000	.000	.00	1 .0
675.300	872.590	1.697	874.287	22.71	7.99	.99	875.28	.00	1.70	1.43	2.000	.000	.00	1 .0

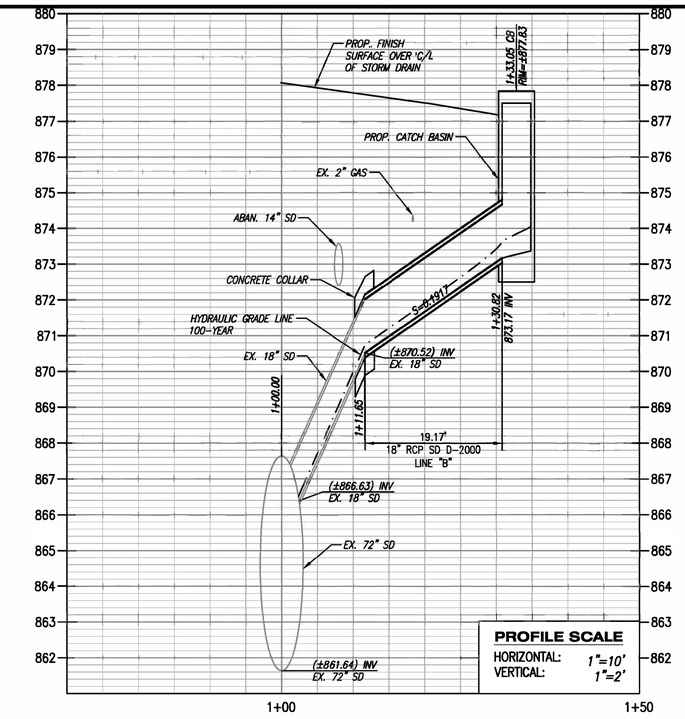
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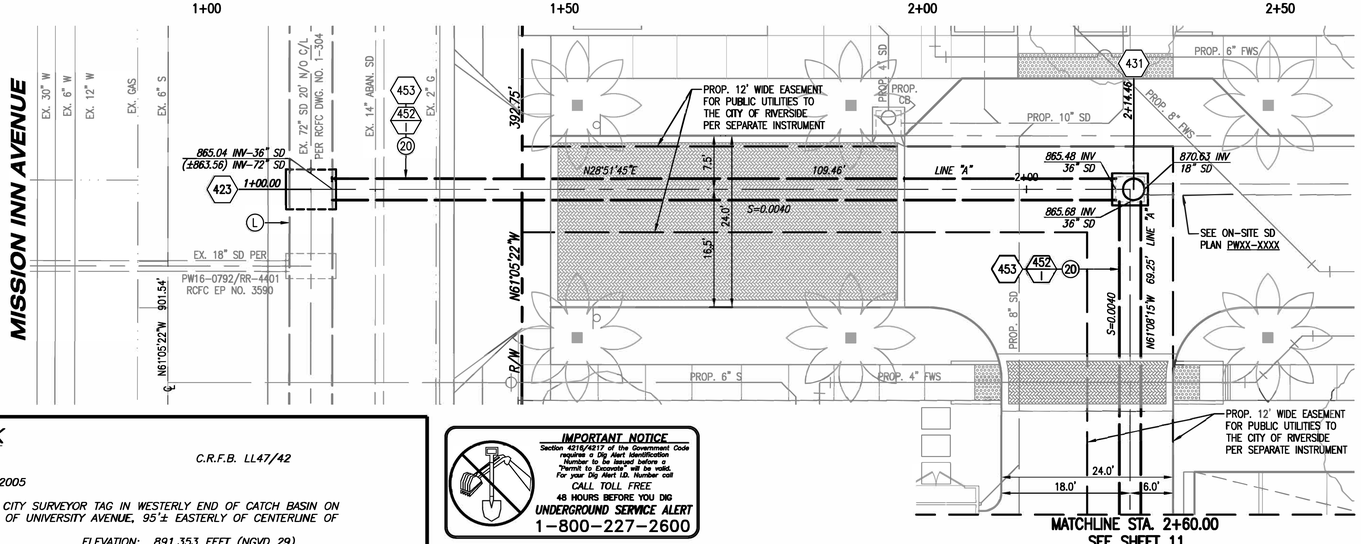
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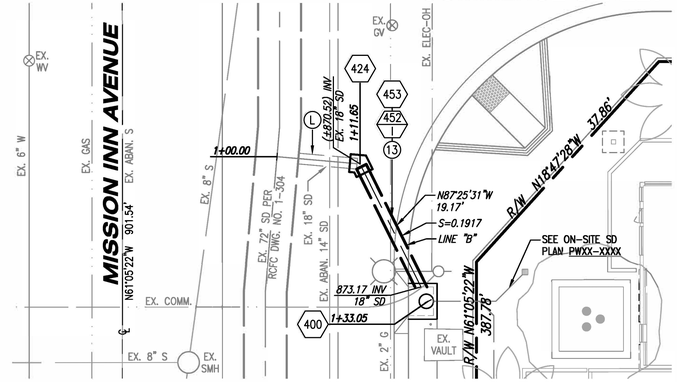
Iron Lofts
Hydraulic Grade Line
Line A - 100-Year Storm Event

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/ Dia.-FT / X-Fall	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
675.300	872.590	.716	873.306	4.76	5.72	.51	873.81	.00	.84	1.50	1.500	.000	.00	1 .0
5.730	.0100				.0095	.05	.72	1.35	.71	.013	.00	.00		PIPE
681.031	872.647	.719	873.366	4.76	5.68	.50	873.87	.00	.84	1.50	1.500	.000	.00	1 .0
16.128	.0100				.0089	.14	.72	1.34	.71	.013	.00	.00		PIPE
697.158	872.808	.747	873.555	4.76	5.41	.46	874.01	.00	.84	1.50	1.500	.000	.00	1 .0
6.234	.0100				.0078	.05	.75	1.25	.71	.013	.00	.00		PIPE
703.392	872.870	.775	873.645	4.76	5.16	.41	874.06	.00	.84	1.50	1.500	.000	.00	1 .0
2.476	.0100				.0069	.02	.78	1.16	.71	.013	.00	.00		PIPE
705.868	872.895	.805	873.700	4.76	4.92	.38	874.08	.00	.84	1.50	1.500	.000	.00	1 .0
.512	.0100				.0061	.00	.81	1.08	.71	.013	.00	.00		PIPE
706.380	872.900	.838	873.738	4.76	4.69	.34	874.08	.00	.84	1.49	1.500	.000	.00	1 .0
711.700	873.350	.838	874.188	4.76	4.69	.34	874.53	.00	.84	1.49	1.500	.000	.00	1 .0









CONSTRUCTION NOTES

(400) CONSTRUCT CATCH BASIN TYPE 1 PER CITY STANDARD DRAWING 400.

(423) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STANDARD DRAWING JS229, CASE 1.

(431) CONSTRUCT MANHOLE EZ PER CITY STANDARD DRAWING 431.

(452 I) CONSTRUCT PIPE BEDDING PER CITY STANDARD DRAWING 452, CASE I. EXCLUDE SAND AND NATIVE MATERIAL.

(453) CONSTRUCT TRENCH BACKFILL PER CITY STANDARD DRAWING 453.

(L) PROTECT IN PLACE EXISTING STORM DRAIN AND STORM DRAIN MANHOLE.

(13) PROVIDE AND INSTALL 18-INCH RCP D-LOAD 2000 DRAINAGE PIPE. SEE SHEET 12.

(20) PROVIDE AND INSTALL 36-INCH RCP D-LOAD 2000 DRAINAGE PIPE. SEE SHEETS 10 & 11.

0 5 10 20 30
1"=10'

BENCHMARK

17-13 TRANSFER C.R.F.B. LL47/42

DATED JANUARY 20, 2005

FOUND PK NAIL AND CITY SURVEYOR TAG IN WESTERLY END OF CATCH BASIN ON THE SOUTHERLY SIDE OF UNIVERSITY AVENUE, 95'± EASTERLY OF CENTERLINE OF PARK AVENUE.

ELEVATION: 891.353 FEET (NGVD 29)

IMPORTANT NOTICE
Section 4216/4217 of the Government Code requires a Dig Alert Identification Number to be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number call
CALL TOLL FREE
48 HOURS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT
1-800-227-2600

PWXX-XXXX | RCFC EP NO. XXXX

PREPARED BY:
KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
17530 Von Karman Ave. - Suite 200 Tel (949) 756-6440
Irvine, California 92614
UNDER THE SUPERVISION OF: JAMES H. KAWAMURA (R.C.E. 30560)

ENGINEER IN RESPONSIBLE CHARGE
JAMES H. KAWAMURA
R.C.E. No. 30560 expires 3/31/26
DATE XXXXXXX XX, 2024

REGISTERED PROFESSIONAL ENGINEER JAMES H. KAWAMURA No. C30560 Expiration: 03/31/26 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR.	DATE

