DRAINAGE STUDY

1923 DENTRO DE LOMAS
Bonsall, CA 92003

Permit Number: PDS2022-LDGRMN-20336

Submittal Date(s):
Prescreen: January 5, 2022
First Submittal: March 11, 2022
Second Submittal: June 27, 2022

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Fusion Project Number WO#0182-0001

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DECLARATION OF RESPONSIBLE CHARGE

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

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

BY: _____ DATE: 03/09/2022

John Silas Rivera

RCE NO.: 73878 EXPIRES: 6/30/2023

FUSION ENGINEERING & TECHNOLOGY
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Table of Contents

Executive Summary

This drainage study presents a hydrologic and hydraulic analysis of the grading improvements at 1923 Dentro De Lomas in Bonsall, California. This study examines the predeveloped and post-developed hydrology of the site and presents final design engineering recommendations for the project drainage facilities necessary to mitigate runoff due to the proposed improvements.

Section 1 – Project Information

Project Description

The project is located at 1923 Dentro de Lomas, in Bonsall, California. It is located approximately 0.66 miles north of Gopher Canyon Road, 2.72 miles west of Interstate 15, and 1.75 miles east of State Road 76. The project coordinates are 33.26485 Latitude / -117.20424 Longitude. The overall lot size is 16.0-acres however, the actual project area will only impact/disturb 8.05 acres. The lot currently contains improvements on its northern half consisting of a single-family home, private driveways, landscaped areas, horse corral, pasture, and other various building structures which are all not associated with the new grading improvements. There are no known historic sources of contamination at the site. Refer to **Exhibit A** for the vicinity map of the project location. This project re-grades the southern half of the lot into tiered pads draining towards an existing natural drainage course which transects the lot in an east-west direction. Since this project will not create any additional impervious surfaces or exceed thresholds to become a Priority Development Project (PDP), no stormwater improvements other than some site design and source control features are proposed. Please refer to the project Standard Storm Water Quality Management Plan (SWQMP) for additional detailed water quality information. This drainage study will address peak flow calculations and any mitigation measures as necessary. **Appendix A** of this study fully describes the pre and post condition hydrological results of the developed site with hydrologic calculations and associated drainage maps. A detention basin is being proposed to keep the peak flow in the post-developed condition below that of the pre-developed condition, see **Appendix C** for the detention analysis. See **Appendix B** for hydraulic calculations for the proposed storm drain facilities.

Hydrologic Setting

The project site is in the Bonsall Hydrologic Sub-Area (903.12) of Lower San Luis Rey Hydrologic Area (903.1) of San Luis Rey Hydrologic Unit (903). **Exhibit B** illustrates the project site in the context of the watershed.

As mentioned above, the project area is essentially the southern portion of the lot. This portion drains in a northerly direction until it reaches the existing natural drainage course which then drains in the westerly direction. From the western project boundary, runoff continues in a northwesterly direction before ultimately reaching the San Luis Rey River located about 1.4 miles away from the site. The project site is hilly with elevations ranging between 520 and 368 feet

above mean sea level (msl). Existing site topography, drainage patterns, and stormwater conveyance systems are shown on existing condition drainage map in **Appendix A**.

The existing surrounding areas generally consist of single-family rural-residential homes with open space areas. The County of San Diego denotes the property with a designation of Rural Residential (RR). The assessor's parcel number (APN) for the site is 127-141-40-00. **Exhibit C** illustrates the project zone information from the County of San Diego PDS- Zoning & Property Information website.

The NRCS WebSoil Survey by the United States Department of Agriculture Soil Conservation Service was referenced as a source to determine the site's underlying hydrologic soil group classification. It determined the sites underlying soil to consist of Type D soils (Friant rocky fine sandy loam and a little Placentia sandy loam). Type D soils are characterized by 'a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.' **Exhibit D** illustrates the soil types and limits.

The Federal Emergency Management Agency (FEMA) website was referenced to determine the site's location relative to any mapped flood hazard areas. The project site was determined to be within an area on the FEMA Flood Insurance Rate Map designated as Zone X, an area of minimal flood hazard. The FIRMette Map associated with this project is included in **Exhibit E**.

Section 2 – Hydrologic and Hydraulic Methodology

Hydrology/ Rational Method

Per the County of San Diego drainage standards, the 50 and 100-year frequency, 6-hour, storm event rainfall precipitation depths are 2.75 inches and 3.1 inches, respectively.

2.1 Rational Method Hydrologic Analysis

Design Storm – 100-year return intervals

Land Use – Single Family development

Soil Type – The NRCS Web Soil Survey website has indicated that the site's soil is underlain with Group D soil.

Runoff Coefficient – In accordance with the San Diego County Hydrology Manual (SDCHM) Standards, the C coefficient for natural and undeveloped areas is 0.35 for Group D soils; the C coefficient for developed areas is a weighted factor of 0.35 (landscape in soil) and 0.9 (impervious areas) as a function of the fraction of impervious areas (a_i expressed as a decimal value between 0 and 1) according to:

$$C = 0.35(1-a_i) + 0.9a_i$$

Rainfall Intensity – Intensity was determined using equation in Section 3.1.3 of the San Diego County Hydrology Manual. Due to the site's respective size and development type, Figure 3-4 in Section 3.1.4.2 of the Manual was considered applicable and was utilized to determine Tc

Method of Analysis – The Rational Method is the most widely used hydrologic model for estimating peak runoff rates. Applied to small urban and semi-urban areas with drainage areas less than 0.5 square miles, the Rational Method relates storm rainfall intensity, a runoff coefficient, and drainage area to peak runoff rate. This relationship is expressed by the equation:

$$Q = C\ I\ A$$

where:

Q = The peak runoff rate in cubic feet per second at the point of analysis.
C = A runoff coefficient representing the area - averaged ratio of runoff to rainfall intensity.
I = The time-averaged rainfall intensity in in/hr. corresponding to the time of concentration.
A = The drainage basin area in acres.

Storm Drain/Hydraulics

The proposed private storm drain system was sized to convey the runoff from the 100-year storm event. The calculations were performed utilizing the AutoCAD Civil3D Hydraflow Express extension & Storm Sewers. There are multiple intermediate storm drain discharges within the project site with velocities that exceed 18 fps. In these locations a continuous rip rap apron is provided between the outlet of the upstream pipe and the inlet of the subsequent downstream pipe. Therefore, standard rip rap is specified, and no special design is proposed.

See **Appendix B** for hydraulic calculations

Section 3 – Hydrologic Effect of Project

Existing Condition

The project site is about 8.05 acres within an existing 16.0-acre lot. Both the northern and southern portions of the lot drain towards an existing drainage course which transects the site and flows towards the western project boundary. The northern portion is partially developed with a single-family home while the southern half is a natural slope. The existing weighted runoff coefficient for the entire watershed is 0.359. The Q100 peak flow from the site at the western project boundary was determined to be 216.78 cfs. See **Appendix A** for calculations and existing condition drainage map.

Proposed Condition

The proposed project will regrade the southern half of the lot. The grading will consist of adding tiered pads but will not add any impervious surfaces. Storm drain facilities consisting of storm drain pipe, rip rap, and swales will be constructed to convey both onsite and offsite runoff through the site and towards the western property boundary.

The site's overall runoff factor in the post developed condition is unchanged and remains at 0.359. The unmitigated Q100 peak flow was calculated to be 221.72 cfs. The mitigated Q100 peak flow was calculated to be 206.27 cfs. See **Appendix C** for a detention analysis regarding the mitigated post developed condition. **Table 1** below summarizes the hydrologic calculations for both the existing and proposed drainage areas graphically depicted on the hydrology maps in **Appendix A.**

Table 1- Summary of Total Pre Vs Post Developed Conditions

Condition	Area (acres)	100-Year Peak Flow (cfs)
Existing	175.8	216.78
Proposed (Unmitigated)	175.8	221.72
Proposed (Mitigated)	175.8	206.27
Difference	0.0	-10.51

Once peak flows were determined, the storm drain capacity was verified by performing hydraulic capacity calculations. Refer to **Appendix B** for post condition hydraulic calculations for proposed storm drain system.

Project Erosion and Sedimentation

The project proposes permanent drainage facilities which will match or minimize the erosion potential compared to existing conditions at the site. Neither erosion or sedimentation are anticipated due to the mitigating effects provided by the proposed grading improvements and drainage facilities. Also, the project will implement construction phase BMPS per the project-specific Storm Water Pollution Prevention Plan (SWPPP) to address pollutants during construction.

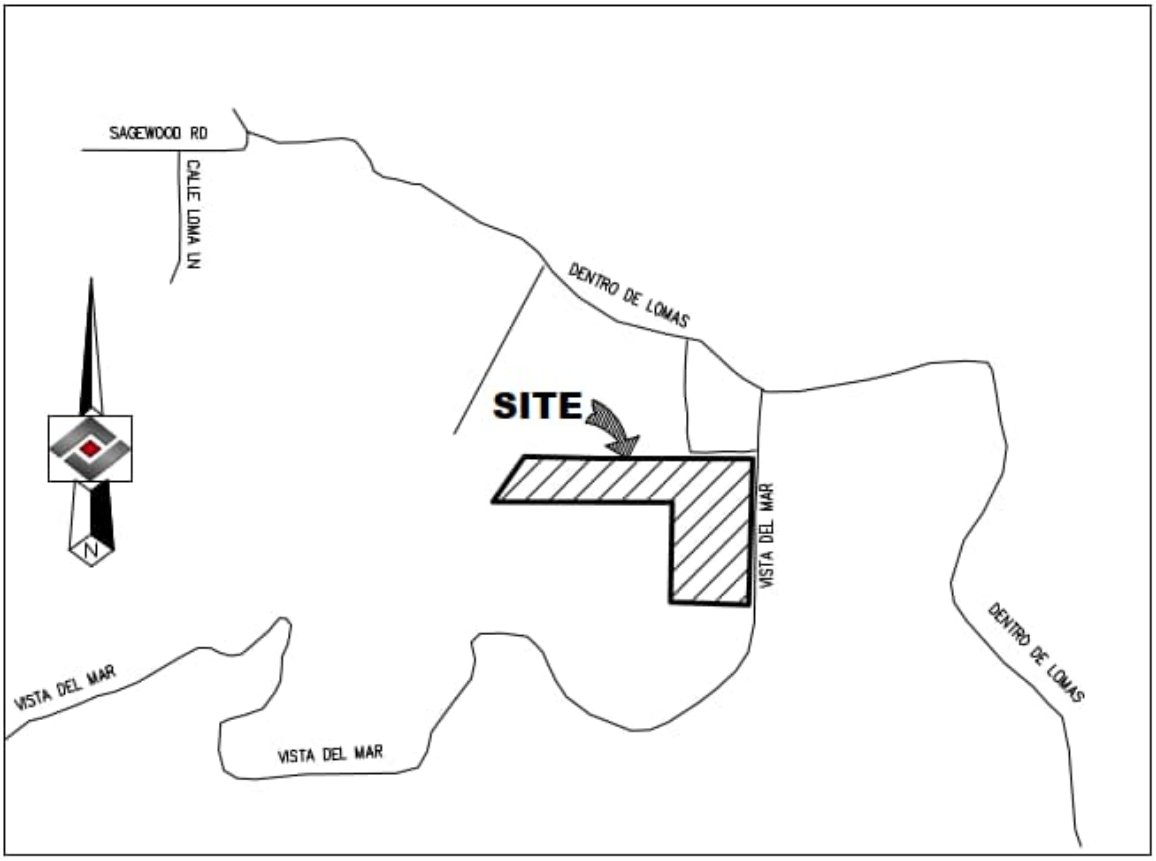
Section 4 – Summary and Conclusions

The proposed grading improvements at 1923 Dentro de Lomas can be constructed without increases to peak flow and will not detrimentally affect the downstream watershed.

Section 5 – References

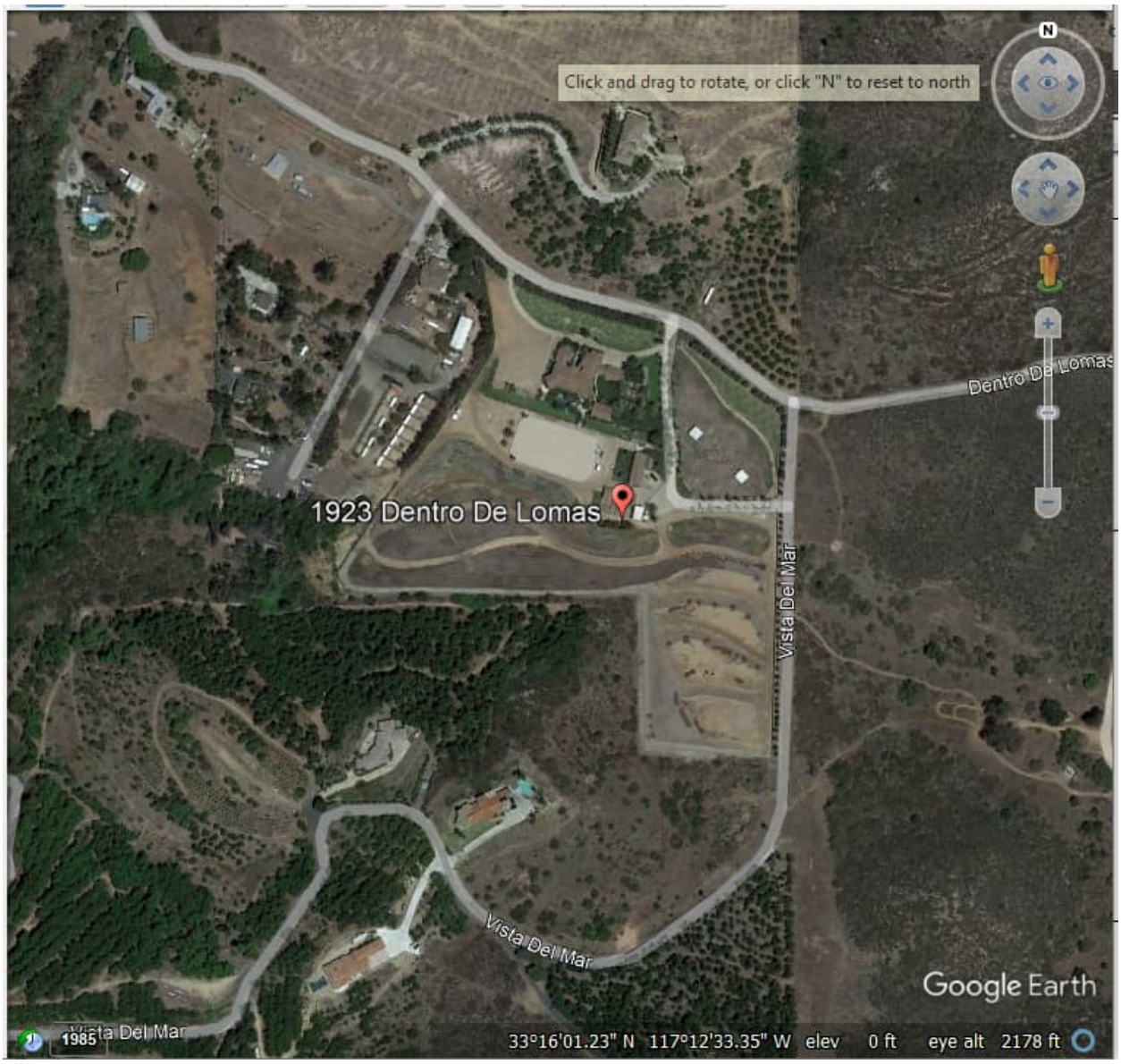
- San Diego County Hydrology Manual, June 2003
- San Diego County Hydraulic Design Manual, September 2014

Exhibit A- Vicinity Map



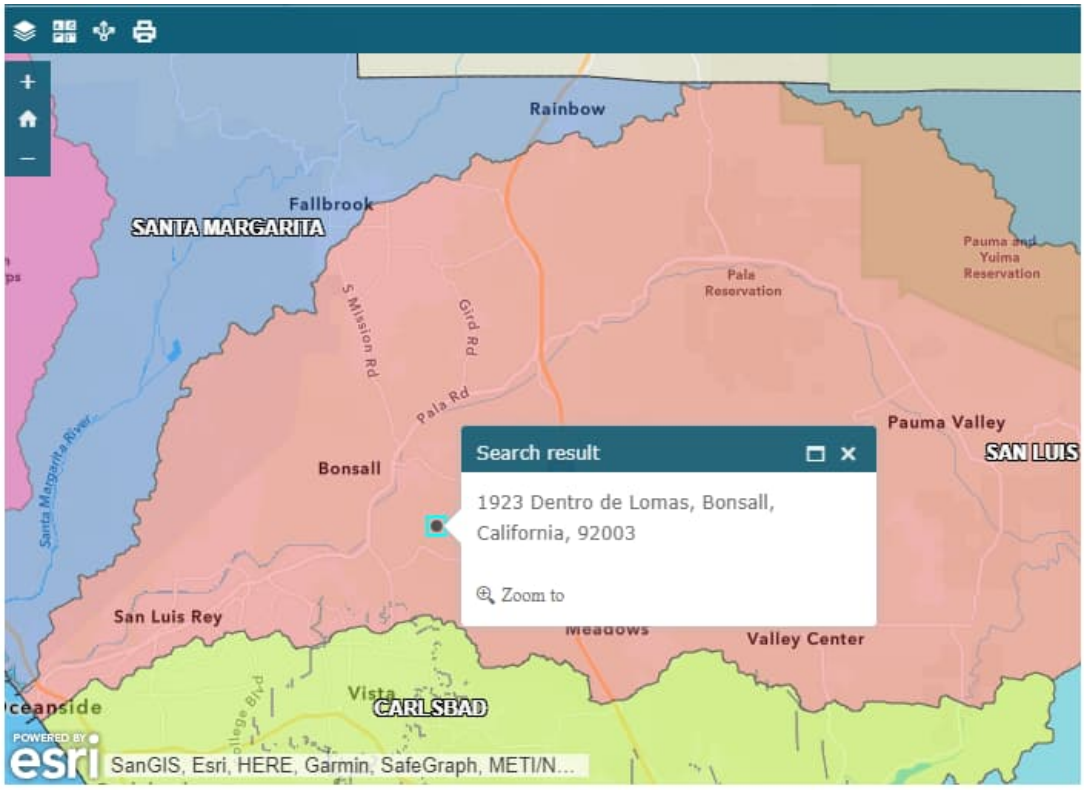
VICINITY MAP

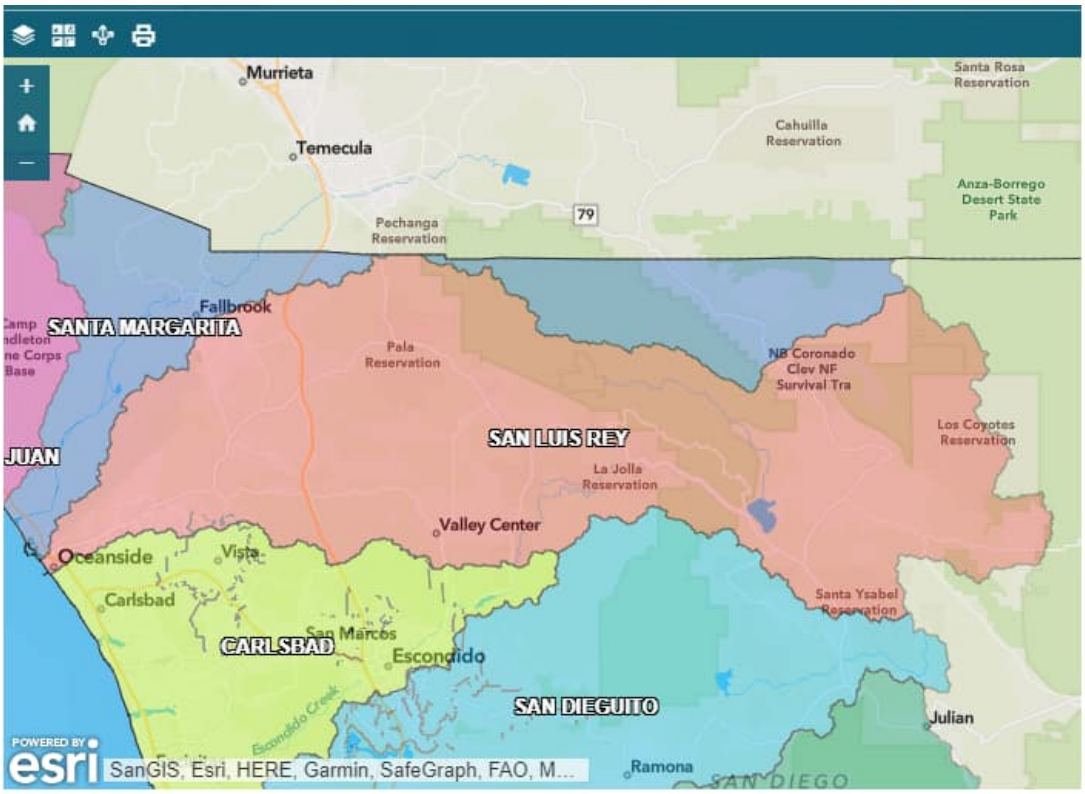
NOT TO SCALE

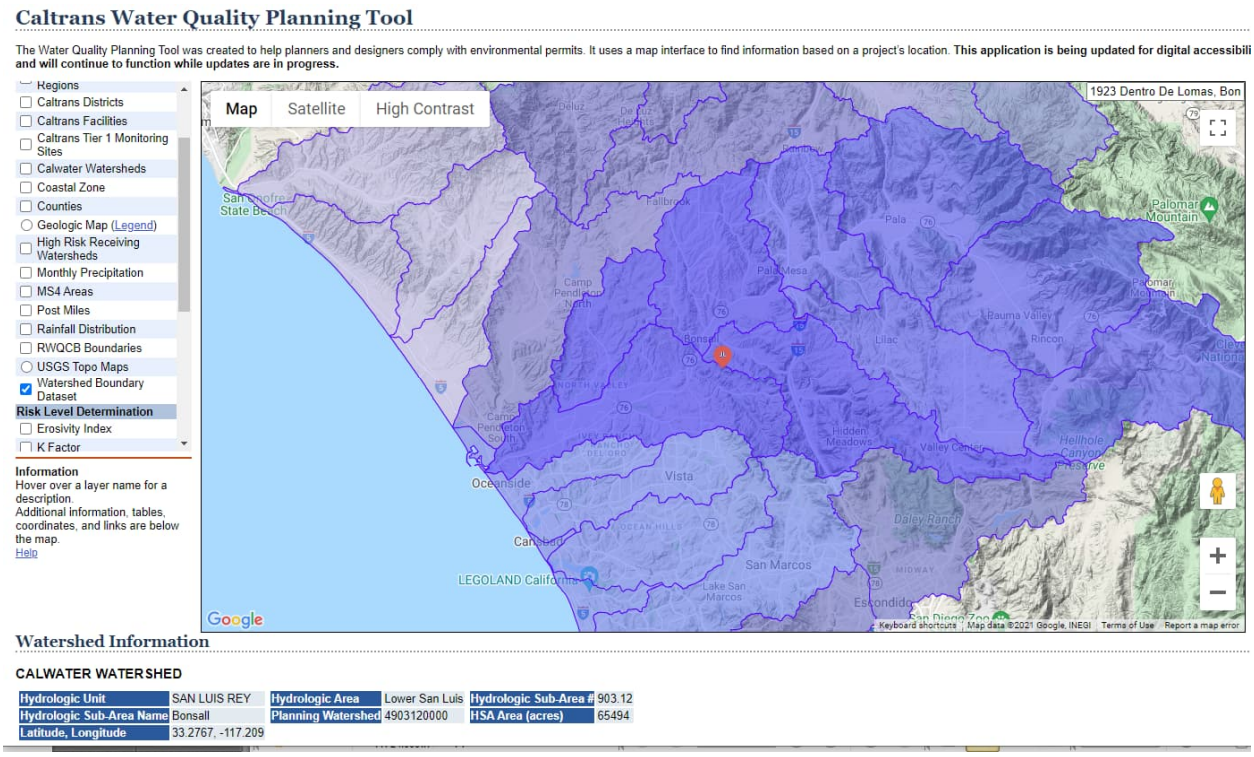


Source: Google Earth Pro

Exhibit B- Watershed Vicinity Map







Source: http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx

Exhibit C- County Zone Map Designation

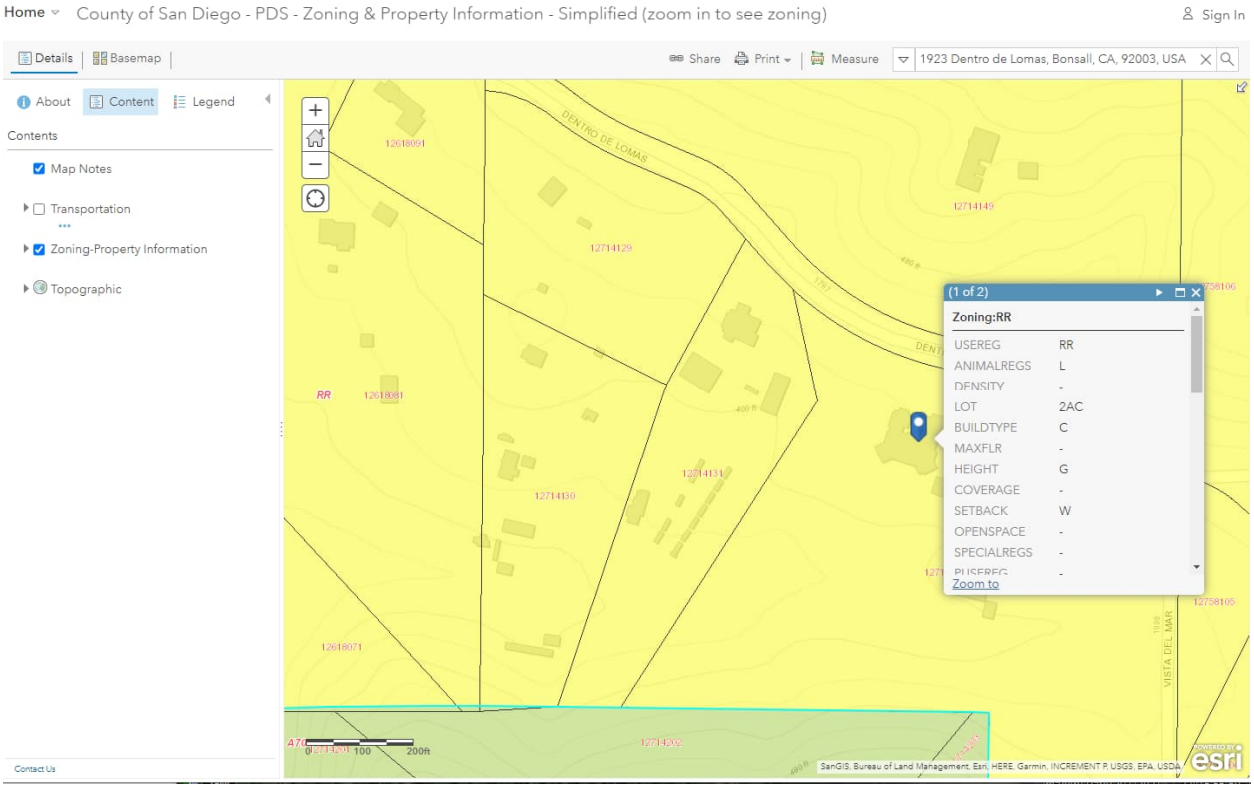


Exhibit D- Geologic Soil Maps

Hydrologic Soil Group—San Diego County Area, California
(1923 Dentro de Lomas)

Map Scale: 1:1,980 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 16, Sep 13, 2021

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FxG	Friant rocky fine sandy loam, 30 to 70 percent slopes	D	9.0	93.6%
PeC2	Placentia sandy loam, 5 to 9 percent slopes, eroded	D	0.0	0.3%
PfC	Placentia sandy loam, thick surface, 2 to 9 percent slo pes	D	0.6	6.1%
Totals for Area of Interest			**9.6**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Exhibit E- FEMA Firmette Map