DESIGNED BY MHR DRAWN BY MHR CHECKED BY JHK

CITY OF RIVERSIDE
PUBLIC UTILITIES DEPARTMENT
WATER DIVISION
REVIEWED FOR CONFLICTS DATE

CITY OF RIVERSIDE
PUBLIC UTILITIES DEPARTMENT
ELECTRIC DIVISION
REVIEWED FOR CONFLICTS DATE

CITY OF RIVERSIDE, CALIFORNIA
PUBLIC WORKS DEPARTMENT

APPROVED BY	BY	DATE
PRINCIPAL ENGINEER		
CONST. CONTRACT ADMIN.		
STREET SERVICES		
SURVEYOR		
TRAFFIC DIVISION		

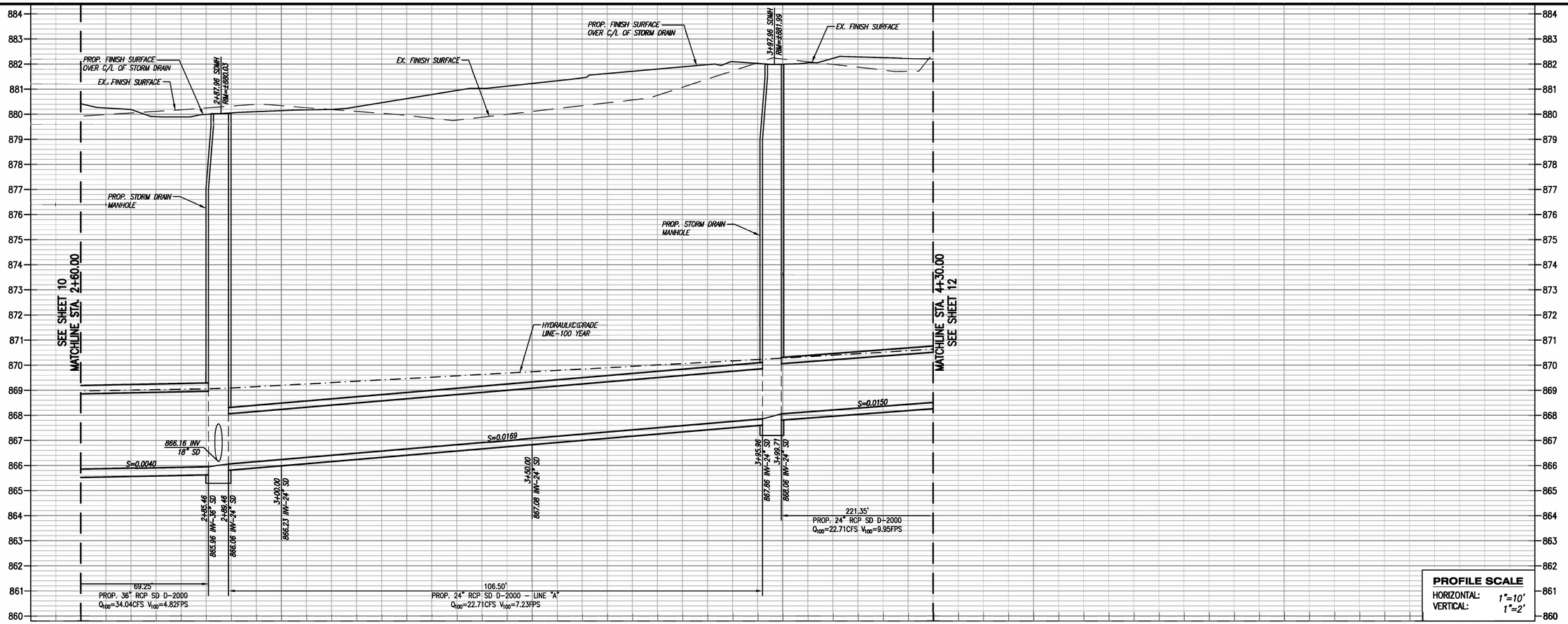
APPROVED BY
CITY ENGINEER
DATE

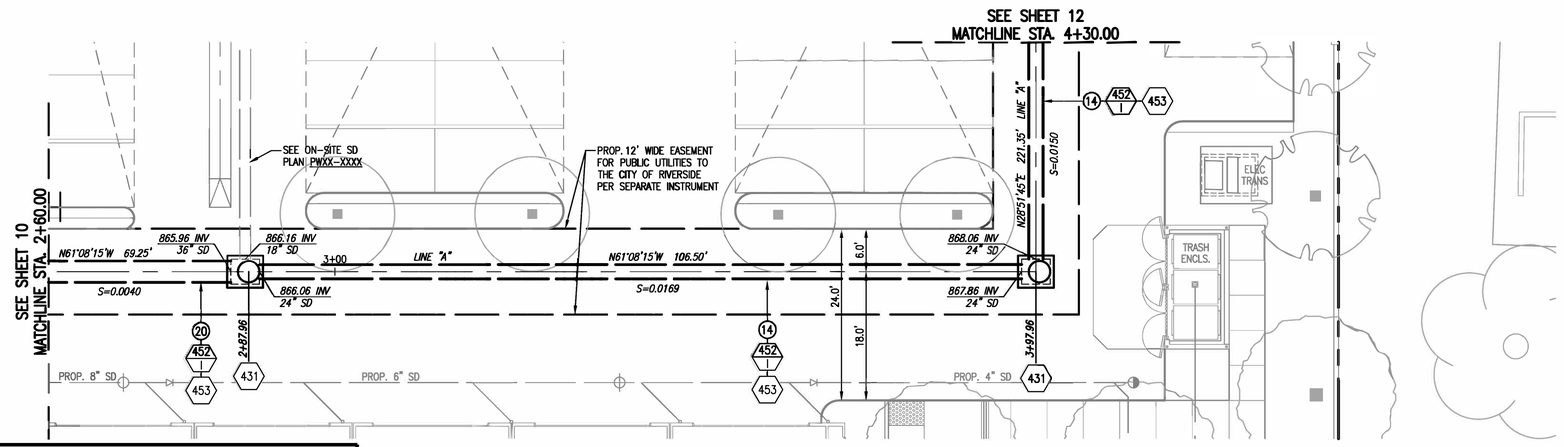
IRON LOFTS
STREET IMPROVEMENT PLAN
STORM DRAIN PLAN AND PROFILE
RIVERSIDE, CALIFORNIA

HORIZONTAL SCALE: 1"=10' VERTICAL SCALE: 1"=2'

ACCT. NO.
R-XXXX
SHEET 10 OF 19

R:\Realm\Realm-Riverside-Iron Lofts\C2d\Street Improvements\VRIL-ROAD-10-STRM.dwg October 02, 2024 - 1:25pm Shiori





CONSTRUCTION NOTES

(431) CONSTRUCT MANHOLE EZ PER CITY STANDARD DRAWING 431.

(452/1) CONSTRUCT PIPE BEDDING PER CITY STANDARD DRAWING 452, CASE I. EXCLUDE SAND AND NATIVE MATERIAL.

(453) CONSTRUCT TRENCH BACKFILL PER CITY STANDARD DRAWING 453.

(14) PROVIDE AND INSTALL 24-INCH RCP D-LOAD 2000 DRAINAGE PIPE. SEE SHEETS 11 & 12.

(20) PROVIDE AND INSTALL 36-INCH RCP D-LOAD 2000 DRAINAGE PIPE. SEE SHEETS 10 & 11.

BENCHMARK

17-13 TRANSFER C.R.F.B. LL47/42

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PWXX-XXXX

PREPARED BY:
KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
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MARK	REVISIONS	APPR.	DATE

DESIGNED BY MMR DRAWN BY MMR CHECKED BY JHK

CITY OF RIVERSIDE
PUBLIC UTILITIES DEPARTMENT
WATER DIVISION
REVIEWED FOR CONFLICTS ____ DATE ____

CITY OF RIVERSIDE
PUBLIC UTILITIES DEPARTMENT
ELECTRIC DIVISION
REVIEWED FOR CONFLICTS ____ DATE ____

CITY OF RIVERSIDE, CALIFORNIA
PUBLIC WORKS DEPARTMENT

APPROVED BY	BY	DATE
PRINCIPAL ENGINEER		
CONST. CONTRACT ADMIN.		
STREET SERVICES		
SURVEYOR		
TRAFFIC DIVISION		

APPROVED BY
CITY ENGINEER
DATE ____

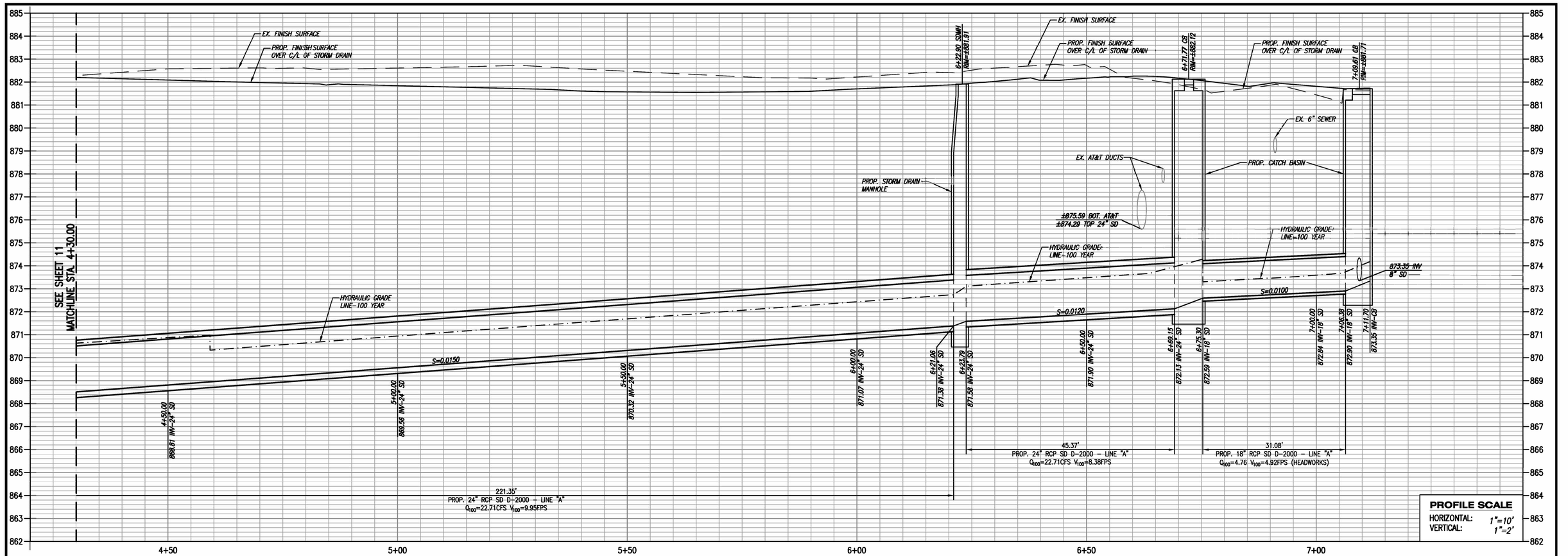
IRON LOFTS
STREET IMPROVEMENT PLAN
STORM DRAIN PLAN AND PROFILE
RIVERSIDE, CALIFORNIA

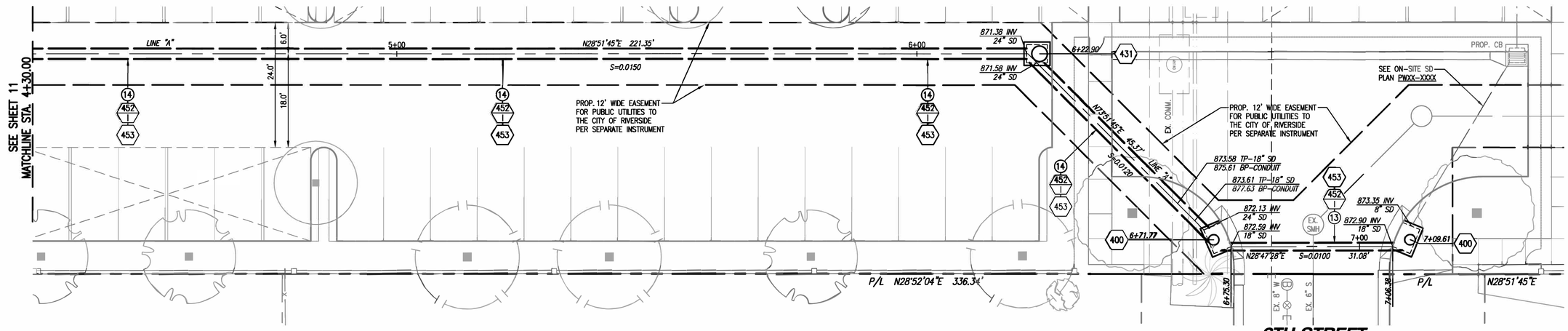
HORIZONTAL SCALE: 1"=10' VERTICAL SCALE: 1"=2'

ACCT. NO. R-XXXX

SHEET 11 OF 19

R:\Realm\Realm-Riverside-Iron Lofts\City Street Improvements\KRIL-ROAD-11-STRM.dwg September 30, 2024 - 2:43pm Short





BENCHMARK

I7–I3 TRANSFER C.R.F.B. LL47/42

DATED JANUARY 20, 2005

FOUND PK NAIL AND CITY SURVEYOR TAG IN WESTERLY END OF CATCH BASIN ON THE SOUTHERLY SIDE OF UNIVERSITY AVENUE, 95'± EASTERLY OF CENTERLINE OF PARK AVENUE.

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(452/1) CONSTRUCT PIPE BEDDING PER CITY STANDARD DRAWING 452, CASE I. EXCLUDE SAND AND NATIVE MATERIAL.