National Flood Hazard Layer FIRMette

FEMA

117°12'42"W 33°16'10"N

117°12'4"W 33°15'40"N

Feet 1:6,000

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

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

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

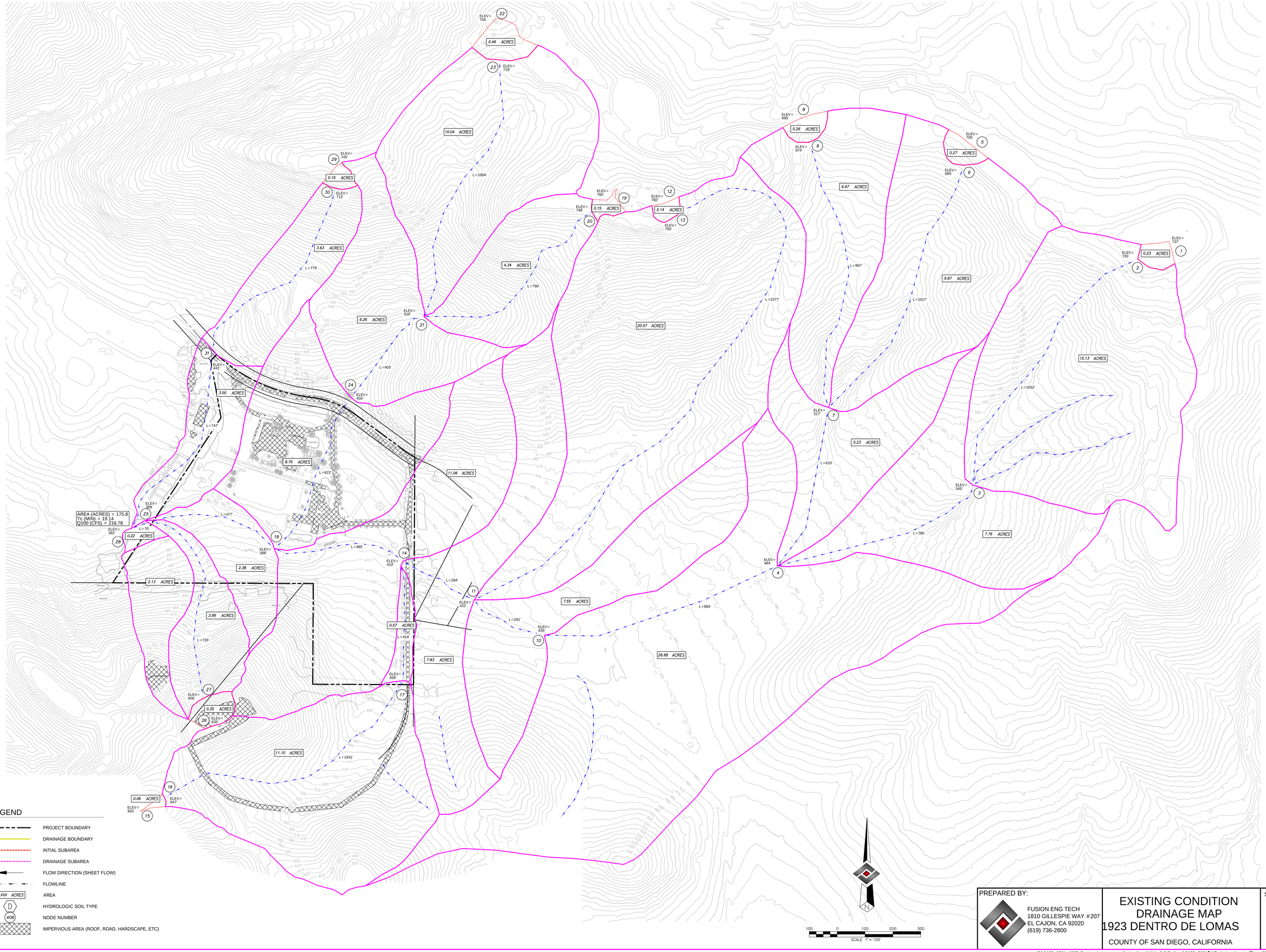
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/5/2022 at 12:08 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix A- Hydrologic Maps & Calculations



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EXISTING CONDITION DRAINAGE MAP
1923 DENTRO DE LOMAS

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 1

W.O.# 0182-0001

R:\0182-0001 1923 Dentro de Lomas - Craig, Meredith\Hyd\CAD Maps\0182-0001$HYD_Hydro_Map.dwg[] Jan-05-2022:12:33

AREA (ACRES) = 175.8
Tc (MIN) = 21.51
Q100 (CFS) = 206.27

404 ELEV= 755
0.49 ACRES
405 ELEV= 718
10.04 ACRES
L=1004'
408 ELEV= 754
0.16 ACRES
409 ELEV= 713
3.63 ACRES
L=779'
4.34 ACRES
L=790'
6.26 ACRES
403 ELEV= 509
L=403'
410 ELEV= 435
L=778'
406 ELEV= 434
8.20 ACRES
2.79 ACRES
L=533'
125
11.96 ACRES
L=282'
211 ELEV= 422
L=291'
210 ELEV= 435
L=1048'
101 ELEV= 652
0.06 ACRES
102 ELEV= 647
11.09 ACRES
401 ELEV= 760
402 0.15 ACRES
ELEV= 748
212 ELEV= 760
0.14 ACRES
213 ELEV= 755
20.57 ACRES
L=2277'
208 ELEV= 695
0.26 ACRES
209 ELEV= 674
6.97 ACRES
L=997'
207 ELEV= 517
5.23 ACRES
L=610'
7.55 ACRES
L=884'
204 ELEV= 484
26.68 ACRES
205 ELEV= 705
0.27 ACRES
ELEV= 685
206
9.87 ACRES
L=1017'
201 ELEV= 737
0.23 ACRES
ELEV= 735
202
15.13 ACRES
L=1052'
203 ELEV= 545
L=785'
7.76 ACRES

SEE SHEET 02

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INTIAL SUBAREA
- DRAINAGE SUBAREA
- FLOW DIRECTION (SHEET FLOW)
- FLOWLINE
- X.XXX ACRES — AREA
- D — HYDROLOGIC SOIL TYPE
- 406 — NODE NUMBER
- IMPERVIOUS AREA (ROOF, ROAD, HARDSCAPE, ETC)

N

100 0 100 200 300
SCALE 1"= 100'

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PROPOSED CONDITION DRAINAGE MAP
1923 DENTRO DE LOMAS
COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 1 OF 2

W.O.# 0182-0001

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AREA (ACRES) = 175.8
Tc (MIN) = 21.61
Q100 (CFS) = 206.27

SEE SHEET 01

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INTIAL SUBAREA
- DRAINAGE SUBAREA
- FLOW DIRECTION (SHEET FLOW)
- FLOWLINE
- X.XXX ACRES — AREA
- D — HYDROLOGIC SOIL TYPE
- 406 — NODE NUMBER
- IMPERVIOUS AREA (ROOF, ROAD, HARDSCAPE, ETC)

SCALE 1"= 50

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PROPOSED CONDITION DRAINAGE MAP
1923 DENTRO DE LOMAS

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET 2 OF 2

W.O.# 0182-0001

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EXISTING CONDITION

Q100 HYDROLOGY MODEL

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1239

                              Analysis prepared by:




  ************************** DESCRIPTION OF STUDY
**************************
 * 1923 Dentro De Lomas
*
 * EXISTING CONDITION
*
 * Q100 Model
*

*****************************************************************************
*

   FILE NAME: R:\AES\0182\0001\EX\EX100.DAT
   TIME/DATE OF STUDY: 10:16 01/04/2022
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   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ---------------------------------------------------------------------------
----
   2003 SAN DIEGO MANUAL CRITERIA

   USER SPECIFIED STORM EVENT(YEAR) = 100.00
   6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.90
   SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW
MODEL*
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:
MANNING
      WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE
FACTOR
```

```
 NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)
(n)
 ===  =====  =========  =================  ======  ===== ====== =====
=======
   1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167
0.0150
   2   17.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   3   20.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   4   16.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   5   26.0     18.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   6   44.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150

   GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
     1. Relative Flow-Depth =  0.50 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
 --------------------------------------------------------------------------
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   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    737.00
   DOWNSTREAM ELEVATION(FEET) =    735.00
   ELEVATION DIFFERENCE(FEET) =      2.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.879
   WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
            THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
            (Reference: Table 3-1B of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
   SUBAREA RUNOFF(CFS) =      0.42
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.42


****************************************************************************
***
   FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
 ------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

========================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    735.00  DOWNSTREAM(FEET) =
545.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1052.00   CHANNEL SLOPE =  0.1806
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.564
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.58
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.16
   AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   2.45
   Tc(MIN.) =   12.33
   SUBAREA AREA(ACRES) =    15.13       SUBAREA RUNOFF(CFS) =   24.17
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =
24.54

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   8.54
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1152.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  51
 ------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

========================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    545.00  DOWNSTREAM(FEET) =
484.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   785.00   CHANNEL SLOPE =  0.0777
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.146
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.17
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.62
   AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.98
   Tc(MIN.) =   14.30
```

```
   SUBAREA AREA(ACRES) =     7.76       SUBAREA RUNOFF(CFS) =   11.26
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       23.1         PEAK FLOW RATE(CFS) =
33.55

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   6.84
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1937.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  10
 --------------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    705.00
   DOWNSTREAM ELEVATION(FEET) =    685.00
   ELEVATION DIFFERENCE(FEET) =     20.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.67
   TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      0.67


****************************************************************************
***
   FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    690.00  DOWNSTREAM(FEET) =
517.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1017.00   CHANNEL SLOPE =  0.1701
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.681
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.56
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.75
   AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.51
   Tc(MIN.) =    8.78
   SUBAREA AREA(ACRES) =     9.87       SUBAREA RUNOFF(CFS) =   19.62
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =
20.16

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   8.09
   LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =    1117.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.78
   RAINFALL INTENSITY(INCH/HR) =   5.68
   TOTAL STREAM AREA(ACRES) =    10.14
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.16


****************************************************************************
***
   FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
```

```
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    695.00
   DOWNSTREAM ELEVATION(FEET) =    674.00
   ELEVATION DIFFERENCE(FEET) =     21.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.64
   TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.64


****************************************************************************
***
   FLOW PROCESS FROM NODE      9.00 TO NODE      7.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    674.00  DOWNSTREAM(FEET) =
517.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   997.00   CHANNEL SLOPE =  0.1575
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.563
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.52
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.93
   AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   2.80
   Tc(MIN.) =    9.07
   SUBAREA AREA(ACRES) =     6.97       SUBAREA RUNOFF(CFS) =   13.57
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        7.2         PEAK FLOW RATE(CFS) =
14.08

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   7.12
   LONGEST FLOWPATH FROM NODE      8.00 TO NODE      7.00 =    1097.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

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

================================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    9.07
   RAINFALL INTENSITY(INCH/HR) =   5.56
   TOTAL STREAM AREA(ACRES) =     7.23
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.08

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       20.16     8.78        5.681         10.14
       2       14.08     9.07        5.563          7.23

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       33.79     8.78       5.681
       2       33.82     9.07       5.563

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      33.82   Tc(MIN.) =    9.07
   TOTAL AREA(ACRES) =       17.4
   LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =    1117.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE      7.00 TO NODE      4.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =
484.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00   CHANNEL SLOPE =  0.0541
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.992
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.39
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.14
```

```
   AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.66
   Tc(MIN.) =   10.73
   SUBAREA AREA(ACRES) =     5.23       SUBAREA RUNOFF(CFS) =    9.14
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       22.6         PEAK FLOW RATE(CFS) =
39.49

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   6.19
   LONGEST FLOWPATH FROM NODE      5.00 TO NODE      4.00 =    1727.00
FEET.


****************************************************************************
***
   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       39.49    10.73       4.992       22.60
   LONGEST FLOWPATH FROM NODE      5.00 TO NODE      4.00 =    1727.00
FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       33.55    14.30       4.146       23.12
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1937.00
FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      64.65      10.73        4.992
       2      66.35      14.30        4.146

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      66.35   Tc(MIN.) =   14.30
   TOTAL AREA(ACRES) =       45.7


****************************************************************************
***
   FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  12
 --------------------------------------------------------------------------
----
   >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
================================================================================
***
   FLOW PROCESS FROM NODE      4.00 TO NODE     10.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =
435.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0554
   CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.805
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.12
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.22
   AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   2.04
   Tc(MIN.) =   16.35
   SUBAREA AREA(ACRES) =    26.68       SUBAREA RUNOFF(CFS) =   35.53
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       72.4         PEAK FLOW RATE(CFS) =
96.41

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   7.53
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    2821.00
FEET.


================================================================================
***
   FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =
422.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   291.00   CHANNEL SLOPE =  0.0447
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
```

```
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.708
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.31
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.32
   AVERAGE FLOW DEPTH(FEET) =   1.08   TRAVEL TIME(MIN.) =   0.66
   Tc(MIN.) =   17.01
   SUBAREA AREA(ACRES) =     7.55       SUBAREA RUNOFF(CFS) =    9.80
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       79.9         PEAK FLOW RATE(CFS) =
103.77

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   7.33
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    3112.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   17.01
   RAINFALL INTENSITY(INCH/HR) =   3.71
   TOTAL STREAM AREA(ACRES) =    79.95
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    103.77


****************************************************************************
***
   FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    760.00
   DOWNSTREAM ELEVATION(FEET) =    755.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.083
```

```
   SUBAREA RUNOFF(CFS) =      0.30
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.30


****************************************************************************
***
   FLOW PROCESS FROM NODE     13.00 TO NODE     11.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    755.00  DOWNSTREAM(FEET) =
422.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2277.00   CHANNEL SLOPE =  0.1462
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.32
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.21
   AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   5.26
   Tc(MIN.) =   13.16
   SUBAREA AREA(ACRES) =    20.57       SUBAREA RUNOFF(CFS) =   31.50
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       20.7         PEAK FLOW RATE(CFS) =
31.72

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.42
   LONGEST FLOWPATH FROM NODE     12.00 TO NODE     11.00 =    2377.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   13.16
   RAINFALL INTENSITY(INCH/HR) =   4.38
   TOTAL STREAM AREA(ACRES) =    20.71
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.72
```

```
   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      103.77    17.01       3.708         79.95
       2       31.72    13.16       4.376         20.71

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      112.00    13.16       4.376
       2      130.65    17.01       3.708

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     130.65   Tc(MIN.) =   17.01
   TOTAL AREA(ACRES) =      100.7
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    3112.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     11.00 TO NODE     14.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    422.00  DOWNSTREAM(FEET) =
410.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   294.00   CHANNEL SLOPE =  0.0408
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     135.61
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.61
   AVERAGE FLOW DEPTH(FEET) =   1.24   TRAVEL TIME(MIN.) =   0.64
   Tc(MIN.) =   17.65
   SUBAREA AREA(ACRES) =     7.83       SUBAREA RUNOFF(CFS) =    9.92
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =      108.5         PEAK FLOW RATE(CFS) =
137.47

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.25   FLOW VELOCITY(FEET/SEC.) =   7.62
```

```
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     14.00 =    3406.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   17.65
   RAINFALL INTENSITY(INCH/HR) =   3.62
   TOTAL STREAM AREA(ACRES) =   108.49
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    137.47


****************************************************************************
***
   FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    652.00
   DOWNSTREAM ELEVATION(FEET) =    647.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.083
   SUBAREA RUNOFF(CFS) =      0.13
   TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13


****************************************************************************
***
   FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    647.00  DOWNSTREAM(FEET) =
458.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1041.00   CHANNEL SLOPE =  0.1816
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.091
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3770
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.81
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.91
   AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.51
   Tc(MIN.) =   10.41
   SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   21.30
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.377
   TOTAL AREA(ACRES) =       11.2         PEAK FLOW RATE(CFS) =
21.41

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   8.33
   LONGEST FLOWPATH FROM NODE     15.00 TO NODE     17.00 =    1141.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     17.00 TO NODE     14.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    458.00  DOWNSTREAM(FEET) =
410.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   414.00   CHANNEL SLOPE =  0.1159
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.804
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4850
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.08
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.05
   AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   0.98
   Tc(MIN.) =   11.38
   SUBAREA AREA(ACRES) =     0.57       SUBAREA RUNOFF(CFS) =    1.33
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.382
   TOTAL AREA(ACRES) =       11.7         PEAK FLOW RATE(CFS) =
21.53

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   7.08
```

```
   LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.00 =    1555.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   11.38
   RAINFALL INTENSITY(INCH/HR) =   4.80
   TOTAL STREAM AREA(ACRES) =    11.73
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.53

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      137.47    17.65        3.620        108.49
       2       21.53    11.38        4.804         11.73

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      125.13    11.38       4.804
       2      153.70    17.65       3.620

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     153.70   Tc(MIN.) =   17.65
   TOTAL AREA(ACRES) =      120.2
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     14.00 =    3406.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     14.00 TO NODE     18.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =
388.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   485.00   CHANNEL SLOPE =  0.0454
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.530
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3590
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     160.71
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.41
   AVERAGE FLOW DEPTH(FEET) =   1.68   TRAVEL TIME(MIN.) =   0.71
   Tc(MIN.) =   18.36
   SUBAREA AREA(ACRES) =    11.06       SUBAREA RUNOFF(CFS) =   14.01
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.354
   TOTAL AREA(ACRES) =      131.3         PEAK FLOW RATE(CFS) =
163.86

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.70   FLOW VELOCITY(FEET/SEC.) =  11.49
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    3891.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  10
 --------------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    760.00
   DOWNSTREAM ELEVATION(FEET) =    748.00
   ELEVATION DIFFERENCE(FEET) =     12.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
SUBAREA RUNOFF(CFS) =      0.37
TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.37


****************************************************************************
***
   FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    748.00  DOWNSTREAM(FEET) =
510.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   790.00   CHANNEL SLOPE =  0.3013
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.940
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.91
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.84
   AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   1.93
   Tc(MIN.) =    8.19
   SUBAREA AREA(ACRES) =     4.34       SUBAREA RUNOFF(CFS) =    9.02
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        4.5         PEAK FLOW RATE(CFS) =
9.33

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   8.06
   LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     890.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.19
   RAINFALL INTENSITY(INCH/HR) =   5.94
   TOTAL STREAM AREA(ACRES) =     4.49
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    755.00
   DOWNSTREAM ELEVATION(FEET) =    718.00
   ELEVATION DIFFERENCE(FEET) =     37.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      1.21
   TOTAL AREA(ACRES) =      0.49   TOTAL RUNOFF(CFS) =      1.21


****************************************************************************
***
   FLOW PROCESS FROM NODE     23.00 TO NODE     21.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    718.00  DOWNSTREAM(FEET) =
510.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1004.00   CHANNEL SLOPE =  0.2072
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.807
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.46
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.55
   AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   2.22
   Tc(MIN.) =    8.48
   SUBAREA AREA(ACRES) =    10.04       SUBAREA RUNOFF(CFS) =   20.41
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       10.5         PEAK FLOW RATE(CFS) =
21.40
```

```
   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   8.66
   LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =    1104.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

==========================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.48
   RAINFALL INTENSITY(INCH/HR) =   5.81
   TOTAL STREAM AREA(ACRES) =    10.53
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.40

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1        9.33     8.19        5.940          4.49
       2       21.40     8.48        5.807         10.53

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       30.00     8.19       5.940
       2       30.53     8.48       5.807

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      30.53   Tc(MIN.) =    8.48
   TOTAL AREA(ACRES) =       15.0
   LONGEST FLOWPATH FROM NODE     22.00 TO NODE     21.00 =    1104.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     21.00 TO NODE     24.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    510.00  DOWNSTREAM(FEET) =
434.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   403.00   CHANNEL SLOPE =  0.1886
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.58
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.66
   AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.70
   Tc(MIN.) =    9.18
   SUBAREA AREA(ACRES) =     6.26       SUBAREA RUNOFF(CFS) =   12.09
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       21.3         PEAK FLOW RATE(CFS) =
41.11

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   9.90
   LONGEST FLOWPATH FROM NODE     22.00 TO NODE     24.00 =    1507.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     24.00 TO NODE     18.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    434.00  DOWNSTREAM(FEET) =
388.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   623.00   CHANNEL SLOPE =  0.0738
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.034
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4350
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.63
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.36
   AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   1.41
   Tc(MIN.) =   10.59
   SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =   19.05
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.375
   TOTAL AREA(ACRES) =       30.0         PEAK FLOW RATE(CFS) =
56.54
```

```
   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   7.61
   LONGEST FLOWPATH FROM NODE     22.00 TO NODE     18.00 =    2130.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 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       56.54    10.59       5.034       29.98
   LONGEST FLOWPATH FROM NODE     22.00 TO NODE     18.00 =    2130.00
FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF       Tc       INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1      163.86    18.36       3.530      131.28
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    3891.00
FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc       INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1     151.06      10.59        5.034
       2     203.51      18.36        3.530

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     203.51   Tc(MIN.) =   18.36
   TOTAL AREA(ACRES) =      161.3


****************************************************************************
***
   FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  12
 ----------------------------------------------------------------------------
----
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

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

```
****************************************************************************
***
   FLOW PROCESS FROM NODE     18.00 TO NODE     25.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    388.00  DOWNSTREAM(FEET) =
369.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   477.00   CHANNEL SLOPE =  0.0398
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.447
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     204.95
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.63
   AVERAGE FLOW DEPTH(FEET) =   1.97   TRAVEL TIME(MIN.) =   0.68
   Tc(MIN.) =   19.04
   SUBAREA AREA(ACRES) =     2.38       SUBAREA RUNOFF(CFS) =    2.87
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.357
   TOTAL AREA(ACRES) =      163.6         PEAK FLOW RATE(CFS) =
203.51

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.96   FLOW VELOCITY(FEET/SEC.) =  11.61
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     25.00 =    4368.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   19.04
   RAINFALL INTENSITY(INCH/HR) =   3.45
   TOTAL STREAM AREA(ACRES) =   163.64
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    203.51


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

```
   FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .6490
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    635.00
   DOWNSTREAM ELEVATION(FEET) =    606.00
   ELEVATION DIFFERENCE(FEET) =     29.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.768
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.86
   TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.86


**********************************************************************
***
   FLOW PROCESS FROM NODE     27.00 TO NODE     25.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    606.00  DOWNSTREAM(FEET) =
369.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   735.00   CHANNEL SLOPE =  0.3224
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.718
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.52
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
   AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   1.69
   Tc(MIN.) =    5.46
   SUBAREA AREA(ACRES) =     2.66       SUBAREA RUNOFF(CFS) =    7.19
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.385
   TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =
8.94

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   8.10
```

```
   LONGEST FLOWPATH FROM NODE     26.00 TO NODE     25.00 =     835.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    5.46
   RAINFALL INTENSITY(INCH/HR) =   7.72
   TOTAL STREAM AREA(ACRES) =     3.01
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.94

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      203.51    19.04        3.447        163.64
       2        8.94     5.46        7.718          3.01

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       67.27     5.46       7.718
       2      207.50    19.04       3.447

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     207.50   Tc(MIN.) =   19.04
   TOTAL AREA(ACRES) =      166.6
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     25.00 =    4368.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     25.00 TO NODE     28.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    369.00  DOWNSTREAM(FEET) =
362.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.1000
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.436
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     207.64
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.89
   AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   0.10
   Tc(MIN.) =   19.14
   SUBAREA AREA(ACRES) =     0.22       SUBAREA RUNOFF(CFS) =    0.26
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.358
   TOTAL AREA(ACRES) =      166.9         PEAK FLOW RATE(CFS) =
207.50

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.23   FLOW VELOCITY(FEET/SEC.) =  11.88
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    4438.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     25.00 TO NODE     28.00 IS CODE =  81
 --------------------------------------------------------------------------
----
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

============================================================================
===
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.436
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3930
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3584
   SUBAREA AREA(ACRES) =    2.13   SUBAREA RUNOFF(CFS) =    2.88
   TOTAL AREA(ACRES) =      169.0   TOTAL RUNOFF(CFS) =     208.09
   TC(MIN.) =   19.14


****************************************************************************
***
   FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
   TIME OF CONCENTRATION(MIN.) =   19.14
   RAINFALL INTENSITY(INCH/HR) =   3.44
   TOTAL STREAM AREA(ACRES) =   169.00
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    208.09


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

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    745.00
   DOWNSTREAM ELEVATION(FEET) =    713.00
   ELEVATION DIFFERENCE(FEET) =     32.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.40
   TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.40


****************************************************************************
***
   FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    713.00  DOWNSTREAM(FEET) =
441.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   779.00   CHANNEL SLOPE =  0.3492
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.970
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.20
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.97
   AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.86
   Tc(MIN.) =    8.13
   SUBAREA AREA(ACRES) =     3.63       SUBAREA RUNOFF(CFS) =    7.59
```

```
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        3.8         PEAK FLOW RATE(CFS) =
7.92

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   8.22
   LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     879.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     31.00 TO NODE     28.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    441.00  DOWNSTREAM(FEET) =
362.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   747.00   CHANNEL SLOPE =  0.1058
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.129
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4010
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.01
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.77
   AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   2.16
   Tc(MIN.) =   10.29
   SUBAREA AREA(ACRES) =     3.00       SUBAREA RUNOFF(CFS) =    6.17
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.373
   TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =
12.97

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   5.97
   LONGEST FLOWPATH FROM NODE     29.00 TO NODE     28.00 =    1626.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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

```
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.29
   RAINFALL INTENSITY(INCH/HR) =   5.13
   TOTAL STREAM AREA(ACRES) =     6.79
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.97

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      208.09    19.14        3.436        169.00
       2       12.97    10.29        5.129          6.79

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      152.38    10.29       5.129
       2      216.78    19.14       3.436

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     216.78   Tc(MIN.) =   19.14
   TOTAL AREA(ACRES) =      175.8
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    4438.00
FEET.

============================================================================
===
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)     =      175.8  TC(MIN.) =     19.14
   PEAK FLOW RATE(CFS)   =     216.78

============================================================================
===

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

PROPOSED CONDITION- UNMITIGATED

Q100 HYDROLOGY MODEL

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_____
___

*****************************************************************************
***

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1239

                              Analysis prepared by:




  ************************** DESCRIPTION OF STUDY
**************************
 * 1923 Dentro De Lomas
*
 * PROPOSED CONDITION
*
 * Q100 Model
*

*****************************************************************************
*

   FILE NAME: R:\AES\0182\0001\PR\PR100.DAT
   TIME/DATE OF STUDY: 10:28 01/04/2022
 ---------------------------------------------------------------------------
----
   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ---------------------------------------------------------------------------
----
   2003 SAN DIEGO MANUAL CRITERIA

   USER SPECIFIED STORM EVENT(YEAR) = 100.00
   6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.90
   SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW
MODEL*
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:
MANNING
      WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE
FACTOR
```

```
 NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)
(n)
 ===  =====  =========  =================  ======  ===== ====== =====
=======
   1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167
0.0150
   2   17.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   3   20.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   4   16.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   5   26.0     18.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   6   44.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150

   GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
     1. Relative Flow-Depth =  0.50 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    101.00 TO NODE    102.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    652.00
   DOWNSTREAM ELEVATION(FEET) =    647.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.083
   SUBAREA RUNOFF(CFS) =      0.13
   TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13


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

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    647.00  DOWNSTREAM(FEET) =
458.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1048.00   CHANNEL SLOPE =  0.1803
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.085
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3770
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.80
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.90
   AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.53
   Tc(MIN.) =   10.43
   SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   21.28
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.377
   TOTAL AREA(ACRES) =       11.2         PEAK FLOW RATE(CFS) =
21.38

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   8.32
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1148.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

================================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.43
   RAINFALL INTENSITY(INCH/HR) =   5.08
   TOTAL STREAM AREA(ACRES) =    11.16
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.38


****************************************************************************
***
   FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

================================================================================
===
   *USER SPECIFIED(SUBAREA):
```

```
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    635.00
   DOWNSTREAM ELEVATION(FEET) =    585.00
   ELEVATION DIFFERENCE(FEET) =     50.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.20
   TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20


****************************************************************************
***
   FLOW PROCESS FROM NODE    105.00 TO NODE    103.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =
458.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   457.00   CHANNEL SLOPE =  0.2779
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.926
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
   AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.96
   Tc(MIN.) =    8.22
   SUBAREA AREA(ACRES) =     0.63       SUBAREA RUNOFF(CFS) =    1.31
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =
1.47

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   4.66
   LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =     557.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

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

================================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.22
   RAINFALL INTENSITY(INCH/HR) =   5.93
   TOTAL STREAM AREA(ACRES) =     0.71
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.47

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       21.38    10.43        5.085         11.16
       2        1.47     8.22        5.926          0.71

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF       Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       18.34     8.22       5.926
       2       22.65    10.43       5.085

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      22.65   Tc(MIN.) =   10.43
   TOTAL AREA(ACRES) =       11.9
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1148.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    103.00 TO NODE    106.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   458.00  DOWNSTREAM(FEET) =   451.00
   FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  22.08
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      22.65
   PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.47
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1207.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.47
   RAINFALL INTENSITY(INCH/HR) =   5.07
   TOTAL STREAM AREA(ACRES) =    11.87
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.65


****************************************************************************
***
   FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    498.00
   DOWNSTREAM ELEVATION(FEET) =    461.00
   ELEVATION DIFFERENCE(FEET) =     37.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.37
   TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.37


****************************************************************************
***
   FLOW PROCESS FROM NODE    108.00 TO NODE    106.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    461.00  DOWNSTREAM(FEET) =
459.00
```

```
   CHANNEL LENGTH THRU SUBAREA(FEET) =   223.00   CHANNEL SLOPE =  0.0090
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.136
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.46
   AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   8.09
   Tc(MIN.) =   14.36
   SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.58
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =
0.80

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.45
   LONGEST FLOWPATH FROM NODE    107.00 TO NODE    106.00 =     323.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   14.36
   RAINFALL INTENSITY(INCH/HR) =   4.14
   TOTAL STREAM AREA(ACRES) =     0.55
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       22.65    10.47        5.071         11.87
       2        0.80    14.36        4.136          0.55

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       23.23    10.47       5.071
       2       19.27    14.36       4.136
```

```
   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      23.23   Tc(MIN.) =   10.47
   TOTAL AREA(ACRES) =       12.4
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1207.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    106.00 TO NODE    109.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    451.00  DOWNSTREAM(FEET) =
442.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    64.00   CHANNEL SLOPE =  0.1406
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.029
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.28
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.81
   AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.14
   Tc(MIN.) =   10.61
   SUBAREA AREA(ACRES) =     0.06       SUBAREA RUNOFF(CFS) =    0.11
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
   TOTAL AREA(ACRES) =       12.5         PEAK FLOW RATE(CFS) =
23.47

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   7.71
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =    1271.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   442.00  DOWNSTREAM(FEET) =   434.00
   FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
```

```
   PIPE-FLOW VELOCITY(FEET/SEC.) =  22.19
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      23.47
   PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.66
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =    1339.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.66
   RAINFALL INTENSITY(INCH/HR) =   5.01
   TOTAL STREAM AREA(ACRES) =    12.48
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.47


****************************************************************************
***
   FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    492.00
   DOWNSTREAM ELEVATION(FEET) =    450.00
   ELEVATION DIFFERENCE(FEET) =     42.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.57
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.57


****************************************************************************
***
   FLOW PROCESS FROM NODE    112.00 TO NODE    110.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
```

```
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    450.00  DOWNSTREAM(FEET) =
448.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   261.00   CHANNEL SLOPE =  0.0077
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.004
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.49
   AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   8.83
   Tc(MIN.) =   15.10
   SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.70
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =
1.02

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   0.46
   LONGEST FLOWPATH FROM NODE    111.00 TO NODE    110.00 =     361.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   15.10
   RAINFALL INTENSITY(INCH/HR) =   4.00
   TOTAL STREAM AREA(ACRES) =     0.73
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.02

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       23.47    10.66        5.013         12.48
       2        1.02    15.10        4.004          0.73

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