(453) CONSTRUCT TRENCH BACKFILL PER CITY STANDARD DRAWING 453.

(13) PROVIDE AND INSTALL 18–INCH RCP D–LOAD 2000 DRAINAGE PIPE. SEE SHEET 12.

(14) PROVIDE AND INSTALL 24–INCH RCP D–LOAD 2000 DRAINAGE PIPE. SEE SHEETS 11 & 12.

0 5 10 20 30
1"=10'

PREPARED BY:
KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
17530 Von Karman Ave. - Suite 200 Tel (949) 756-6440
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REGISTERED PROFESSIONAL ENGINEER JAMES H. KAWAMURA No. C30560 Expiration: 03/31/26 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR.	DATE

DESIGNED BY MHR DRAWN BY MHR CHECKED BY JHK

CITY OF RIVERSIDE
PUBLIC UTILITIES DEPARTMENT
WATER DIVISION
REVIEWED FOR CONFLICTS DATE

CITY OF RIVERSIDE
PUBLIC UTILITIES DEPARTMENT
ELECTRIC DIVISION
REVIEWED FOR CONFLICTS DATE

CITY OF RIVERSIDE, CALIFORNIA
PUBLIC WORKS DEPARTMENT

APPROVED BY	BY	DATE
PRINCIPAL ENGINEER		
CONST. CONTRACT ADMIN.		
STREET SERVICES		
SURVEYOR		
TRAFFIC DIVISION		

APPROVED BY
CITY ENGINEER
DATE

PWXX-XXXX

IRON LOFTS
STREET IMPROVEMENT PLAN
STORM DRAIN PLAN AND PROFILE
RIVERSIDE, CALIFORNIA

HORIZONTAL SCALE: 1"=10' VERTICAL SCALE: 1"=2'

ACCT. NO. R-XXXX

SHEET 12 OF 19

R:\Realm\Realm-Riverside-Iron Lofts\Civil\Street Improvements\PRIL-ROAD-12-STRM.dwg September 30, 2024 - 2:27pm Shiori

Pipe Capacity: 36" SD @0.004 - Discharging Outlet

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.004 ft/ft
Diameter	36.0 in
Discharge	36.04 cfs

Results	
Normal Depth	25.6 in
Flow Area	5.4 ft²
Wetted Perimeter	6.0 ft
Hydraulic Radius	10.7 in
Top Width	2.72 ft
Critical Depth	23.4 in
Percent Full	71.1 %
Critical Slope	0.005 ft/ft
Velocity	6.70 ft/s
Velocity Head	0.70 ft
Specific Energy	2.83 ft
Froude Number	0.841
Maximum Discharge	45.37 cfs
Discharge Full	42.18 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	57.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	25.6 in
Critical Depth	23.4 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Pipe Capacity: 36" SD @0.004 - Off-site plus On-site Overflow

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.004 ft/ft
Diameter	36.0 in
Discharge	29.63 cfs

Results	
Normal Depth	22.2 in
Flow Area	4.6 ft²
Wetted Perimeter	5.4 ft
Hydraulic Radius	10.1 in
Top Width	2.92 ft
Critical Depth	21.2 in
Percent Full	61.8 %
Critical Slope	0.005 ft/ft
Velocity	6.46 ft/s
Velocity Head	0.65 ft
Specific Energy	2.50 ft
Froude Number	0.908
Maximum Discharge	45.37 cfs
Discharge Full	42.18 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	64.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	22.2 in
Critical Depth	21.2 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Pipe Capacity: 24"SD @0.0169

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.017 ft/ft
Diameter	24.0 in
Discharge	22.71 cfs

Results	
Normal Depth	15.8 in
Flow Area	2.2 ft²
Wetted Perimeter	3.8 ft
Hydraulic Radius	7.0 in
Top Width	1.90 ft
Critical Depth	20.4 in
Percent Full	66.0 %
Critical Slope	0.010 ft/ft
Velocity	10.33 ft/s
Velocity Head	1.66 ft
Specific Energy	2.98 ft
Froude Number	1.691
Maximum Discharge	31.63 cfs
Discharge Full	29.41 cfs
Slope Full	0.010 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	66.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.8 in
Critical Depth	20.4 in
Channel Slope	0.017 ft/ft
Critical Slope	0.010 ft/ft

Pipe Capacity: 24" SD @0.0150

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.015 ft/ft
Diameter	24.0 in
Discharge	22.71 cfs

Results	
Normal Depth	16.5 in
Flow Area	2.3 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	7.1 in
Top Width	1.85 ft
Critical Depth	20.4 in
Percent Full	68.9 %
Critical Slope	0.010 ft/ft
Velocity	9.84 ft/s
Velocity Head	1.50 ft
Specific Energy	2.88 ft
Froude Number	1.554
Maximum Discharge	29.80 cfs
Discharge Full	27.71 cfs
Slope Full	0.010 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	68.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.5 in
Critical Depth	20.4 in
Channel Slope	0.015 ft/ft
Critical Slope	0.010 ft/ft

Pipe Capacity: 24" SD @0.0120

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.012 ft/ft
Diameter	24.0 in
Discharge	22.71 cfs

Results	
Normal Depth	18.1 in
Flow Area	2.5 ft²
Wetted Perimeter	4.2 ft
Hydraulic Radius	7.2 in
Top Width	1.72 ft
Critical Depth	20.4 in
Percent Full	75.3 %
Critical Slope	0.010 ft/ft
Velocity	8.95 ft/s
Velocity Head	1.24 ft
Specific Energy	2.75 ft
Froude Number	1.300
Maximum Discharge	26.66 cfs
Discharge Full	24.78 cfs
Slope Full	0.010 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	75.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.1 in
Critical Depth	20.4 in
Channel Slope	0.012 ft/ft
Critical Slope	0.010 ft/ft

Pipe Capacity: 18" SD @0.010

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	4.76 cfs

Results	
Normal Depth	8.5 in
Flow Area	0.8 ft²
Wetted Perimeter	2.3 ft
Hydraulic Radius	4.3 in
Top Width	1.50 ft
Critical Depth	10.1 in
Percent Full	47.2 %
Critical Slope	0.006 ft/ft
Velocity	5.80 ft/s
Velocity Head	0.52 ft
Specific Energy	1.23 ft
Froude Number	1.381
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.002 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	47.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.5 in
Critical Depth	10.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

Appendix 2.1.1

Post-Development Hydrology Calculations:
On-Site Only

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**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - ON-SITE ONLY                             *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: RIL1-S10.DAT
  TIME/DATE OF STUDY: 12:44 08/02/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   124.00
  UPSTREAM ELEVATION(FEET) =    879.50
  DOWNSTREAM ELEVATION(FEET) =    877.89
  ELEVATION DIFFERENCE(FEET) =      1.61
  TC = 0.323*[(  124.00**3)/(     1.61)]**.2 =    5.290
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.066
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8706
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.37   TOTAL RUNOFF(CFS) =      0.99

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.44
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   93.44**3)/(     2.00)]**.2 =    4.275
```

```
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    59.80   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.67
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    5.22
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.10 =     153.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    13.79   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.67
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.27
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

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

```
 FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
 UPSTREAM ELEVATION(FEET) =     15.00
 DOWNSTREAM ELEVATION(FEET) =     13.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 TC = 0.323*[(   94.00**3)/(     2.00)]**.2 =    4.290
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    12.57   MANNING'S N =  0.009
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.55
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        0.55     5.03       3.151        0.20
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

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

```
      1        0.67     5.27       3.072        0.24
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.19       5.03        3.151
      2       1.21       5.27        3.072

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.21   Tc(MIN.) =    5.27
  TOTAL AREA(ACRES) =        0.4

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.072
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7531
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.45
  TC(MIN.) =    5.27

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      2.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    78.38   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.45
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.51
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

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

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.44     5.27       3.072        0.55
      2        1.45     5.51       2.998        0.55
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.99     5.29       3.066        0.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =     124.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.42       5.27        3.072
      2       2.42       5.29        3.066
      3       2.41       5.51        2.998

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.42   Tc(MIN.) =    5.29
  TOTAL AREA(ACRES) =        0.9

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

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      8.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   145.73   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    5.68
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
------------------------------------------------------------------------------
```

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

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    71.61
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   71.61**3)/(     2.00)]**.2 =    3.644
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.56
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    45.35   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.56
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.12
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.10 =     116.96 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.68   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.56
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.30 TO NODE     10.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    17.00
  UPSTREAM ELEVATION(FEET) =    878.70
  DOWNSTREAM ELEVATION(FEET) =    878.32
  ELEVATION DIFFERENCE(FEET) =      0.38
  TC = 0.937*[(   17.00**3)/(     0.38)]**.2 =    6.226
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.804
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7416
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE     10.40 TO NODE     10.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     8.88   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.4 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.20
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.17     6.27       2.792        0.08
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.56     5.26       3.075        0.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       0.71       5.26        3.075
      2       0.68       6.27        2.792

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.71   Tc(MIN.) =    5.26
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.50 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   131.52   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
```

```
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.71
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    5.75
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.50 =     286.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE     10.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.930
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7472
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.92
  TC(MIN.) =    5.75

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   137.41   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.92
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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        0.92     6.20       2.809        0.39
      2        0.88     7.22       2.584        0.39
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.42     5.66       2.955        0.92
      2        2.42     5.68       2.949        0.92
```

```
      3        2.41     5.90       2.889        0.92
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.26       5.66        2.955
      2       3.27       5.68        2.949
      3       3.29       5.90        2.889
      4       3.27       6.20        2.809
      5       3.04       7.22        2.584

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.29   Tc(MIN.) =    5.90
  TOTAL AREA(ACRES) =        1.3

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    38.12   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    36.94
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   36.94**3)/(     2.00)]**.2 =    2.450
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    41.32   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.07
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.14
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    5.22
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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        0.14     5.22       3.087        0.05
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

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

```
     1        3.26     5.77       2.925        1.30
     2        3.27     5.78       2.920        1.30
     3        3.29     6.00       2.861        1.30
     4        3.27     6.31       2.783        1.30
     5        3.04     7.32       2.565        1.30
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       3.10       5.22        3.087
     2       3.39       5.77        2.925
     3       3.40       5.78        2.920
     4       3.42       6.00        2.861
     5       3.39       6.31        2.783
     6       3.15       7.32        2.565

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.42   Tc(MIN.) =    6.00
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   282.36
  UPSTREAM ELEVATION(FEET) =    881.50
  DOWNSTREAM ELEVATION(FEET) =    877.80
```

```
  ELEVATION DIFFERENCE(FEET) =      3.70
  TC = 0.323*[(  282.36**3)/(     3.70)]**.2 =    7.339
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.562
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8659
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      1.32   TOTAL RUNOFF(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.93     7.34       2.562        1.32
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     15.00 =     282.36 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.10     5.22       3.087        1.35
      2        3.39     5.77       2.925        1.35
      3        3.40     5.78       2.920        1.35
      4        3.42     6.00       2.861        1.35
      5        3.39     6.31       2.783        1.35
      6        3.15     7.32       2.565        1.35
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     15.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.18       5.22        3.087
      2       5.70       5.77        2.925
      3       5.71       5.78        2.920
      4       5.82       6.00        2.861
      5       5.92       6.31        2.783
      6       6.08       7.32        2.565
      7       6.08       7.34        2.562

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.08   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        2.7