```
   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       24.19    10.66       5.013
       2       19.77    15.10       4.004

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      24.19   Tc(MIN.) =   10.66
   TOTAL AREA(ACRES) =       13.2
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =    1339.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   421.00
   FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  24.08
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      24.19
   PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.72
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    113.00 =    1430.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.72
   RAINFALL INTENSITY(INCH/HR) =   4.99
   TOTAL STREAM AREA(ACRES) =    13.21
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.19
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    463.00
   DOWNSTREAM ELEVATION(FEET) =    436.00
   ELEVATION DIFFERENCE(FEET) =     27.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.27
   TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27


****************************************************************************
***
   FLOW PROCESS FROM NODE    115.00 TO NODE    113.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =
433.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   326.00   CHANNEL SLOPE =  0.0092
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.374
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.59
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.40
   AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  13.42
   Tc(MIN.) =   19.69
   SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.59
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =
0.72

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
   DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.50
   LONGEST FLOWPATH FROM NODE    114.00 TO NODE    113.00 =     426.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   19.69
   RAINFALL INTENSITY(INCH/HR) =   3.37
   TOTAL STREAM AREA(ACRES) =     0.61
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.72

   ** CONFLUENCE DATA **
   STREAM     RUNOFF        Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       24.19    10.72        4.994         13.21
       2        0.72    19.69        3.374          0.61

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       24.59    10.72       4.994
       2       17.07    19.69       3.374

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      24.59   Tc(MIN.) =   10.72
   TOTAL AREA(ACRES) =       13.8
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    113.00 =    1430.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    113.00 TO NODE    116.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   414.00
   FLOW LENGTH(FEET) =    69.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  22.29
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      24.59
   PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.77
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    116.00 =    1499.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.77
   RAINFALL INTENSITY(INCH/HR) =   4.98
   TOTAL STREAM AREA(ACRES) =    13.82
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.59


****************************************************************************
***
   FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    434.00
   DOWNSTREAM ELEVATION(FEET) =    420.00
   ELEVATION DIFFERENCE(FEET) =     14.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.25
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25


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

```
   FLOW PROCESS FROM NODE    118.00 TO NODE    116.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    420.00  DOWNSTREAM(FEET) =
418.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   251.00   CHANNEL SLOPE =  0.0080
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.663
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.38
   AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  11.07
   Tc(MIN.) =   17.33
   SUBAREA AREA(ACRES) =     0.44       SUBAREA RUNOFF(CFS) =    0.56
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =
0.69

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.39
   LONGEST FLOWPATH FROM NODE    117.00 TO NODE    116.00 =     351.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
 ----------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

======================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   17.33
   RAINFALL INTENSITY(INCH/HR) =   3.66
   TOTAL STREAM AREA(ACRES) =     0.54
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.69

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       24.59    10.77        4.979         13.82
       2        0.69    17.33        3.663          0.54
```

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       25.02    10.77       4.979
       2       18.78    17.33       3.663

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      25.02   Tc(MIN.) =   10.77
   TOTAL AREA(ACRES) =       14.4
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    116.00 =    1499.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    116.00 TO NODE    119.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    414.00  DOWNSTREAM(FEET) =
407.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    94.00   CHANNEL SLOPE =  0.0745
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.905
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.12
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.20
   AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.25
   Tc(MIN.) =   11.02
   SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.21
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.371
   TOTAL AREA(ACRES) =       14.5         PEAK FLOW RATE(CFS) =
26.33

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   6.30
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    119.00 =    1593.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  31
```

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

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   403.00
   FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  20.51
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      26.33
   PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.06
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    120.00 =    1637.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  10
 ----------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

======================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    737.00
   DOWNSTREAM ELEVATION(FEET) =    735.00
   ELEVATION DIFFERENCE(FEET) =      2.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.879
   WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
            THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
            (Reference: Table 3-1B of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
   SUBAREA RUNOFF(CFS) =      0.42
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.42
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    735.00  DOWNSTREAM(FEET) =
545.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1052.00   CHANNEL SLOPE =  0.1806
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.564
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.58
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.16
   AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   2.45
   Tc(MIN.) =   12.33
   SUBAREA AREA(ACRES) =    15.13       SUBAREA RUNOFF(CFS) =   24.17
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =
24.54

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   8.54
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1152.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    545.00  DOWNSTREAM(FEET) =
484.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   785.00   CHANNEL SLOPE =  0.0777
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.146
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.17
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.62
   AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.98
   Tc(MIN.) =   14.30
   SUBAREA AREA(ACRES) =     7.76       SUBAREA RUNOFF(CFS) =   11.26
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       23.1         PEAK FLOW RATE(CFS) =
33.55

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   6.84
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =    1937.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  10
 ----------------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    705.00
   DOWNSTREAM ELEVATION(FEET) =    685.00
   ELEVATION DIFFERENCE(FEET) =     20.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.67
   TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      0.67


****************************************************************************
***
   FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  51
```

```
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    685.00  DOWNSTREAM(FEET) =
517.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1017.00   CHANNEL SLOPE =  0.1652
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.671
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.56
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.68
   AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.54
   Tc(MIN.) =    8.80
   SUBAREA AREA(ACRES) =     9.87       SUBAREA RUNOFF(CFS) =   19.59
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =
20.12

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   7.89
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =    1117.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
 ----------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

======================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.80
   RAINFALL INTENSITY(INCH/HR) =   5.67
   TOTAL STREAM AREA(ACRES) =    10.14
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.12


****************************************************************************
***
   FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    695.00
   DOWNSTREAM ELEVATION(FEET) =    674.00
   ELEVATION DIFFERENCE(FEET) =     21.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.64
   TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.64


****************************************************************************
***
   FLOW PROCESS FROM NODE    209.00 TO NODE    207.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    674.00  DOWNSTREAM(FEET) =
517.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   997.00   CHANNEL SLOPE =  0.1575
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.563
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.52
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.93
   AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   2.80
   Tc(MIN.) =    9.07
   SUBAREA AREA(ACRES) =     6.97       SUBAREA RUNOFF(CFS) =   13.57
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        7.2         PEAK FLOW RATE(CFS) =
14.08

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   7.12
   LONGEST FLOWPATH FROM NODE    208.00 TO NODE    207.00 =    1097.00
FEET.


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

```
   FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
 ----------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

======================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    9.07
   RAINFALL INTENSITY(INCH/HR) =   5.56
   TOTAL STREAM AREA(ACRES) =     7.23
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.08

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       20.12     8.80        5.671         10.14
       2       14.08     9.07        5.563          7.23

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       33.79     8.80       5.671
       2       33.82     9.07       5.563

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      33.82   Tc(MIN.) =    9.07
   TOTAL AREA(ACRES) =       17.4
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =    1117.00
FEET.


**********************************************************************
***
   FLOW PROCESS FROM NODE    207.00 TO NODE    204.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =
484.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00   CHANNEL SLOPE =  0.0541
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.992
   *USER SPECIFIED(SUBAREA):
```

```
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.39
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.14
   AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.66
   Tc(MIN.) =   10.73
   SUBAREA AREA(ACRES) =     5.23       SUBAREA RUNOFF(CFS) =    9.14
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       22.6         PEAK FLOW RATE(CFS) =
39.49

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   6.19
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    204.00 =    1727.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 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       39.49    10.73       4.992       22.60
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    204.00 =    1727.00
FEET.

   ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       33.55    14.30       4.146       23.12
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =    1937.00
FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      64.65      10.73        4.992
       2      66.35      14.30        4.146

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      66.35   Tc(MIN.) =   14.30
   TOTAL AREA(ACRES) =       45.7


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

```
   FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  12
 ----------------------------------------------------------------------
----
   >>>>>CLEAR MEMORY BANK # 2 <<<<<

======================================================================
===


**********************************************************************
***
   FLOW PROCESS FROM NODE    204.00 TO NODE    210.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =
435.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0554
   CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.805
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.12
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.22
   AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   2.04
   Tc(MIN.) =   16.35
   SUBAREA AREA(ACRES) =    26.68       SUBAREA RUNOFF(CFS) =   35.53
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       72.4         PEAK FLOW RATE(CFS) =
96.41

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   7.53
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =    2821.00
FEET.


**********************************************************************
***
   FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =
422.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   291.00   CHANNEL SLOPE =  0.0447
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.708
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.31
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.32
   AVERAGE FLOW DEPTH(FEET) =   1.08   TRAVEL TIME(MIN.) =   0.66
   Tc(MIN.) =   17.01
   SUBAREA AREA(ACRES) =     7.55       SUBAREA RUNOFF(CFS) =    9.80
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       79.9         PEAK FLOW RATE(CFS) =
103.77

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   7.33
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    211.00 =    3112.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   17.01
   RAINFALL INTENSITY(INCH/HR) =   3.71
   TOTAL STREAM AREA(ACRES) =    79.95
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    103.77


****************************************************************************
***
   FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
   UPSTREAM ELEVATION(FEET) =    760.00
   DOWNSTREAM ELEVATION(FEET) =    755.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.083
   SUBAREA RUNOFF(CFS) =      0.30
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.30


****************************************************************************
***
   FLOW PROCESS FROM NODE    213.00 TO NODE    211.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    755.00  DOWNSTREAM(FEET) =
422.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2277.00   CHANNEL SLOPE =  0.1462
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.32
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.21
   AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   5.26
   Tc(MIN.) =   13.16
   SUBAREA AREA(ACRES) =    20.57       SUBAREA RUNOFF(CFS) =   31.50
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       20.7         PEAK FLOW RATE(CFS) =
31.72

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.42
   LONGEST FLOWPATH FROM NODE    212.00 TO NODE    211.00 =    2377.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
```

```
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   13.16
   RAINFALL INTENSITY(INCH/HR) =   4.38
   TOTAL STREAM AREA(ACRES) =    20.71
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.72

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      103.77    17.01        3.708         79.95
       2       31.72    13.16        4.376         20.71

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      112.00    13.16       4.376
       2      130.65    17.01       3.708

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     130.65   Tc(MIN.) =   17.01
   TOTAL AREA(ACRES) =      100.7
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    211.00 =    3112.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    211.00 TO NODE    214.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    422.00  DOWNSTREAM(FEET) =
412.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   282.00   CHANNEL SLOPE =  0.0355
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3540
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     138.31
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
   AVERAGE FLOW DEPTH(FEET) =   1.28   TRAVEL TIME(MIN.) =   0.65
   Tc(MIN.) =   17.66
   SUBAREA AREA(ACRES) =    11.96       SUBAREA RUNOFF(CFS) =   15.33
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
```

```
   TOTAL AREA(ACRES) =      112.6         PEAK FLOW RATE(CFS) =
142.86

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.30   FLOW VELOCITY(FEET/SEC.) =   7.31
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    214.00 =    3394.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    214.00 TO NODE    120.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   403.00
   FLOW LENGTH(FEET) =    69.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  35.28
   ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     142.86
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   17.69
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    120.00 =    3463.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 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      142.86    17.69       3.616      112.62
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    120.00 =    3463.00
FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       26.33    11.06       4.894       14.48
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    120.00 =    1637.00
FEET.
```

```
   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1     115.66      11.06        4.894
       2     162.31      17.69        3.616

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     162.31   Tc(MIN.) =   17.69
   TOTAL AREA(ACRES) =      127.1


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  12
 ----------------------------------------------------------------------------
----
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    403.00  DOWNSTREAM(FEET) =
395.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   219.00   CHANNEL SLOPE =  0.0365
   CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.559
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4380
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     163.42
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.30
   AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   0.44
   Tc(MIN.) =   18.13
   SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    2.23
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.354
   TOTAL AREA(ACRES) =      128.5         PEAK FLOW RATE(CFS) =
162.31

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   8.30
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    121.00 =    3682.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   391.00
   FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  32.56
   ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     162.31
   PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   18.15
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    122.00 =    3723.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   18.15
   RAINFALL INTENSITY(INCH/HR) =   3.56
   TOTAL STREAM AREA(ACRES) =   128.53
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    162.31


****************************************************************************
***
   FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .5340
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    636.00
```

```
   DOWNSTREAM ELEVATION(FEET) =    592.00
   ELEVATION DIFFERENCE(FEET) =     44.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.729
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.09
   TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      1.09


****************************************************************************
***
   FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    592.00  DOWNSTREAM(FEET) =
420.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   559.00   CHANNEL SLOPE =  0.3077
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.094
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
   AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.49
   Tc(MIN.) =    6.22
   SUBAREA AREA(ACRES) =     1.92       SUBAREA RUNOFF(CFS) =    4.77
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.371
   TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =
5.71

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   7.08
   LONGEST FLOWPATH FROM NODE    301.00 TO NODE    303.00 =     659.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    303.00 TO NODE    122.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   394.00
   FLOW LENGTH(FEET) =   162.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  16.98
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       5.71
   PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.38
   LONGEST FLOWPATH FROM NODE    301.00 TO NODE    122.00 =     821.00
FEET.


****************************************************************************
   FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
 ----------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

================================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    6.38
   RAINFALL INTENSITY(INCH/HR) =   6.98
   TOTAL STREAM AREA(ACRES) =     2.17
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.71

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      162.31    18.15       3.556        128.53
       2        5.71     6.38       6.979          2.17

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       62.77     6.38       6.979
       2      165.22    18.15       3.556

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     165.22   Tc(MIN.) =   18.15
   TOTAL AREA(ACRES) =      130.7
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    122.00 =    3723.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    394.00  DOWNSTREAM(FEET) =
383.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   251.00   CHANNEL SLOPE =  0.0438
   CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.497
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     165.55
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.81
   AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   0.47
   Tc(MIN.) =   18.62
   SUBAREA AREA(ACRES) =     0.55       SUBAREA RUNOFF(CFS) =    0.67
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.354
   TOTAL AREA(ACRES) =      131.2         PEAK FLOW RATE(CFS) =
165.22

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   8.85
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    123.00 =    3974.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   18.62
   RAINFALL INTENSITY(INCH/HR) =   3.50
   TOTAL STREAM AREA(ACRES) =   131.25
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    165.22


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