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

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

**************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  13
--------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.23
 UPSTREAM ELEVATION(FEET) =     15.00
 DOWNSTREAM ELEVATION(FEET) =     13.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 TC = 0.323*[(   74.23**3)/(     2.00)]**.2 =    3.723
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.80

**************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.10 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    15.20   MANNING'S N =  0.009
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.80
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     17.10 =      89.43 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     17.10 TO NODE     18.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   164.51   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.80
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    5.60
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     253.94 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   147.00
  UPSTREAM ELEVATION(FEET) =    881.00
  DOWNSTREAM ELEVATION(FEET) =    878.08
  ELEVATION DIFFERENCE(FEET) =      2.92
  TC = 0.323*[(  147.00**3)/(     2.92)]**.2 =    5.201
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.095
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8708
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.85     5.20       3.095        0.31
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     20.00 =     147.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.80     5.60       2.972        0.29
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     20.00 =     253.94 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.59       5.20        3.095
      2       1.61       5.60        2.972

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.61   Tc(MIN.) =    5.60
  TOTAL AREA(ACRES) =        0.6

**************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
--------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    35.92   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.61
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  10
--------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
```

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

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.86
  UPSTREAM ELEVATION(FEET) =    881.47
  DOWNSTREAM ELEVATION(FEET) =    880.67
  ELEVATION DIFFERENCE(FEET) =      0.80
  TC = 0.937*[(   77.86**3)/(     0.80)]**.2 =   13.369
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.843
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6792
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     21.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   107.21   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.93
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.13
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   13.98
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

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

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.13    13.98       1.798        0.10
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.59     5.28       3.071        0.60
      2        1.61     5.67       2.951        0.60
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.64       5.28        3.071
      2       1.66       5.67        2.951
      3       1.11      13.98        1.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.66   Tc(MIN.) =    5.67
  TOTAL AREA(ACRES) =        0.7

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   136.64   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.47
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.66
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    5.94
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.64     5.55       2.987        0.70
      2        1.66     5.94       2.877        0.70
      3        1.11    14.38       1.770        0.70
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.18     5.22       3.087        2.68
      2        5.70     5.77       2.925        2.68
      3        5.71     5.78       2.920        2.68
      4        5.82     6.00       2.861        2.68
      5        5.92     6.31       2.783        2.68
      6        6.08     7.32       2.565        2.68
      7        6.08     7.34       2.562        2.68
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     24.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       6.73       5.22        3.087
      2       7.12       5.55        2.987
      3       7.31       5.77        2.925
      4       7.33       5.78        2.920
      5       7.42       5.94        2.877
      6       7.47       6.00        2.861
      7       7.53       6.31        2.783
      8       7.56       7.32        2.565
      9       7.56       7.34        2.562
     10       5.31      14.38        1.770

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.56   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        3.4

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.93   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.52
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     25.00 =     517.62 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   255.17   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.00 =     772.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   279.97   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.10 =    1052.76 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
```

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

**************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     28.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    71.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.45
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     28.00 =    1124.01 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
--------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================
  ***MEMORY BANK #  1 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

**************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  13
--------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.88
  UPSTREAM ELEVATION(FEET) =    882.80
  DOWNSTREAM ELEVATION(FEET) =    882.10
  ELEVATION DIFFERENCE(FEET) =      0.70
  TC = 0.323*[(   61.88**3)/(     0.70)]**.2 =    4.118
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.57   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.18
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     117.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    89.09   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.16
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    5.54
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =     206.54 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    23.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.09
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   65.92**3)/(     2.00)]**.2 =    3.467
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     2.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.46
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.26
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.26     5.01       3.159        0.09
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.45     5.63       2.963        0.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       0.66       5.01        3.159
      2       0.69       5.63        2.963

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.69   Tc(MIN.) =    5.63
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.57   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.69
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

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

```
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =    879.59
  DOWNSTREAM ELEVATION(FEET) =    878.75
  ELEVATION DIFFERENCE(FEET) =      0.84
  TC = 0.937*[(   47.00**3)/(     0.84)]**.2 =    9.780
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.188
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7066
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    14.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.88
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.14
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.86
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.14     9.86       2.178        0.09
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.
```

```
  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.66      5.19        3.100        0.26
      2        0.69      5.81        2.913        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       0.73       5.19        3.100
      2       0.77       5.81        2.913
      3       0.66       9.86        2.178

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.77   Tc(MIN.) =    5.81
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    52.84   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.72
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.77
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.99
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     331.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================
  ***MEMORY BANK #  3 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   74.92**3)/(     2.00)]**.2 =    3.744
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     7.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.11
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.11     5.01       3.159        0.40
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.66     5.19       3.100        0.26
```

```
      2        0.69     5.81       2.913        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.75       5.01        3.159
      2       1.75       5.19        3.100
      3       1.72       5.81        2.913

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.75   Tc(MIN.) =    5.19
  TOTAL AREA(ACRES) =        0.7

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     42.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    52.87   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.83
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.75
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.34
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     42.00 =     331.48 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    91.61   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.75
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.62
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   47.00**3)/(     2.00)]**.2 =    2.830
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    32.65   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.97
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.11
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =      79.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.97
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    5.87
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     310.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.895
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8691
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.56
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.53
  TC(MIN.) =    5.87

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    40.21   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.53
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     350.86 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.863
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8689
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.72
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.25
```

```
  TC(MIN.) =    6.00

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    98.04   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.25
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.25     6.25       2.798        0.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.75     5.44       3.018        0.66
      2        1.75     5.62       2.966        0.66
      3        1.72     6.24       2.800        0.66
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.71       5.44        3.018
      2       3.77       5.62        2.966
      3       3.97       6.24        2.800
      4       3.97       6.25        2.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.97   Tc(MIN.) =    6.25
  TOTAL AREA(ACRES) =        1.5
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    33.92   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.97
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.34
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     482.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.11
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.75
  ELEVATION DIFFERENCE(FEET) =      1.10
  TC = 0.323*[(   97.11**3)/(     1.10)]**.2 =    4.930
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =      0.93
  TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      0.93

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.93     5.00       3.163        0.34
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =      97.11 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.71     5.53       2.992        1.52
      2        3.77     5.71       2.940        1.52
      3        3.97     6.33       2.778        1.52
      4        3.97     6.34       2.777        1.52
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     51.00 =     482.82 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.28       5.00        3.163
      2       4.59       5.53        2.992
      3       4.64       5.71        2.940
      4       4.78       6.33        2.778
      5       4.78       6.34        2.777

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.78   Tc(MIN.) =    6.34
  TOTAL AREA(ACRES) =        1.9

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =    51.05   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.78
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     52.00 =     533.87 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.84
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.60
  ELEVATION DIFFERENCE(FEET) =      1.25
  TC = 0.323*[(   96.84**3)/(     1.25)]**.2 =    4.798
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
```

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

**************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   217.19
  UPSTREAM ELEVATION(FEET) =    881.21
  DOWNSTREAM ELEVATION(FEET) =    878.03
  ELEVATION DIFFERENCE(FEET) =      3.18
  TC = 0.323*[(  217.19**3)/(     3.18)]**.2 =    6.463
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.747
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8678
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      1.12   TOTAL RUNOFF(CFS) =      2.66

**************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   140.51   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.66
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    6.77
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
--------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
==========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.66     6.77        2.678        1.12
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.85     5.00       3.163        0.31
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     57.00 =      96.84 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.82       5.00        3.163
      2       3.39       6.77        2.678

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.39   Tc(MIN.) =    6.77
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.82     5.00       3.163        1.43
      2        3.39     6.77       2.678        1.43
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.28     5.13       3.120        1.86
      2        4.59     5.66       2.956        1.86
      3        4.64     5.83       2.906        1.86
      4        4.78     6.45       2.749        1.86
      5        4.78     6.46       2.748        1.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     57.00 =     533.87 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       7.00       5.00        3.163
      2       7.06       5.13        3.120
      3       7.42       5.66        2.956
      4       7.56       5.83        2.906
      5       8.01       6.45        2.749
      6       8.01       6.46        2.748
      7       8.05       6.77        2.678

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       8.05   Tc(MIN.) =    6.77
  TOTAL AREA(ACRES) =        3.3

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    77.27   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.89
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.05
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.93
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     58.00 =     611.14 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.00     5.17       3.105        3.29
      2        7.06     5.29       3.065        3.29
      3        7.42     5.82       2.909        3.29
      4        7.56     6.00       2.862        3.29
      5        8.01     6.62       2.712        3.29
      6        8.01     6.62       2.710        3.29
      7        8.05     6.93       2.643        3.29
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     58.00 =     611.14 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.73     6.94       2.642        3.38
      2        7.12     7.24       2.580        3.38
      3        7.31     7.45       2.540        3.38
      4        7.33     7.47       2.537        3.38
      5        7.42     7.62       2.509        3.38
      6        7.47     7.68       2.498        3.38
      7        7.53     7.99       2.445        3.38
      8        7.56     9.00       2.290        3.38
      9        7.56     9.02       2.288        3.38
     10        5.31    16.19       1.659        3.38
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     58.00 =    1052.76 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      12.08       5.17        3.105
      2      12.27       5.29        3.065
      3      13.14       5.82        2.909
      4      13.45       6.00        2.862
      5      14.52       6.62        2.712
      6      14.53       6.62        2.710
      7      14.86       6.93        2.643
      8      14.77       6.94        2.642
      9      14.98       7.24        2.580
     10      15.05       7.45        2.540
     11      15.05       7.47        2.537
     12      15.06       7.62        2.509
     13      15.08       7.68        2.498
     14      14.97       7.99        2.445
     15      14.54       9.00        2.290
     16      14.53       9.02        2.288
     17      10.36      16.19        1.659

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.08   Tc(MIN.) =    7.68
  TOTAL AREA(ACRES) =        6.7

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   109.46   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.37
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.08
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     59.00 =    1162.22 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =      8.02
  PEAK FLOW RATE(CFS)   =      15.08
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       12.08       5.53
  2       12.27       5.65
  3       13.14       6.17
  4       13.45       6.35
  5       14.52       6.96
  6       14.53       6.97
  7       14.86       7.27
  8       14.77       7.28
  9       14.98       7.58
 10       15.05       7.79
 11       15.05       7.81
 12       15.06       7.96
 13       15.08       8.02
 14       14.97       8.33
 15       14.54       9.34
 16       14.53       9.36
 17       10.36      16.56
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - ON-SITE ONLY                             *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: RIL1-S10.DAT
  TIME/DATE OF STUDY: 12:44 08/02/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   124.00
  UPSTREAM ELEVATION(FEET) =    879.50
  DOWNSTREAM ELEVATION(FEET) =    877.89
  ELEVATION DIFFERENCE(FEET) =      1.61
  TC = 0.323*[(  124.00**3)/(     1.61)]**.2 =    5.290
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.554
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8791
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.48
  TOTAL AREA(ACRES) =      0.37   TOTAL RUNOFF(CFS) =      1.48

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    93.44
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   93.44**3)/(     2.00)]**.2 =    4.275
```

```
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    59.80   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.19
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      4.10 =     153.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    13.79   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   94.00**3)/(     2.00)]**.2 =    4.290
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    12.57   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.83
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.02
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.83     5.02       4.686        0.20
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      5.00 =     106.57 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.24       4.577        0.24
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     167.03 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.79       5.02        4.686
      2       1.82       5.24        4.577

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.82   Tc(MIN.) =    5.24
  TOTAL AREA(ACRES) =        0.4

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.577
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7959
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.19
  TC(MIN.) =    5.24

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      2.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    78.38   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.19
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

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

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.17     5.23       4.582        0.55
      2        2.19     5.45       4.480        0.55
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     245.41 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.48     5.29       4.554        0.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =     124.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.64       5.23        4.582
      2       3.64       5.29        4.554
      3       3.64       5.45        4.480

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.64   Tc(MIN.) =    5.45
  TOTAL AREA(ACRES) =        0.9

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

************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      8.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   145.73   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.64
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    71.61
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   71.61**3)/(     2.00)]**.2 =    3.644
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.84
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.84

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    45.35   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.84
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.08
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.10 =     116.96 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.68   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.84
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.30 TO NODE     10.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    17.00
  UPSTREAM ELEVATION(FEET) =    878.70
  DOWNSTREAM ELEVATION(FEET) =    878.32
  ELEVATION DIFFERENCE(FEET) =      0.38
  TC = 0.937*[(   17.00**3)/(     0.38)]**.2 =    6.226
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.164
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7868
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     10.40 TO NODE     10.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     8.88   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.15
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.28     6.27       4.147        0.08
  LONGEST FLOWPATH FROM NODE     10.30 TO NODE     10.20 =      25.88 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.84     5.23       4.584        0.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.20 =     154.64 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.07       5.23        4.584
      2       1.03       6.27        4.147

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.07   Tc(MIN.) =    5.23
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.20 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.50 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   131.52   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     10.50 =     286.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE     10.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.401
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7922
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.42
  TC(MIN.) =    5.63

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   137.41   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.42
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    6.05
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.42     6.05       4.231        0.39
      2        1.35     7.11       3.870        0.39
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE      8.00 =     423.57 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.64     5.60       4.415        0.92
      2        3.64     5.65       4.390        0.92
      3        3.64     5.81       4.324        0.92
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      8.00 =     391.14 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.95       5.60        4.415
      2       4.97       5.65        4.390
      3       5.01       5.81        4.324
      4       4.98       6.05        4.231
      5       4.61       7.11        3.870

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.01   Tc(MIN.) =    5.81
  TOTAL AREA(ACRES) =        1.3

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    38.12   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.01
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.88
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    36.94
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   36.94**3)/(     2.00)]**.2 =    2.450
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    41.32   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.21
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.21
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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        0.21     5.21       4.594        0.05
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =      78.26 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        4.95     5.67       4.385        1.30
     2        4.97     5.72       4.361        1.30
     3        5.01     5.88       4.296        1.30
     4        4.98     6.12       4.205        1.30
     5        4.61     7.19       3.848        1.30
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       4.75       5.21        4.594
     2       5.15       5.67        4.385
     3       5.16       5.72        4.361
     4       5.20       5.88        4.296
     5       5.17       6.12        4.205
     6       4.78       7.19        3.848

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.20   Tc(MIN.) =    5.88
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   282.36
  UPSTREAM ELEVATION(FEET) =    881.50
  DOWNSTREAM ELEVATION(FEET) =    877.80
  ELEVATION DIFFERENCE(FEET) =      3.70
  TC = 0.323*[(  282.36**3)/(     3.70)]**.2 =    7.339
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.804
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8755
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.41
  TOTAL AREA(ACRES) =      1.32   TOTAL RUNOFF(CFS) =      4.41

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.41     7.34       3.804        1.32
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     15.00 =     282.36 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.75     5.21       4.594        1.35
      2        5.15     5.67       4.385        1.35
      3        5.16     5.72       4.361        1.35
      4        5.20     5.88       4.296        1.35
      5        5.17     6.12       4.205        1.35
      6        4.78     7.19       3.848        1.35
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     15.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       7.88       5.21        4.594
      2       8.55       5.67        4.385
      3       8.60       5.72        4.361
      4       8.73       5.88        4.296
      5       8.84       6.12        4.205
      6       9.10       7.19        3.848
      7       9.13       7.34        3.804

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.13   Tc(MIN.) =    7.34
```

```
  TOTAL AREA(ACRES) =        2.7

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.23
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   74.23**3)/(     2.00)]**.2 =    3.723
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    15.20   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.68
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.02
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     17.10 =      89.43 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.10 TO NODE     18.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   164.51   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.54
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     253.94 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   147.00
  UPSTREAM ELEVATION(FEET) =    881.00
  DOWNSTREAM ELEVATION(FEET) =    878.08
  ELEVATION DIFFERENCE(FEET) =      2.92
  TC = 0.323*[(  147.00**3)/(     2.92)]**.2 =    5.201
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.596
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8792
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.27
```

```
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.27     5.20       4.596        0.31
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     20.00 =     147.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.19     5.54       4.440        0.29
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     20.00 =     253.94 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.39       5.20        4.596
      2       2.42       5.54        4.440

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.42   Tc(MIN.) =    5.54
  TOTAL AREA(ACRES) =        0.6

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    35.92   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.34
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.59
```

```
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.86
  UPSTREAM ELEVATION(FEET) =    881.47
  DOWNSTREAM ELEVATION(FEET) =    880.67
  ELEVATION DIFFERENCE(FEET) =      0.80
  TC = 0.937*[(   77.86**3)/(     0.80)]**.2 =   13.369
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.737
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7384
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     21.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   107.21   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.40
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.20
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   13.90
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  11
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.20    13.90       2.679        0.10
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =     185.07 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.39     5.25       4.573        0.60
      2        2.42     5.59       4.419        0.60
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     289.86 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.47       5.25        4.573
      2       2.51       5.59        4.419
      3       1.67      13.90        2.679

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.51   Tc(MIN.) =    5.59
  TOTAL AREA(ACRES) =        0.7

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   136.64   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.51
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.77
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.47     5.43       4.488        0.70
      2        2.51     5.77       4.344        0.70
      3        1.67    14.16       2.652        0.70
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     24.00 =     426.50 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.88     5.21       4.594        2.68
      2        8.55     5.67       4.385        2.68
      3        8.60     5.72       4.361        2.68
      4        8.73     5.88       4.296        2.68
      5        8.84     6.12       4.205        2.68
      6        9.10     7.19       3.848        2.68
      7        9.13     7.34       3.804        2.68
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     24.00 =     461.69 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.25       5.21        4.594
      2      10.67       5.43        4.488
      3      11.01       5.67        4.385
      4      11.09       5.72        4.361
      5      11.07       5.77        4.344
      6      11.21       5.88        4.296
      7      11.27       6.12        4.205
      8      11.32       7.19        3.848
      9      11.33       7.34        3.804
     10       8.04      14.16        2.652

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.33   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        3.4

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.93   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  57.70
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     25.00 =     517.62 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   255.17   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.00 =     772.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   279.97   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    8.75
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     27.10 =    1052.76 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  10
```

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

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     27.10 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.10 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    71.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.45
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     28.00 =    1124.01 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
  ***MEMORY BANK #  1 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.88
  UPSTREAM ELEVATION(FEET) =    882.80
  DOWNSTREAM ELEVATION(FEET) =    882.10
```

```
  ELEVATION DIFFERENCE(FEET) =      0.70
  TC = 0.323*[(   61.88**3)/(     0.70)]**.2 =    4.118
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.57   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.12
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     117.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    89.09   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =     206.54 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    23.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
```

```
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.53
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   65.92**3)/(     2.00)]**.2 =    3.467
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     2.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.40
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.38
```

```
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.38     5.01       4.693        0.09
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =      67.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.68     5.53       4.442        0.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     33.00 =     230.04 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.00       5.01        4.693
      2       1.04       5.53        4.442

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.04   Tc(MIN.) =    5.53
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.57   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.04
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.69
```

```
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =    879.59
  DOWNSTREAM ELEVATION(FEET) =    878.75
  ELEVATION DIFFERENCE(FEET) =      0.84
  TC = 0.937*[(   47.00**3)/(     0.84)]**.2 =    9.780
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.250
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7599
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    14.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.25
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  11
```

```
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.22     9.85       3.236        0.09
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =      61.50 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.17       4.613        0.26
      2        1.04     5.69       4.374        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     36.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.11       5.17        4.613
      2       1.17       5.69        4.374
      3       0.99       9.85        3.236

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.17   Tc(MIN.) =    5.69
  TOTAL AREA(ACRES) =        0.3

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    52.84   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    5.86
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     331.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================
  ***MEMORY BANK #  3 IS FULL. THEREFORE, MAIN-STREAM MEMORY
     DATA CAN NOT BE COPIED ONTO IT - PROCESS IGNORED.***
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.92
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   74.92**3)/(     2.00)]**.2 =    3.744
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     7.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.13
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.67
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.67     5.01       4.694        0.40
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     39.00 =      81.92 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.17       4.613        0.26
      2        1.04     5.69       4.374        0.26
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     39.00 =     278.61 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.64       5.01        4.694
      2       2.64       5.17        4.613
      3       2.60       5.69        4.374

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.64   Tc(MIN.) =    5.17
  TOTAL AREA(ACRES) =        0.7

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     42.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    52.87   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     42.00 =     331.48 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    91.61   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.97
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =     15.00
  DOWNSTREAM ELEVATION(FEET) =     13.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.323*[(   47.00**3)/(     2.00)]**.2 =    2.830
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.46
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.46

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    32.65   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.43
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.46
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.07
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =      79.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.46
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    5.77
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     310.65 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.340
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8782
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.85
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.31
  TC(MIN.) =    5.77

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    40.21   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.31
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.88
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     350.86 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.298
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8780
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.09
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.40
  TC(MIN.) =    5.88

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    98.04   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.73
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.40
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.04
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.40     6.04       4.232        0.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     448.90 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.64     5.40       4.502        0.66
      2        2.64     5.56       4.430        0.66
      3        2.60     6.09       4.215        0.66
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     43.00 =     423.09 FEET.

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

```
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.67       5.40        4.502
      2       5.76       5.56        4.430
      3       5.97       6.04        4.232
      4       5.98       6.09        4.215

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.98   Tc(MIN.) =    6.09
  TOTAL AREA(ACRES) =        1.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    33.92   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.98
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.16
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     482.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
```

```
       DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.11
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.75
  ELEVATION DIFFERENCE(FEET) =      1.10
  TC = 0.323*[(   97.11**3)/(     1.10)]**.2 =    4.930
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.39
  TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.39     5.00       4.697        0.34
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     51.00 =      97.11 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.67     5.48       4.467        1.52
      2        5.76     5.64       4.397        1.52
      3        5.97     6.12       4.204        1.52
      4        5.98     6.16       4.187        1.52
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     51.00 =     482.82 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       6.57       5.00        4.697
      2       6.99       5.48        4.467
      3       7.07       5.64        4.397
      4       7.22       6.12        4.204
      5       7.22       6.16        4.187

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.22   Tc(MIN.) =    6.16
  TOTAL AREA(ACRES) =        1.9

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  12
```

```
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    51.05   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.22
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.28
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     52.00 =     533.87 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.84
  UPSTREAM ELEVATION(FEET) =    878.85
  DOWNSTREAM ELEVATION(FEET) =    877.60
  ELEVATION DIFFERENCE(FEET) =      1.25
  TC = 0.323*[(   96.84**3)/(     1.25)]**.2 =    4.798
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      1.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   217.19
  UPSTREAM ELEVATION(FEET) =    881.21
  DOWNSTREAM ELEVATION(FEET) =    878.03
  ELEVATION DIFFERENCE(FEET) =      3.18
  TC = 0.323*[(  217.19**3)/(     3.18)]**.2 =    6.463
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.080
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8770
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.00
  TOTAL AREA(ACRES) =      1.12   TOTAL RUNOFF(CFS) =      4.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   140.51   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.00
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    6.67
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
```