```
   FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    407.00
   DOWNSTREAM ELEVATION(FEET) =    401.00
   ELEVATION DIFFERENCE(FEET) =      6.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.430
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.326
   SUBAREA RUNOFF(CFS) =      0.31
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.31


**********************************************************************
***
   FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    401.00  DOWNSTREAM(FEET) =
392.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   223.00   CHANNEL SLOPE =  0.0404
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.529
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.03
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.15
   AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   1.72
   Tc(MIN.) =    9.15
   SUBAREA AREA(ACRES) =     0.74       SUBAREA RUNOFF(CFS) =    1.43
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =
1.70

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.48
   LONGEST FLOWPATH FROM NODE    304.00 TO NODE    306.00 =     323.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    306.00 TO NODE    123.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   383.00
   FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  11.22
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       1.70
   PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.25
   LONGEST FLOWPATH FROM NODE    304.00 TO NODE    123.00 =     389.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    9.25
   RAINFALL INTENSITY(INCH/HR) =   5.49
   TOTAL STREAM AREA(ACRES) =     0.88
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.70

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      165.22    18.62       3.497        131.25
       2        1.70     9.25       5.492          0.88

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      106.92     9.25       5.492
       2      166.30    18.62       3.497
```

```
   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     166.30   Tc(MIN.) =   18.62
   TOTAL AREA(ACRES) =      132.1
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    123.00 =    3974.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  10
 ----------------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    760.00
   DOWNSTREAM ELEVATION(FEET) =    748.00
   ELEVATION DIFFERENCE(FEET) =     12.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.37
   TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.37


****************************************************************************
***
   FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    748.00  DOWNSTREAM(FEET) =
509.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   790.00   CHANNEL SLOPE =  0.3025
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.940
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.91
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.84
   AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   1.93
   Tc(MIN.) =    8.19
   SUBAREA AREA(ACRES) =     4.34       SUBAREA RUNOFF(CFS) =    9.02
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        4.5         PEAK FLOW RATE(CFS) =
9.33

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   8.06
   LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =     890.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.19
   RAINFALL INTENSITY(INCH/HR) =   5.94
   TOTAL STREAM AREA(ACRES) =     4.49
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33


****************************************************************************
***
   FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
   UPSTREAM ELEVATION(FEET) =    755.00
   DOWNSTREAM ELEVATION(FEET) =    718.00
   ELEVATION DIFFERENCE(FEET) =     37.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      1.21
   TOTAL AREA(ACRES) =      0.49   TOTAL RUNOFF(CFS) =      1.21


****************************************************************************
***
   FLOW PROCESS FROM NODE    405.00 TO NODE    403.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    718.00  DOWNSTREAM(FEET) =
509.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1004.00   CHANNEL SLOPE =  0.2082
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.807
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.46
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.55
   AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   2.22
   Tc(MIN.) =    8.48
   SUBAREA AREA(ACRES) =    10.04       SUBAREA RUNOFF(CFS) =   20.41
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       10.5         PEAK FLOW RATE(CFS) =
21.40

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   8.86
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    403.00 =    1104.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
================================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.48
   RAINFALL INTENSITY(INCH/HR) =   5.81
   TOTAL STREAM AREA(ACRES) =    10.53
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.40

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1        9.33     8.19        5.940          4.49
       2       21.40     8.48        5.807         10.53

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       30.00     8.19       5.940
       2       30.53     8.48       5.807

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      30.53   Tc(MIN.) =    8.48
   TOTAL AREA(ACRES) =       15.0
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    403.00 =    1104.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    403.00 TO NODE    406.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =
434.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   403.00   CHANNEL SLOPE =  0.1861
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.58
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.66
   AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.70
```

```
   Tc(MIN.) =    9.18
   SUBAREA AREA(ACRES) =     6.26       SUBAREA RUNOFF(CFS) =   12.09
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       21.3         PEAK FLOW RATE(CFS) =
41.11

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   9.90
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    406.00 =    1507.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    434.00  DOWNSTREAM(FEET) =
398.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   533.00   CHANNEL SLOPE =  0.0675
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.086
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4340
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.15
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.16
   AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   1.24
   Tc(MIN.) =   10.42
   SUBAREA AREA(ACRES) =     8.20       SUBAREA RUNOFF(CFS) =   18.10
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.373
   TOTAL AREA(ACRES) =       29.5         PEAK FLOW RATE(CFS) =
55.98

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   7.31
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    407.00 =    2040.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    407.00 TO NODE    123.00 IS CODE =  31
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   383.00
   FLOW LENGTH(FEET) =    71.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  34.15
   ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      55.98
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.45
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    123.00 =    2111.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 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       55.98    10.45       5.075       29.48
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    123.00 =    2111.00
FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1      166.30    18.62       3.497      132.13
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    123.00 =    3974.00
FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1     149.34      10.45        5.075
       2     204.88      18.62        3.497

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     204.88   Tc(MIN.) =   18.62
   TOTAL AREA(ACRES) =      161.6


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  12
 ----------------------------------------------------------------------------
----
```

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

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    383.00  DOWNSTREAM(FEET) =
367.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   373.00   CHANNEL SLOPE =  0.0429
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.393
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     205.49
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
   AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   0.89
   Tc(MIN.) =   19.52
   SUBAREA AREA(ACRES) =     1.02       SUBAREA RUNOFF(CFS) =    1.21
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.357
   TOTAL AREA(ACRES) =      162.6         PEAK FLOW RATE(CFS) =
204.88

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   6.97
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    124.00 =    4347.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   19.52
   RAINFALL INTENSITY(INCH/HR) =   3.39
   TOTAL STREAM AREA(ACRES) =   162.63
```

```
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    204.88


****************************************************************************
***
   FLOW PROCESS FROM NODE    307.00 TO NODE    308.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .6490
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    635.00
   DOWNSTREAM ELEVATION(FEET) =    606.00
   ELEVATION DIFFERENCE(FEET) =     29.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.768
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.86
   TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.86


****************************************************************************
***
   FLOW PROCESS FROM NODE    308.00 TO NODE    309.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    606.00  DOWNSTREAM(FEET) =
425.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   448.00   CHANNEL SLOPE =  0.4040
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.04
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.93
   AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.94
   Tc(MIN.) =    4.71
   SUBAREA AREA(ACRES) =     2.93       SUBAREA RUNOFF(CFS) =    8.38
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.382
```

```
   TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =
10.23

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   9.27
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    309.00 =     548.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    309.00 TO NODE    310.00 IS CODE =  31
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   410.00
   FLOW LENGTH(FEET) =    46.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  25.84
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      10.23
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.74
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    310.00 =     594.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =
404.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    25.00   CHANNEL SLOPE =  0.2400
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.50
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.59
   AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   0.05
```

```
   Tc(MIN.) =    4.79
   SUBAREA AREA(ACRES) =     0.19       SUBAREA RUNOFF(CFS) =    0.54
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.380
   TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =
10.77

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   7.71
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    311.00 =     619.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   404.00  DOWNSTREAM(FEET) =   398.00
   FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  20.21
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      10.77
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.83
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    312.00 =     657.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    398.00  DOWNSTREAM(FEET) =
382.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    69.00   CHANNEL SLOPE =  0.2319
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.08
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.95
   AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   0.14
   Tc(MIN.) =    4.97
   SUBAREA AREA(ACRES) =     0.91       SUBAREA RUNOFF(CFS) =    2.60
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
   TOTAL AREA(ACRES) =        4.4         PEAK FLOW RATE(CFS) =
13.38

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   8.14
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    313.00 =     726.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
 ----------------------------------------------------------------------------
----
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

============================================================================
===
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3712
   SUBAREA AREA(ACRES) =    0.55   SUBAREA RUNOFF(CFS) =    1.57
   TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =      14.95
   TC(MIN.) =    4.97


****************************************************************************
***
   FLOW PROCESS FROM NODE    313.00 TO NODE    124.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   367.00
   FLOW LENGTH(FEET) =   142.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  19.06
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      14.95
   PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.09
```

```
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    124.00 =     868.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    5.09
   RAINFALL INTENSITY(INCH/HR) =   8.07
   TOTAL STREAM AREA(ACRES) =     4.93
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.95

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      204.88    19.52        3.393        162.63
       2       14.95     5.09        8.070          4.93

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       68.43     5.09        8.070
       2      211.17    19.52        3.393

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     211.17   Tc(MIN.) =   19.52
   TOTAL AREA(ACRES) =      167.6
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    124.00 =    4347.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   358.00
```

```
   FLOW LENGTH(FEET) =   156.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.7 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  28.99
   ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     211.17
   PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   19.61
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    125.00 =    4503.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  3
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   19.61
   RAINFALL INTENSITY(INCH/HR) =   3.38
   TOTAL STREAM AREA(ACRES) =   167.56
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    211.17


****************************************************************************
***
   FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .5350
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    625.00
   DOWNSTREAM ELEVATION(FEET) =    553.00
   ELEVATION DIFFERENCE(FEET) =     72.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.721
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.01
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      1.01


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

```
   FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    553.00  DOWNSTREAM(FEET) =
400.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   381.00   CHANNEL SLOPE =  0.4016
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.507
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3890
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.86
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.50
   AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.98
   Tc(MIN.) =    5.70
   SUBAREA AREA(ACRES) =     1.26       SUBAREA RUNOFF(CFS) =    3.68
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.412
   TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =
4.60

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   7.27
   LONGEST FLOWPATH FROM NODE    314.00 TO NODE    316.00 =     481.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    316.00 TO NODE    125.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =
358.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   118.00   CHANNEL SLOPE =  0.3559
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.281
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.78
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
   AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   0.28
```

```
   Tc(MIN.) =    5.98
   SUBAREA AREA(ACRES) =     0.14       SUBAREA RUNOFF(CFS) =    0.36
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.406
   TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =
4.82

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   7.15
   LONGEST FLOWPATH FROM NODE    314.00 TO NODE    125.00 =     599.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  3
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    5.98
   RAINFALL INTENSITY(INCH/HR) =   7.28
   TOTAL STREAM AREA(ACRES) =     1.63
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.82


****************************************************************************
***
   FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    745.00
   DOWNSTREAM ELEVATION(FEET) =    713.00
   ELEVATION DIFFERENCE(FEET) =     32.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.40
   TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.40
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    713.00  DOWNSTREAM(FEET) =
435.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   779.00   CHANNEL SLOPE =  0.3569
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.972
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.99
   AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.86
   Tc(MIN.) =    8.12
   SUBAREA AREA(ACRES) =     3.63       SUBAREA RUNOFF(CFS) =    7.59
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        3.8         PEAK FLOW RATE(CFS) =
7.92

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   8.23
   LONGEST FLOWPATH FROM NODE    408.00 TO NODE    410.00 =     879.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    410.00 TO NODE    125.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =
358.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   778.00   CHANNEL SLOPE =  0.0990
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.068
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4050
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.79
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.50
   AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   2.36
   Tc(MIN.) =   10.48
   SUBAREA AREA(ACRES) =     2.79       SUBAREA RUNOFF(CFS) =    5.73
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.373
   TOTAL AREA(ACRES) =        6.6         PEAK FLOW RATE(CFS) =
12.45

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   5.73
   LONGEST FLOWPATH FROM NODE    408.00 TO NODE    125.00 =    1657.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  3
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.48
   RAINFALL INTENSITY(INCH/HR) =   5.07
   TOTAL STREAM AREA(ACRES) =     6.58
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.45

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      211.17    19.61        3.383        167.56
       2        4.82     5.98        7.281          1.63
       3       12.45    10.48        5.068          6.58

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      110.05     5.98       7.281
       2      156.78    10.48       5.068
       3      221.72    19.61       3.383

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     221.72   Tc(MIN.) =   19.61
   TOTAL AREA(ACRES) =      175.8
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    125.00 =    4503.00
FEET.
```

```
================================================================================
===
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)     =      175.8  TC(MIN.) =     19.61
   PEAK FLOW RATE(CFS)   =     221.72

================================================================================
===