```
------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.00     6.67       4.010        1.12
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.28     5.00       4.697        0.31
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     57.00 =      96.84 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.28       5.00        4.697
      2       5.09       6.67        4.010

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.09   Tc(MIN.) =    6.67
  TOTAL AREA(ACRES) =        1.4

************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  11
------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.28     5.00       4.697        1.43
      2        5.09     6.67       4.010        1.43
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 =     357.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.57     5.11       4.639        1.86
      2        6.99     5.59       4.417        1.86
      3        7.07     5.75       4.349        1.86
      4        7.22     6.23       4.162        1.86
      5        7.22     6.28       4.146        1.86
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     57.00 =     533.87 FEET.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.70       5.00        4.697
      2      10.79       5.11        4.639
      3      11.26       5.59        4.417
      4      11.46       5.75        4.349
      5      11.98       6.23        4.162
      6      12.01       6.28        4.146
      7      12.07       6.67        4.010

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.07   Tc(MIN.) =    6.67
  TOTAL AREA(ACRES) =        3.3

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    77.27   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.07
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     58.00 =     611.14 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 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	10.70	5.15	4.619	3.29
2	10.79	5.27	4.564	3.29
3	11.26	5.74	4.352	3.29
4	11.46	5.90	4.287	3.29
5	11.98	6.38	4.108	3.29
6	12.01	6.43	4.092	3.29
7	12.07	6.82	3.961	3.29

LONGEST FLOWPATH FROM NODE 44.00 TO NODE 58.00 = 611.14 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	10.25	6.76	3.980	3.38
2	10.67	6.93	3.927	3.38
3	11.01	7.11	3.870	3.38
4	11.09	7.16	3.856	3.38
5	11.07	7.21	3.843	3.38
6	11.21	7.30	3.814	3.38
7	11.27	7.53	3.751	3.38
8	11.32	8.60	3.488	3.38
9	11.33	8.75	3.455	3.38
10	8.04	15.83	2.494	3.38

LONGEST FLOWPATH FROM NODE 9.00 TO NODE 58.00 = 1052.76 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	18.67	5.15	4.619
2	18.95	5.27	4.564
3	20.16	5.74	4.352
4	20.60	5.90	4.287
5	21.86	6.38	4.108
6	21.96	6.43	4.092
7	22.22	6.76	3.980
8	22.63	6.82	3.961
9	22.64	6.93	3.927
10	22.81	7.11	3.870
11	22.84	7.16	3.856
12	22.78	7.21	3.843
13	22.83	7.30	3.814
14	22.70	7.53	3.751
15	21.95	8.60	3.488
16	21.86	8.75	3.455
17	15.64	15.83	2.494

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 22.84 Tc(MIN.) = 7.16
TOTAL AREA(ACRES) = 6.7

****

```
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   109.46   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.97
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.84
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    7.47
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     59.00 =    1162.22 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =      7.47
  PEAK FLOW RATE(CFS)   =      22.84
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       18.67       5.48
  2       18.95       5.59
  3       20.16       6.06
  4       20.60       6.22
  5       21.86       6.69
  6       21.96       6.74
  7       22.22       7.07
  8       22.63       7.12
  9       22.64       7.23
 10       22.81       7.42
 11       22.84       7.47
 12       22.78       7.51
 13       22.83       7.61
 14       22.70       7.84
 15       21.95       8.91
 16       21.86       9.06
 17       15.64      16.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



Catch Basin A1 - Grate Inlet

Project Description	
Solve For	Spread

Input Data	
Discharge	1.48 cfs
Gutter Width	5.13 ft
Gutter Cross Slope	0.051 ft/ft
Road Cross Slope	0.030 ft/ft
Grate Width	3.13 ft
Grate Length	4.0 ft
Local Depression	1.3 in
Local Depression Width	1.3 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	5.2 ft
Depth	3.2 in
Gutter Depression	1.3 in
Total Depression	2.6 in
Open Grate Area	5.0 ft²
Active Grate Weir Length	7.1 ft

Catch Basin A10 - Combination Inlet

Project Description	
Solve For	Spread

Input Data	
Discharge	0.20 cfs
Gutter Width	3.00 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.018 ft/ft
Local Depression	2.0 in
Local Depression Width	2.0 in
Grate Width	2.80 ft
Grate Length	4.3 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	3.0 ft
Opening Height	0.5 ft
Curb Throat Type	Horizontal
Throat Incline Angle	90.00 degrees

Options	
Calculation Option	Use Both

Results	
Spread	0.6 ft
Depth	0.9 in
Gutter Depression	3.3 in
Total Depression	5.3 in
Open Grate Area	5.4 ft²
Active Grate Weir Length	7.1 ft

Catch Basin A7 - Grate Inlet

Project Description	
Solve For	Spread

Input Data	
Discharge	4.41 cfs
Gutter Width	5.13 ft
Gutter Cross Slope	0.051 ft/ft
Road Cross Slope	0.031 ft/ft
Grate Width	3.13 ft
Grate Length	10.9 ft
Local Depression	1.3 in
Local Depression Width	1.3 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	7.9 ft
Depth	4.2 in
Gutter Depression	1.2 in
Total Depression	2.5 in
Open Grate Area	13.6 ft²
Active Grate Weir Length	14.0 ft

Catch Basin A9 - Grate Inlet

Project Description	
Solve For	Spread

Input Data	
Discharge	1.27 cfs
Gutter Width	5.13 ft
Gutter Cross Slope	0.051 ft/ft
Road Cross Slope	0.030 ft/ft
Grate Width	3.13 ft
Grate Length	7.4 ft
Local Depression	1.3 in
Local Depression Width	1.3 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	4.5 ft
Depth	2.7 in
Gutter Depression	1.3 in
Total Depression	2.6 in
Open Grate Area	9.3 ft²
Active Grate Weir Length	10.5 ft

Catch Basin B10 - Curb Opening Inlet

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.28 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.220 ft/ft
Road Cross Slope	0.043 ft/ft
Roughness Coefficient	0.013
Curb Opening Length	7.0 ft
Local Depression	2.0 in
Local Depression Width	2.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	1.28 cfs
Bypass Flow	0.00 cfs
Spread	2.2 ft
Depth	4.3 in
Flow Area	0.3 ft²
Gutter Depression	3.2 in
Total Depression	5.2 in
Velocity	4.25 ft/s
Equivalent Cross Slope	0.329 ft/ft
Length Factor	1.588
Total Interception Length	4.4 ft

Catch Basin B3 - Curb Opening Inlet

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.22 cfs
Slope	0.010 ft/ft
Gutter Width	1.00 ft
Gutter Cross Slope	0.100 ft/ft
Road Cross Slope	0.021 ft/ft
Roughness Coefficient	0.013
Curb Opening Length	3.2 ft
Local Depression	1.0 in
Local Depression Width	1.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.22 cfs
Bypass Flow	0.00 cfs
Spread	2.6 ft
Depth	1.6 in
Flow Area	0.1 ft²
Gutter Depression	0.9 in
Total Depression	1.9 in
Velocity	1.98 ft/s
Equivalent Cross Slope	0.165 ft/ft
Length Factor	1.000
Total Interception Length	3.2 ft

Catch Basin B8 - Grate Inlet

Project Description	
Solve For	Spread

Input Data	
Discharge	1.39 cfs
Gutter Width	5.13 ft
Gutter Cross Slope	0.051 ft/ft
Road Cross Slope	0.043 ft/ft
Grate Width	3.13 ft
Grate Length	7.4 ft
Local Depression	1.3 in
Local Depression Width	1.3 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	4.6 ft
Depth	2.8 in
Gutter Depression	0.5 in
Total Depression	1.8 in
Open Grate Area	9.3 ft²
Active Grate Weir Length	10.5 ft

Catch Basin B9 - Grate Inlet

Project Description	
Solve For	Spread

Input Data	
Discharge	4.00 cfs
Gutter Width	5.13 ft
Gutter Cross Slope	0.051 ft/ft
Road Cross Slope	0.022 ft/ft
Grate Width	3.13 ft
Grate Length	10.9 ft
Local Depression	1.3 in
Local Depression Width	1.3 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	8.5 ft
Depth	4.0 in
Gutter Depression	1.8 in
Total Depression	3.1 in
Open Grate Area	13.6 ft²
Active Grate Weir Length	14.0 ft

Catch Basin No.	**1**		
Drainage area no.	**B3**		
Curb-opening CB in a sump			
Discharge, Q=	0.2	cfs	(0.09 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of flow in gutter, y=	0.03	ft	
Local depression, a=	0.08	ft	
h=y+a=	0.11	ft	
Weir coefficient, C	3.0		
Length of opening: $L=Q/Ch^{3/2}$	2.0	ft	
Use L=	**2**	**ft**	
Depth of ponding: $h=[Q/CL]^{2/3}$	0.11	ft	

Catch Basin No.	**2**		
Drainage area no.	**B10**		
Curb-opening CB in a sump			
Discharge, Q=	1.3	cfs	(0.31 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of flow in gutter, y=	0.03	ft	
Local depression, a=	0.17	ft	
h=y+a=	0.20	ft	
Weir coefficient, C	3.0		
Length of opening: $L=Q/Ch^{3/2}$	4.8	ft	
Use L=	**7**	**ft**	
Depth of ponding: $h=[Q/CL]^{2/3}$	0.15	ft	

Catch Basin No.	**3**		
Drainage area no.	**B8**		
Grated inlet in a sump			
Discharge, Q=	1.4	cfs	(0.34 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of pond, h=	0.25	ft	
Weir coefficient, C	3.0		
Assume 50% clogging			
Perimeter required: $L=2Q/Ch^{3/2}$	7.4	ft	
Use L=	**7**	**ft**	
Depth of ponding: $h=[2Q/CL]^{2/3}$	0.25	ft	

Catch Basin No.	**4**		
Drainage area no.	**B9**		
Grated inlet in a sump			
Discharge, Q=	4.0	cfs	(1.12 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of pond, h=	0.42	ft	
Weir coefficient, C	3.0		
Assume 50% clogging			
Perimeter required: $L=2Q/Ch^{3/2}$	9.8	ft	
Use L=	**11**	**ft**	
Depth of ponding: $h=[2Q/CL]^{2/3}$	0.39	ft	

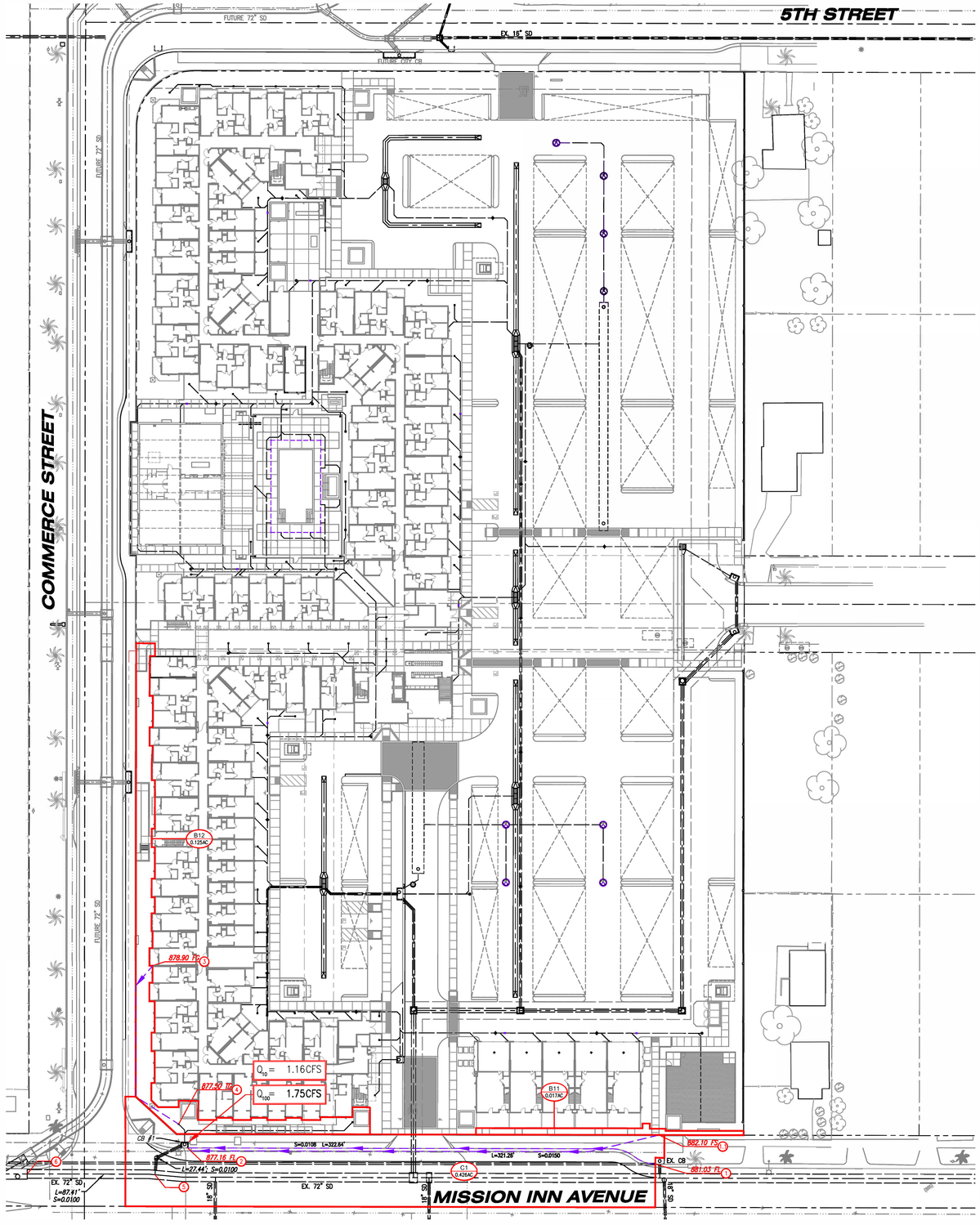
Catch Basin No.	**5**		
Drainage area no.	**A9**		
Grated inlet in a sump			
Discharge, Q=	1.3	cfs	(0.32 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of pond, h=	0.25	ft	
Weir coefficient, C	3.0		
Assume 50% clogging			
Perimeter required: $L=2Q/Ch^{3/2}$	6.8	ft	
Use L=	**7**	**ft**	
Depth of ponding: $h=[2Q/CL]^{2/3}$	0.24	ft	

Catch Basin No.	**7**		
Drainage area no.	**A7**		
Grated inlet in a sump			
Discharge, Q=	4.4	cfs	(1.32 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of pond, h=	0.42	ft	
Weir coefficient, C	3.0		
Assume 50% clogging			
Perimeter required: $L=2Q/Ch^{3/2}$	10.8	ft	
Use L=	**11**	**ft**	
Depth of ponding: $h=[2Q/CL]^{2/3}$	0.42	ft	

Catch Basin No.	**8**		
Drainage area no.	**A1**		
Grated inlet in a sump			
Discharge, Q=	1.5	cfs	(0.37 ac)
Weir equation: $Q=CLh^{3/2}$			
Depth of pond, h=	0.42	ft	
Weir coefficient, C	3.0		
Assume 50% clogging			
Perimeter required: $L=2Q/Ch^{3/2}$	3.6	ft	
Use L=	**4**	**ft**	
Depth of ponding: $h=[2Q/CL]^{2/3}$	0.39	ft	

Appendix 2.2

Post-Development Hydrology Map: Off-Site



LEGEND

- ON-SITE SUBAREA BOUNDARY
- SURFACE FLOW PATH
- S — SURFACE FLOW PATH SLOPE
- L — SURFACE FLOW PATH LENGTH
- "X" SD — STORM DRAIN PIPE SIZE
- S — PIPE FLOW PATH SLOPE
- L — PIPE FLOW PATH LENGTH
- XX / XX.XXAC — OFF-SITE SUBAREA LABEL
- XXX.XX FL XX — OFF-SITE ELEVATION NODES
- Q_{10}= XXXCFS, T_c = X.XXMIN — 10-YEAR PEAK FLOW RATE, 10-YEAR TIME OF CONCENTRATION
- Q_{100}= XXXCFS, T_c = X.XXMIN — 100-YEAR PEAK FLOW RATE, 100-YEAR TIME OF CONCENTRATION

0 20 40 80 120

SCALE: 1"=40' DATE: 09/30/24

IRON LOFTS

IRON LOFTS, LLC

POST-DEVELOPMENT HYDROLOGY MAP - OFF-SITE AREA

RIVERSIDE, CALIFORNIA

KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
17530 Von Karman Ave. - Suite 200 Tel (949) 756-6440
Irvine, California 92614

R:\Revit\Revit-Riverside-Iron Lofts\Documents\Hydrology\Final\Site 1\CAD\RL1-HYDRO-PROP-OSITE-24.07.31.dwg Sep 30, 2024 - 12:55pm

Appendix 2.3

Post-Development Hydrology Calculations:

On-site plus Off-Site Street Runoff

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - MISSION INN AVENUE STREET RUNOFF         *
* 10-YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: MISSION.DAT
  TIME/DATE OF STUDY: 17:23 07/31/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.64
  UPSTREAM ELEVATION(FEET) =    881.03
  DOWNSTREAM ELEVATION(FEET) =    877.16
  ELEVATION DIFFERENCE(FEET) =      3.87
  TC = 0.303*[(  322.64**3)/(     3.87)]**.2 =    7.401
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.550
  USER-SPECIFIED RUNOFF COEFFICIENT = .8829
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      0.96

+----------------------------------------------------------------------------+
| SUBAREA C1 SHEETFLOWS TO CB #1                                             |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.550
  USER-SPECIFIED RUNOFF COEFFICIENT = .7288
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.03
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.99
  TC(MIN.) =    7.40

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

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

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   122.07
  UPSTREAM ELEVATION(FEET) =    878.90
  DOWNSTREAM ELEVATION(FEET) =    877.50
  ELEVATION DIFFERENCE(FEET) =      1.40
  TC = 0.533*[(  122.07**3)/(     1.40)]**.2 =    8.895
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.305
  USER-SPECIFIED RUNOFF COEFFICIENT = .7143
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      2.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    14.77   MANNING'S N =  0.009
  DEPTH OF FLOW IN   4.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.21
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.97
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     136.84 FEET.

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.21     8.97       2.295        0.12
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     136.84 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.99      7.40        2.550        0.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =     322.64 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)   (INCH/HOUR)
      1       1.16        7.40        2.550
      2       1.10        8.97        2.295

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.16   Tc(MIN.) =    7.40
  TOTAL AREA(ACRES) =        0.6

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

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    20.12   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.83
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     342.76 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    87.41   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.19
  GIVEN PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
```

```
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    7.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     430.17 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.6  TC(MIN.) =      7.94
  PEAK FLOW RATE(CFS)   =       1.16
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1        1.16       7.94
  2        1.10       9.52
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