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

PROPOSED CONDITION- MITIGATED

Q100 HYDROLOGY MODEL

```
_____
___

*****************************************************************************
***

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1239

                              Analysis prepared by:




  ************************** DESCRIPTION OF STUDY
**************************
 * 1923 Dentro De Lomas
*
 * PROPOSED CONDITION
*
 * Q100 Model
*

*****************************************************************************
*

   FILE NAME: R:\AES\0182\0001\PRM\PR100.DAT
   TIME/DATE OF STUDY: 08:59 01/05/2022
 ---------------------------------------------------------------------------
----
   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ---------------------------------------------------------------------------
----
   2003 SAN DIEGO MANUAL CRITERIA

   USER SPECIFIED STORM EVENT(YEAR) = 100.00
   6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.90
   SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW
MODEL*
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:
MANNING
      WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE
FACTOR
```

```
 NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)
(n)
 ===  =====  =========  =================  ======  ===== ====== =====
=======
   1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167
0.0150
   2   17.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   3   20.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   4   16.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   5   26.0     18.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150
   6   44.0     12.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125
0.0150

   GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
     1. Relative Flow-Depth =  0.50 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    101.00 TO NODE    102.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    652.00
   DOWNSTREAM ELEVATION(FEET) =    647.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.083
   SUBAREA RUNOFF(CFS) =      0.13
   TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13


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

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    647.00  DOWNSTREAM(FEET) =
458.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1048.00   CHANNEL SLOPE =  0.1803
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.085
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3770
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.80
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.90
   AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.53
   Tc(MIN.) =   10.43
   SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   21.28
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.377
   TOTAL AREA(ACRES) =       11.2         PEAK FLOW RATE(CFS) =
21.38

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   8.32
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1148.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

================================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.43
   RAINFALL INTENSITY(INCH/HR) =   5.08
   TOTAL STREAM AREA(ACRES) =    11.16
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.38


****************************************************************************
***
   FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

================================================================================
===
   *USER SPECIFIED(SUBAREA):
```

```
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    635.00
   DOWNSTREAM ELEVATION(FEET) =    585.00
   ELEVATION DIFFERENCE(FEET) =     50.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.20
   TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20


****************************************************************************
***
   FLOW PROCESS FROM NODE    105.00 TO NODE    103.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =
458.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   457.00   CHANNEL SLOPE =  0.2779
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.926
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
   AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.96
   Tc(MIN.) =    8.22
   SUBAREA AREA(ACRES) =     0.63       SUBAREA RUNOFF(CFS) =    1.31
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =
1.47

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   4.66
   LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =     557.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

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

================================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.22
   RAINFALL INTENSITY(INCH/HR) =   5.93
   TOTAL STREAM AREA(ACRES) =     0.71
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.47

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       21.38    10.43        5.085         11.16
       2        1.47     8.22        5.926          0.71

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF       Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       18.34     8.22       5.926
       2       22.65    10.43       5.085

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      22.65   Tc(MIN.) =   10.43
   TOTAL AREA(ACRES) =       11.9
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1148.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    103.00 TO NODE    106.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   458.00  DOWNSTREAM(FEET) =   451.00
   FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  22.08
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      22.65
   PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.47
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1207.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.47
   RAINFALL INTENSITY(INCH/HR) =   5.07
   TOTAL STREAM AREA(ACRES) =    11.87
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.65


****************************************************************************
***
   FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    498.00
   DOWNSTREAM ELEVATION(FEET) =    461.00
   ELEVATION DIFFERENCE(FEET) =     37.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.37
   TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.37


****************************************************************************
***
   FLOW PROCESS FROM NODE    108.00 TO NODE    106.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    461.00  DOWNSTREAM(FEET) =
459.00
```

```
   CHANNEL LENGTH THRU SUBAREA(FEET) =   223.00   CHANNEL SLOPE =  0.0090
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.136
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.46
   AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   8.09
   Tc(MIN.) =   14.36
   SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.58
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =
0.80

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.45
   LONGEST FLOWPATH FROM NODE    107.00 TO NODE    106.00 =     323.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   14.36
   RAINFALL INTENSITY(INCH/HR) =   4.14
   TOTAL STREAM AREA(ACRES) =     0.55
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       22.65    10.47        5.071         11.87
       2        0.80    14.36        4.136          0.55

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       23.23    10.47       5.071
       2       19.27    14.36       4.136
```

```
   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      23.23   Tc(MIN.) =   10.47
   TOTAL AREA(ACRES) =       12.4
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1207.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    106.00 TO NODE    109.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    451.00  DOWNSTREAM(FEET) =
442.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    64.00   CHANNEL SLOPE =  0.1406
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.029
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.28
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.81
   AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.14
   Tc(MIN.) =   10.61
   SUBAREA AREA(ACRES) =     0.06       SUBAREA RUNOFF(CFS) =    0.11
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
   TOTAL AREA(ACRES) =       12.5         PEAK FLOW RATE(CFS) =
23.47

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   7.71
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =    1271.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   442.00  DOWNSTREAM(FEET) =   434.00
   FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
```

```
   PIPE-FLOW VELOCITY(FEET/SEC.) =  22.19
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      23.47
   PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.66
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =    1339.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.66
   RAINFALL INTENSITY(INCH/HR) =   5.01
   TOTAL STREAM AREA(ACRES) =    12.48
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.47


****************************************************************************
***
   FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    492.00
   DOWNSTREAM ELEVATION(FEET) =    450.00
   ELEVATION DIFFERENCE(FEET) =     42.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.57
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.57


****************************************************************************
***
   FLOW PROCESS FROM NODE    112.00 TO NODE    110.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
```

```
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    450.00  DOWNSTREAM(FEET) =
448.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   261.00   CHANNEL SLOPE =  0.0077
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.004
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.49
   AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   8.83
   Tc(MIN.) =   15.10
   SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.70
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =
1.02

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   0.46
   LONGEST FLOWPATH FROM NODE    111.00 TO NODE    110.00 =     361.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   15.10
   RAINFALL INTENSITY(INCH/HR) =   4.00
   TOTAL STREAM AREA(ACRES) =     0.73
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.02

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       23.47    10.66        5.013         12.48
       2        1.02    15.10        4.004          0.73

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

```
   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       24.19    10.66       5.013
       2       19.77    15.10       4.004

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      24.19   Tc(MIN.) =   10.66
   TOTAL AREA(ACRES) =       13.2
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =    1339.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   421.00
   FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  24.08
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      24.19
   PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.72
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    113.00 =    1430.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.72
   RAINFALL INTENSITY(INCH/HR) =   4.99
   TOTAL STREAM AREA(ACRES) =    13.21
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.19
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    463.00
   DOWNSTREAM ELEVATION(FEET) =    436.00
   ELEVATION DIFFERENCE(FEET) =     27.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.27
   TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27


****************************************************************************
***
   FLOW PROCESS FROM NODE    115.00 TO NODE    113.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =
433.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   326.00   CHANNEL SLOPE =  0.0092
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.374
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.59
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.40
   AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  13.42
   Tc(MIN.) =   19.69
   SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.59
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =
0.72

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
   DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.50
   LONGEST FLOWPATH FROM NODE    114.00 TO NODE    113.00 =     426.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   19.69
   RAINFALL INTENSITY(INCH/HR) =   3.37
   TOTAL STREAM AREA(ACRES) =     0.61
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.72

   ** CONFLUENCE DATA **
   STREAM     RUNOFF        Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       24.19    10.72        4.994         13.21
       2        0.72    19.69        3.374          0.61

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       24.59    10.72       4.994
       2       17.07    19.69       3.374

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      24.59   Tc(MIN.) =   10.72
   TOTAL AREA(ACRES) =       13.8
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    113.00 =    1430.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    113.00 TO NODE    116.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   414.00
   FLOW LENGTH(FEET) =    69.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  22.29
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      24.59
   PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.77
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    116.00 =    1499.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.77
   RAINFALL INTENSITY(INCH/HR) =   4.98
   TOTAL STREAM AREA(ACRES) =    13.82
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.59


****************************************************************************
***
   FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    434.00
   DOWNSTREAM ELEVATION(FEET) =    420.00
   ELEVATION DIFFERENCE(FEET) =     14.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.25
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25


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

```
   FLOW PROCESS FROM NODE    118.00 TO NODE    116.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    420.00  DOWNSTREAM(FEET) =
418.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   251.00   CHANNEL SLOPE =  0.0080
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  90.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.663
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.38
   AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  11.07
   Tc(MIN.) =   17.33
   SUBAREA AREA(ACRES) =     0.44       SUBAREA RUNOFF(CFS) =    0.56
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =
0.69

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   0.39
   LONGEST FLOWPATH FROM NODE    117.00 TO NODE    116.00 =     351.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
 ----------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

======================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   17.33
   RAINFALL INTENSITY(INCH/HR) =   3.66
   TOTAL STREAM AREA(ACRES) =     0.54
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.69

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       24.59    10.77        4.979         13.82
       2        0.69    17.33        3.663          0.54
```

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       25.02    10.77       4.979
       2       18.78    17.33       3.663

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      25.02   Tc(MIN.) =   10.77
   TOTAL AREA(ACRES) =       14.4
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    116.00 =    1499.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    116.00 TO NODE    119.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    414.00  DOWNSTREAM(FEET) =
407.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    94.00   CHANNEL SLOPE =  0.0745
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.905
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.12
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.20
   AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.25
   Tc(MIN.) =   11.02
   SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.21
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.371
   TOTAL AREA(ACRES) =       14.5         PEAK FLOW RATE(CFS) =
26.33

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   6.30
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    119.00 =    1593.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  31
```

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

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   403.00
   FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  20.51
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      26.33
   PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.06
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    120.00 =    1637.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  10
 ----------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

======================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    737.00
   DOWNSTREAM ELEVATION(FEET) =    735.00
   ELEVATION DIFFERENCE(FEET) =      2.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.879
   WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
            THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
            (Reference: Table 3-1B of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
   SUBAREA RUNOFF(CFS) =      0.42
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.42
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    735.00  DOWNSTREAM(FEET) =
545.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1052.00   CHANNEL SLOPE =  0.1806
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.564
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.58
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.16
   AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   2.45
   Tc(MIN.) =   12.33
   SUBAREA AREA(ACRES) =    15.13       SUBAREA RUNOFF(CFS) =   24.17
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =
24.54

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   8.54
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1152.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    545.00  DOWNSTREAM(FEET) =
484.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   785.00   CHANNEL SLOPE =  0.0777
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.146
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.17
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.62
   AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.98
   Tc(MIN.) =   14.30
   SUBAREA AREA(ACRES) =     7.76       SUBAREA RUNOFF(CFS) =   11.26
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       23.1         PEAK FLOW RATE(CFS) =
33.55

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   6.84
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =    1937.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  10
 --------------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    705.00
   DOWNSTREAM ELEVATION(FEET) =    685.00
   ELEVATION DIFFERENCE(FEET) =     20.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.67
   TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      0.67


****************************************************************************
***
   FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  51
```

```
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    685.00  DOWNSTREAM(FEET) =
517.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1017.00   CHANNEL SLOPE =  0.1652
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.671
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.56
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.68
   AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.54
   Tc(MIN.) =    8.80
   SUBAREA AREA(ACRES) =     9.87       SUBAREA RUNOFF(CFS) =   19.59
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =
20.12

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   7.89
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =    1117.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
 ----------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

======================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.80
   RAINFALL INTENSITY(INCH/HR) =   5.67
   TOTAL STREAM AREA(ACRES) =    10.14
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.12


****************************************************************************
***
   FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    695.00
   DOWNSTREAM ELEVATION(FEET) =    674.00
   ELEVATION DIFFERENCE(FEET) =     21.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.64
   TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.64


****************************************************************************
***
   FLOW PROCESS FROM NODE    209.00 TO NODE    207.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    674.00  DOWNSTREAM(FEET) =
517.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   997.00   CHANNEL SLOPE =  0.1575
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.563
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.52
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.93
   AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   2.80
   Tc(MIN.) =    9.07
   SUBAREA AREA(ACRES) =     6.97       SUBAREA RUNOFF(CFS) =   13.57
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        7.2         PEAK FLOW RATE(CFS) =
14.08

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   7.12
   LONGEST FLOWPATH FROM NODE    208.00 TO NODE    207.00 =    1097.00
FEET.


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

```
   FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
 ----------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

======================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    9.07
   RAINFALL INTENSITY(INCH/HR) =   5.56
   TOTAL STREAM AREA(ACRES) =     7.23
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.08

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1       20.12     8.80        5.671         10.14
       2       14.08     9.07        5.563          7.23

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       33.79     8.80       5.671
       2       33.82     9.07       5.563

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      33.82   Tc(MIN.) =    9.07
   TOTAL AREA(ACRES) =       17.4
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =    1117.00
FEET.


**********************************************************************
***
   FLOW PROCESS FROM NODE    207.00 TO NODE    204.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =
484.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   610.00   CHANNEL SLOPE =  0.0541
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.992
   *USER SPECIFIED(SUBAREA):
```

```
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.39
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.14
   AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.66
   Tc(MIN.) =   10.73
   SUBAREA AREA(ACRES) =     5.23       SUBAREA RUNOFF(CFS) =    9.14
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       22.6         PEAK FLOW RATE(CFS) =
39.49

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   6.19
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    204.00 =    1727.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 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       39.49    10.73       4.992       22.60
   LONGEST FLOWPATH FROM NODE    205.00 TO NODE    204.00 =    1727.00
FEET.

   ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       33.55    14.30       4.146       23.12
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =    1937.00
FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1      64.65      10.73        4.992
       2      66.35      14.30        4.146

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      66.35   Tc(MIN.) =   14.30
   TOTAL AREA(ACRES) =       45.7


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

```
   FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  12
 ----------------------------------------------------------------------
----
   >>>>>CLEAR MEMORY BANK # 2 <<<<<

======================================================================
===


**********************************************************************
***
   FLOW PROCESS FROM NODE    204.00 TO NODE    210.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =
435.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0554
   CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.805
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.12
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.22
   AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   2.04
   Tc(MIN.) =   16.35
   SUBAREA AREA(ACRES) =    26.68       SUBAREA RUNOFF(CFS) =   35.53
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       72.4         PEAK FLOW RATE(CFS) =
96.41

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   7.53
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =    2821.00
FEET.


**********************************************************************
***
   FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =
422.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   291.00   CHANNEL SLOPE =  0.0447
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.708
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.31
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.32
   AVERAGE FLOW DEPTH(FEET) =   1.08   TRAVEL TIME(MIN.) =   0.66
   Tc(MIN.) =   17.01
   SUBAREA AREA(ACRES) =     7.55       SUBAREA RUNOFF(CFS) =    9.80
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       79.9         PEAK FLOW RATE(CFS) =
103.77

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   7.33
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    211.00 =    3112.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   17.01
   RAINFALL INTENSITY(INCH/HR) =   3.71
   TOTAL STREAM AREA(ACRES) =    79.95
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    103.77


****************************************************************************
***
   FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  21
 --------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
   UPSTREAM ELEVATION(FEET) =    760.00
   DOWNSTREAM ELEVATION(FEET) =    755.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.083
   SUBAREA RUNOFF(CFS) =      0.30
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.30


****************************************************************************
***
   FLOW PROCESS FROM NODE    213.00 TO NODE    211.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    755.00  DOWNSTREAM(FEET) =
422.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2277.00   CHANNEL SLOPE =  0.1462
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.32
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.21
   AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   5.26
   Tc(MIN.) =   13.16
   SUBAREA AREA(ACRES) =    20.57       SUBAREA RUNOFF(CFS) =   31.50
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       20.7         PEAK FLOW RATE(CFS) =
31.72

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.42
   LONGEST FLOWPATH FROM NODE    212.00 TO NODE    211.00 =    2377.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
```

```
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   13.16
   RAINFALL INTENSITY(INCH/HR) =   4.38
   TOTAL STREAM AREA(ACRES) =    20.71
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.72

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      103.77    17.01        3.708         79.95
       2       31.72    13.16        4.376         20.71

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      112.00    13.16       4.376
       2      130.65    17.01       3.708

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     130.65   Tc(MIN.) =   17.01
   TOTAL AREA(ACRES) =      100.7
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    211.00 =    3112.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    211.00 TO NODE    214.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    422.00  DOWNSTREAM(FEET) =
412.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   282.00   CHANNEL SLOPE =  0.0355
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.620
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3540
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     138.31
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
   AVERAGE FLOW DEPTH(FEET) =   1.28   TRAVEL TIME(MIN.) =   0.65
   Tc(MIN.) =   17.66
   SUBAREA AREA(ACRES) =    11.96       SUBAREA RUNOFF(CFS) =   15.33
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
```

```
   TOTAL AREA(ACRES) =      112.6         PEAK FLOW RATE(CFS) =
142.86

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.30   FLOW VELOCITY(FEET/SEC.) =   7.31
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    214.00 =    3394.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    214.00 TO NODE    120.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   403.00
   FLOW LENGTH(FEET) =    69.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  35.28
   ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     142.86
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   17.69
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    120.00 =    3463.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 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      142.86    17.69       3.616      112.62
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    120.00 =    3463.00
FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1       26.33    11.06       4.894       14.48
   LONGEST FLOWPATH FROM NODE    101.00 TO NODE    120.00 =    1637.00
FEET.
```

```
   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1     115.66      11.06        4.894
       2     162.31      17.69        3.616

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     162.31   Tc(MIN.) =   17.69
   TOTAL AREA(ACRES) =      127.1


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  12
 ----------------------------------------------------------------------------
----
   >>>>>CLEAR MEMORY BANK # 1 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    403.00  DOWNSTREAM(FEET) =
395.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   219.00   CHANNEL SLOPE =  0.0365
   CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.559
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4380
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     163.42
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.30
   AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   0.44
   Tc(MIN.) =   18.13
   SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    2.23
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.354
   TOTAL AREA(ACRES) =      128.5         PEAK FLOW RATE(CFS) =
162.31

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   8.30
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    121.00 =    3682.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   391.00
   FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  32.56
   ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     162.31
   PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   18.15
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    122.00 =    3723.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   18.15
   RAINFALL INTENSITY(INCH/HR) =   3.56
   TOTAL STREAM AREA(ACRES) =   128.53
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    162.31


****************************************************************************
***
   FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .5340
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    636.00
```

```
   DOWNSTREAM ELEVATION(FEET) =    592.00
   ELEVATION DIFFERENCE(FEET) =     44.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.729
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.09
   TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      1.09


****************************************************************************
***
   FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    592.00  DOWNSTREAM(FEET) =
420.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   559.00   CHANNEL SLOPE =  0.3077
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.094
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
   AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.49
   Tc(MIN.) =    6.22
   SUBAREA AREA(ACRES) =     1.92       SUBAREA RUNOFF(CFS) =    4.77
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.371
   TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =
5.71

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   7.08
   LONGEST FLOWPATH FROM NODE    301.00 TO NODE    303.00 =     659.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    303.00 TO NODE    122.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   394.00
   FLOW LENGTH(FEET) =   162.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  16.98
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       5.71
   PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.38
   LONGEST FLOWPATH FROM NODE    301.00 TO NODE    122.00 =     821.00
FEET.


****************************************************************************
   FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
 ----------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

================================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    6.38
   RAINFALL INTENSITY(INCH/HR) =   6.98
   TOTAL STREAM AREA(ACRES) =     2.17
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.71

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      162.31    18.15       3.556        128.53
       2        5.71     6.38       6.979          2.17

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       62.77     6.38       6.979
       2      165.22    18.15       3.556

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     165.22   Tc(MIN.) =   18.15
   TOTAL AREA(ACRES) =      130.7
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    122.00 =    3723.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    394.00  DOWNSTREAM(FEET) =
383.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   251.00   CHANNEL SLOPE =  0.0438
   CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.497
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     165.55
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.81
   AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   0.47
   Tc(MIN.) =   18.62
   SUBAREA AREA(ACRES) =     0.55       SUBAREA RUNOFF(CFS) =    0.67
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.354
   TOTAL AREA(ACRES) =      131.2         PEAK FLOW RATE(CFS) =
165.22

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   8.85
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    123.00 =    3974.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   18.62
   RAINFALL INTENSITY(INCH/HR) =   3.50
   TOTAL STREAM AREA(ACRES) =   131.25
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    165.22


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

```
   FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  21
 ----------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    407.00
   DOWNSTREAM ELEVATION(FEET) =    401.00
   ELEVATION DIFFERENCE(FEET) =      6.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.430
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.326
   SUBAREA RUNOFF(CFS) =      0.31
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.31


**********************************************************************
***
   FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  51
 ----------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    401.00  DOWNSTREAM(FEET) =
392.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   223.00   CHANNEL SLOPE =  0.0404
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.529
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.03
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.15
   AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   1.72
   Tc(MIN.) =    9.15
   SUBAREA AREA(ACRES) =     0.74       SUBAREA RUNOFF(CFS) =    1.43
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =
1.70

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.48
   LONGEST FLOWPATH FROM NODE    304.00 TO NODE    306.00 =     323.00
FEET.
```

```
****************************************************************************
***
   FLOW PROCESS FROM NODE    306.00 TO NODE    123.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   383.00
   FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  11.22
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       1.70
   PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.25
   LONGEST FLOWPATH FROM NODE    304.00 TO NODE    123.00 =     389.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    9.25
   RAINFALL INTENSITY(INCH/HR) =   5.49
   TOTAL STREAM AREA(ACRES) =     0.88
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.70

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      165.22    18.62       3.497        131.25
       2        1.70     9.25       5.492          0.88

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF       Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1      106.92     9.25       5.492
       2      166.30    18.62       3.497
```

```
   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     166.30   Tc(MIN.) =   18.62
   TOTAL AREA(ACRES) =      132.1
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    123.00 =    3974.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  10
 ----------------------------------------------------------------------------
----
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    760.00
   DOWNSTREAM ELEVATION(FEET) =    748.00
   ELEVATION DIFFERENCE(FEET) =     12.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.37
   TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.37


****************************************************************************
***
   FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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

```
   ELEVATION DATA: UPSTREAM(FEET) =    748.00  DOWNSTREAM(FEET) =
509.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   790.00   CHANNEL SLOPE =  0.3025
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.940
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.91
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.84
   AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   1.93
   Tc(MIN.) =    8.19
   SUBAREA AREA(ACRES) =     4.34       SUBAREA RUNOFF(CFS) =    9.02
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        4.5         PEAK FLOW RATE(CFS) =
9.33

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   8.06
   LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =     890.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.19
   RAINFALL INTENSITY(INCH/HR) =   5.94
   TOTAL STREAM AREA(ACRES) =     4.49
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33


****************************************************************************
***
   FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
   UPSTREAM ELEVATION(FEET) =    755.00
   DOWNSTREAM ELEVATION(FEET) =    718.00
   ELEVATION DIFFERENCE(FEET) =     37.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      1.21
   TOTAL AREA(ACRES) =      0.49   TOTAL RUNOFF(CFS) =      1.21


****************************************************************************
***
   FLOW PROCESS FROM NODE    405.00 TO NODE    403.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    718.00  DOWNSTREAM(FEET) =
509.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1004.00   CHANNEL SLOPE =  0.2082
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.807
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.46
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.55
   AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   2.22
   Tc(MIN.) =    8.48
   SUBAREA AREA(ACRES) =    10.04       SUBAREA RUNOFF(CFS) =   20.41
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       10.5         PEAK FLOW RATE(CFS) =
21.40

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   8.86
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    403.00 =    1104.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =   1
 --------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
================================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    8.48
   RAINFALL INTENSITY(INCH/HR) =   5.81
   TOTAL STREAM AREA(ACRES) =    10.53
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.40

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1        9.33     8.19        5.940          4.49
       2       21.40     8.48        5.807         10.53

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       30.00     8.19       5.940
       2       30.53     8.48       5.807

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      30.53   Tc(MIN.) =    8.48
   TOTAL AREA(ACRES) =       15.0
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    403.00 =    1104.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    403.00 TO NODE    406.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =
434.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   403.00   CHANNEL SLOPE =  0.1861
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.58
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.66
   AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   0.70
```

```
   Tc(MIN.) =    9.18
   SUBAREA AREA(ACRES) =     6.26       SUBAREA RUNOFF(CFS) =   12.09
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =       21.3         PEAK FLOW RATE(CFS) =
41.11

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   9.90
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    406.00 =    1507.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    434.00  DOWNSTREAM(FEET) =
398.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   533.00   CHANNEL SLOPE =  0.0675
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.086
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4340
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.15
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.16
   AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   1.24
   Tc(MIN.) =   10.42
   SUBAREA AREA(ACRES) =     8.20       SUBAREA RUNOFF(CFS) =   18.10
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.373
   TOTAL AREA(ACRES) =       29.5         PEAK FLOW RATE(CFS) =
55.98

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   7.31
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    407.00 =    2040.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    407.00 TO NODE    123.00 IS CODE =  31
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   383.00
   FLOW LENGTH(FEET) =    71.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  34.15
   ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      55.98
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.45
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    123.00 =    2111.00
FEET.


****************************************************************************
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 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       55.98    10.45       5.075       29.48
   LONGEST FLOWPATH FROM NODE    404.00 TO NODE    123.00 =    2111.00
FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM     RUNOFF      Tc      INTENSITY     AREA
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
       1      166.30    18.62       3.497      132.13
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    123.00 =    3974.00
FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF       Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
       1     149.34      10.45        5.075
       2     204.88      18.62        3.497

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     204.88   Tc(MIN.) =   18.62
   TOTAL AREA(ACRES) =      161.6


****************************************************************************
   FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  12
 ----------------------------------------------------------------------------
```

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

============================================================================
===


****************************************************************************
***
   FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    383.00  DOWNSTREAM(FEET) =
367.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   373.00   CHANNEL SLOPE =  0.0429
   CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   2.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.393
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     205.49
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
   AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   0.89
   Tc(MIN.) =   19.52
   SUBAREA AREA(ACRES) =     1.02       SUBAREA RUNOFF(CFS) =    1.21
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.357
   TOTAL AREA(ACRES) =      162.6         PEAK FLOW RATE(CFS) =
204.88

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   6.97
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    124.00 =    4347.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   19.52
   RAINFALL INTENSITY(INCH/HR) =   3.39
   TOTAL STREAM AREA(ACRES) =   162.63
```

```
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    204.88


****************************************************************************
***
   FLOW PROCESS FROM NODE    307.00 TO NODE    308.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .6490
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    635.00
   DOWNSTREAM ELEVATION(FEET) =    606.00
   ELEVATION DIFFERENCE(FEET) =     29.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.768
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.86
   TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.86


****************************************************************************
***
   FLOW PROCESS FROM NODE    308.00 TO NODE    309.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    606.00  DOWNSTREAM(FEET) =
425.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   448.00   CHANNEL SLOPE =  0.4040
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.04
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.93
   AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.94
   Tc(MIN.) =    4.71
   SUBAREA AREA(ACRES) =     2.93       SUBAREA RUNOFF(CFS) =    8.38
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.382
```

```
   TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =
10.23

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   9.27
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    309.00 =     548.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    309.00 TO NODE    310.00 IS CODE =  31
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   410.00
   FLOW LENGTH(FEET) =    46.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  25.84
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      10.23
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.74
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    310.00 =     594.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  51
 --------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =
404.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    25.00   CHANNEL SLOPE =  0.2400
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.50
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.59
   AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   0.05
```

```
   Tc(MIN.) =    4.79
   SUBAREA AREA(ACRES) =     0.19       SUBAREA RUNOFF(CFS) =    0.54
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.380
   TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =
10.77

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   7.71
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    311.00 =     619.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   404.00  DOWNSTREAM(FEET) =   398.00
   FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  20.21
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      10.77
   PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.83
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    312.00 =     657.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    398.00  DOWNSTREAM(FEET) =
382.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    69.00   CHANNEL SLOPE =  0.2319
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.08
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.95
   AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   0.14
   Tc(MIN.) =    4.97
   SUBAREA AREA(ACRES) =     0.91       SUBAREA RUNOFF(CFS) =    2.60
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
   TOTAL AREA(ACRES) =        4.4         PEAK FLOW RATE(CFS) =
13.38

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   8.14
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    313.00 =     726.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
 ----------------------------------------------------------------------------
----
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

============================================================================
===
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3712
   SUBAREA AREA(ACRES) =    0.55   SUBAREA RUNOFF(CFS) =    1.57
   TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =      14.95
   TC(MIN.) =    4.97


****************************************************************************
***
   FLOW PROCESS FROM NODE    313.00 TO NODE    124.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   367.00
   FLOW LENGTH(FEET) =   142.00   MANNING'S N =  0.012
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  19.06
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      14.95
   PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.09
```

```
   LONGEST FLOWPATH FROM NODE    307.00 TO NODE    124.00 =     868.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    5.09
   RAINFALL INTENSITY(INCH/HR) =   8.07
   TOTAL STREAM AREA(ACRES) =     4.93
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.95

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      204.88    19.52        3.393        162.63
       2       14.95     5.09        8.070          4.93

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

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       68.43     5.09       8.070
       2      211.17    19.52       3.393

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     211.17   Tc(MIN.) =   19