```
************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                               Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* IRON LOFTS                                                            *
* POST-DEVELOPMENT HYDROLOGY - MISSION INN AVENUE STREET RUNOFF         *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: MISSION.DAT
  TIME/DATE OF STUDY: 17:24 07/31/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.64
  UPSTREAM ELEVATION(FEET) =    881.03
  DOWNSTREAM ELEVATION(FEET) =    877.16
  ELEVATION DIFFERENCE(FEET) =      3.87
  TC = 0.303*[(  322.64**3)/(     3.87)]**.2 =    7.401
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.787
  USER-SPECIFIED RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.43
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.43

+----------------------------------------------------------------------------+
| SUBAREA C1 SHEETFLOWS TO CB #1                                             |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.787
  USER-SPECIFIED RUNOFF COEFFICIENT = .7771
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.48
  TC(MIN.) =    7.40

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

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

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   122.07
  UPSTREAM ELEVATION(FEET) =    878.90
  DOWNSTREAM ELEVATION(FEET) =    877.50
  ELEVATION DIFFERENCE(FEET) =      1.40
  TC = 0.533*[(  122.07**3)/(     1.40)]**.2 =    8.895
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.423
  USER-SPECIFIED RUNOFF COEFFICIENT = .7660
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      2.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    14.77   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.33
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     136.84 FEET.

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.33     8.96       3.409        0.12
```

```
 LONGEST FLOWPATH FROM NODE      3.00 TO NODE      2.00 =     136.84 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        1.48     7.40       3.787        0.44
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =     322.64 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       1.75       7.40        3.787
     2       1.66       8.96        3.409

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       1.75   Tc(MIN.) =    7.40
 TOTAL AREA(ACRES) =        0.6

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

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    20.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.33
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.75
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.48
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     342.76 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    87.41   MANNING'S N =  0.013
 DEPTH OF FLOW IN  72.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.62
 GIVEN PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.75
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.88
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     430.17 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.6  TC(MIN.) =      7.88
  PEAK FLOW RATE(CFS)   =       1.75
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1        1.75       7.88
  2        1.66       9.45
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Program Package Serial Number: 7379

WATER SURFACE PROFILE LISTING Date:10- 2-2024 Time:12:58:11

Iron Lofts
Hydraulic Grade Line
Line B - 100-Year Storm Event

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
103.000	866.630	.175	866.805	1.75	15.24	3.60	870.41	.00	.50	.96	1.500	.000	.00	1 .0
2.006	.4497					.3175	.64	.17	7.77	.16	.013	.00	.00	PIPE
105.006	867.532	.179	867.711	1.75	14.60	3.31	871.02	.00	.50	.97	1.500	.000	.00	1 .0
1.726	.4497					.2789	.48	.18	7.33	.16	.013	.00	.00	PIPE
106.732	868.308	.185	868.493	1.75	13.92	3.01	871.50	.00	.50	.99	1.500	.000	.00	1 .0
1.296	.4497					.2433	.32	.19	6.87	.16	.013	.00	.00	PIPE
108.028	868.891	.191	869.082	1.75	13.27	2.74	871.82	.00	.50	1.00	1.500	.000	.00	1 .0
1.019	.4497					.2126	.22	.19	6.44	.16	.013	.00	.00	PIPE
109.047	869.350	.198	869.548	1.75	12.66	2.49	872.03	.00	.50	1.02	1.500	.000	.00	1 .0
.833	.4497					.1856	.15	.20	6.04	.16	.013	.00	.00	PIPE
109.881	869.724	.204	869.928	1.75	12.07	2.26	872.19	.00	.50	1.03	1.500	.000	.00	1 .0
.690	.4497					.1619	.11	.20	5.66	.16	.013	.00	.00	PIPE
110.570	870.034	.211	870.246	1.75	11.50	2.06	872.30	.00	.50	1.04	1.500	.000	.00	1 .0
.583	.4497					.1414	.08	.21	5.31	.16	.013	.00	.00	PIPE
111.154	870.297	.218	870.515	1.75	10.97	1.87	872.38	.00	.50	1.06	1.500	.000	.00	1 .0
.496	.4497					.1235	.06	.22	4.98	.16	.013	.00	.00	PIPE
111.650	870.520	.226	870.746	1.75	10.46	1.70	872.44	.00	.50	1.07	1.500	.000	.00	1 .0
2.465	.1382					.1121	.28	.23	4.67	.22	.013	.00	.00	PIPE

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Iron Lofts
Hydraulic Grade Line
Line B - 100-Year Storm Event

Station	Invert Elev	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
114.115	870.861	.229	871.090	1.75	10.25	1.63	872.72	.00	.50	1.08	1.500	.000	.00	1 .0
3.889	.1382					.1019	.40	.23	4.54	.22	.013	.00	.00	PIPE
118.004	871.399	.236	871.635	1.75	9.78	1.48	873.12	.00	.50	1.09	1.500	.000	.00	1 .0
2.571	.1382					.0889	.23	.24	4.26	.22	.013	.00	.00	PIPE
120.575	871.754	.244	871.998	1.75	9.32	1.35	873.35	.00	.50	1.11	1.500	.000	.00	1 .0
1.891	.1382					.0776	.15	.24	3.99	.22	.013	.00	.00	PIPE
122.466	872.015	.252	872.267	1.75	8.89	1.23	873.49	.00	.50	1.12	1.500	.000	.00	1 .0
1.455	.1382					.0678	.10	.25	3.74	.22	.013	.00	.00	PIPE
123.921	872.216	.261	872.478	1.75	8.47	1.11	873.59	.00	.50	1.14	1.500	.000	.00	1 .0
1.170	.1382					.0593	.07	.26	3.50	.22	.013	.00	.00	PIPE
125.091	872.378	.270	872.648	1.75	8.08	1.01	873.66	.00	.50	1.15	1.500	.000	.00	1 .0
.962	.1382					.0518	.05	.27	3.28	.22	.013	.00	.00	PIPE
126.053	872.511	.279	872.790	1.75	7.70	.92	873.71	.00	.50	1.17	1.500	.000	.00	1 .0
.804	.1382					.0452	.04	.28	3.08	.22	.013	.00	.00	PIPE
126.856	872.622	.288	872.910	1.75	7.34	.84	873.75	.00	.50	1.18	1.500	.000	.00	1 .0
.670	.1382					.0395	.03	.29	2.88	.22	.013	.00	.00	PIPE
127.526	872.715	.298	873.013	1.75	7.00	.76	873.77	.00	.50	1.20	1.500	.000	.00	1 .0
.571	.1382					.0345	.02	.30	2.70	.22	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date:10- 2-2024 Time:12:58:11

Iron Lofts
Hydraulic Grade Line
Line B - 100-Year Storm Event

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
128.097	872.794	.308	873.102	1.75	6.68	.69	873.79	.00	.50	1.21	1.500	.000	.00	1 .0
.481	.1382					.0302	.01	.31	2.53	.22	.013	.00	.00	PIPE
128.578	872.860	.319	873.179	1.75	6.37	.63	873.81	.00	.50	1.23	1.500	.000	.00	1 .0
.413	.1382					.0264	.01	.32	2.37	.22	.013	.00	.00	PIPE
128.991	872.917	.330	873.247	1.75	6.07	.57	873.82	.00	.50	1.24	1.500	.000	.00	1 .0
.356	.1382					.0231	.01	.33	2.22	.22	.013	.00	.00	PIPE
129.347	872.966	.341	873.307	1.75	5.79	.52	873.83	.00	.50	1.26	1.500	.000	.00	1 .0
.307	.1382					.0202	.01	.34	2.08	.22	.013	.00	.00	PIPE
129.654	873.009	.352	873.361	1.75	5.52	.47	873.83	.00	.50	1.27	1.500	.000	.00	1 .0
.249	.1382					.0176	.00	.35	1.95	.22	.013	.00	.00	PIPE
129.903	873.043	.365	873.408	1.75	5.26	.43	873.84	.00	.50	1.29	1.500	.000	.00	1 .0
.220	.1382					.0154	.00	.37	1.82	.22	.013	.00	.00	PIPE
130.123	873.074	.377	873.451	1.75	5.02	.39	873.84	.00	.50	1.30	1.500	.000	.00	1 .0
.181	.1382					.0135	.00	.38	1.71	.22	.013	.00	.00	PIPE
130.304	873.099	.390	873.489	1.75	4.78	.36	873.84	.00	.50	1.32	1.500	.000	.00	1 .0
.145	.1382					.0118	.00	.39	1.60	.22	.013	.00	.00	PIPE
130.448	873.119	.404	873.523	1.75	4.56	.32	873.85	.00	.50	1.33	1.500	.000	.00	1 .0
.120	.1382					.0103	.00	.40	1.50	.22	.013	.00	.00	PIPE

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Iron Lofts
Hydraulic Grade Line
Line B - 100-Year Storm Event

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
130.568	873.135	.418	873.553	1.75	4.35	.29	873.85	.00	.50	1.35	1.500	.000	.00	1 .0
.098	.1382					.0090	.00	.42	1.40	.22	.013	.00	.00	PIPE
130.666	873.149	.432	873.581	1.75	4.15	.27	873.85	.00	.50	1.36	1.500	.000	.00	1 .0
.071	.1382					.0079	.00	.43	1.31	.22	.013	.00	.00	PIPE
130.737	873.159	.447	873.606	1.75	3.95	.24	873.85	.00	.50	1.37	1.500	.000	.00	1 .0
.046	.1382					.0069	.00	.45	1.23	.22	.013	.00	.00	PIPE
130.784	873.165	.463	873.628	1.75	3.77	.22	873.85	.00	.50	1.39	1.500	.000	.00	1 .0
.031	.1382					.0061	.00	.46	1.15	.22	.013	.00	.00	PIPE
130.814	873.169	.479	873.648	1.75	3.59	.20	873.85	.00	.50	1.40	1.500	.000	.00	1 .0
.006	.1382					.0053	.00	.48	1.07	.22	.013	.00	.00	PIPE
130.820	873.170	.498	873.668	1.75	3.42	.18	873.85	.00	.50	1.41	1.500	.000	.00	1 .0

CB1 - Curb Opening Inlet Q10

Project Description	
Solve For	Spread

Input Data	
Discharge	1.16 cfs
Gutter Width	2.00 ft
Gutter Cross Slope	0.022 ft/ft
Road Cross Slope	0.020 ft/ft
Curb Opening Length	4.0 ft
Opening Height	0.7 ft
Curb Throat Type	Horizontal
Local Depression	2.0 in
Local Depression Width	2.0 in
Throat Incline Angle	90.00 degrees

Results	
Spread	8.2 ft
Depth	2.0 in
Gutter Depression	0.0 in
Total Depression	2.0 in

CB1 - Curb Opening Inlet Q100

Project Description	
Solve For	Spread

Input Data	
Discharge	1.75 cfs
Gutter Width	2.00 ft
Gutter Cross Slope	0.022 ft/ft
Road Cross Slope	0.020 ft/ft
Curb Opening Length	4.0 ft
Opening Height	0.7 ft
Curb Throat Type	Horizontal
Local Depression	2.0 in
Local Depression Width	2.0 in
Throat Incline Angle	90.00 degrees

Results	
Spread	10.8 ft
Depth	2.6 in
Gutter Depression	0.0 in
Total Depression	2.0 in

Pipe Capacity: 18SD @0.192 - Q10

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.192 ft/ft
Diameter	18.0 in
Discharge	1.16 cfs

Results	
Normal Depth	2.0 in
Flow Area	0.1 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.2 in
Top Width	0.94 ft
Critical Depth	4.8 in
Percent Full	10.9 %
Critical Slope	0.005 ft/ft
Velocity	11.04 ft/s
Velocity Head	1.90 ft
Specific Energy	2.06 ft
Froude Number	5.815
Maximum Discharge	49.47 cfs
Discharge Full	45.99 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	10.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.0 in
Critical Depth	4.8 in
Channel Slope	0.192 ft/ft
Critical Slope	0.005 ft/ft

Pipe Capacity: 18SD @0.192 - Q100

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.192 ft/ft
Diameter	18.0 in
Discharge	1.75 cfs

Results	
Normal Depth	2.4 in
Flow Area	0.1 ft²
Wetted Perimeter	1.1 ft
Hydraulic Radius	1.5 in
Top Width	1.02 ft
Critical Depth	6.0 in
Percent Full	13.3 %
Critical Slope	0.005 ft/ft
Velocity	12.51 ft/s
Velocity Head	2.43 ft
Specific Energy	2.63 ft
Froude Number	5.952
Maximum Discharge	49.47 cfs
Discharge Full	45.99 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	13.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.4 in
Critical Depth	6.0 in
Channel Slope	0.192 ft/ft
Critical Slope	0.005 ft/ft

Pipe Capacity: 18SD @0.010 - Q100

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	1.75 cfs

Results	
Normal Depth	5.0 in
Flow Area	0.4 ft²
Wetted Perimeter	1.7 ft
Hydraulic Radius	2.9 in
Top Width	1.34 ft
Critical Depth	6.0 in
Percent Full	27.6 %
Critical Slope	0.005 ft/ft
Velocity	4.41 ft/s
Velocity Head	0.30 ft
Specific Energy	0.72 ft
Froude Number	1.427
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	27.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.0 in
Critical Depth	6.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

Pipe Capacity: 18SD @0.008 - Q100

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.008 ft/ft
Diameter	18.0 in
Discharge	1.75 cfs

Results	
Normal Depth	5.4 in
Flow Area	0.4 ft²
Wetted Perimeter	1.7 ft
Hydraulic Radius	3.1 in
Top Width	1.37 ft
Critical Depth	6.0 in
Percent Full	29.7 %
Critical Slope	0.005 ft/ft
Velocity	3.98 ft/s
Velocity Head	0.25 ft
Specific Energy	0.69 ft
Froude Number	1.237
Maximum Discharge	9.79 cfs
Discharge Full	9.10 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	29.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.4 in
Critical Depth	6.0 in
Channel Slope	0.008 ft/ft
Critical Slope	0.005 ft/ft

Pipe Capacity: 18SD @0.005 - Q100

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	18.0 in
Discharge	1.75 cfs

Results	
Normal Depth	5.9 in
Flow Area	0.5 ft²
Wetted Perimeter	1.8 ft
Hydraulic Radius	3.3 in
Top Width	1.41 ft
Critical Depth	6.0 in
Percent Full	33.0 %
Critical Slope	0.005 ft/ft
Velocity	3.44 ft/s
Velocity Head	0.18 ft
Specific Energy	0.68 ft
Froude Number	1.009
Maximum Discharge	7.99 cfs
Discharge Full	7.43 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.9 in
Critical Depth	6.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft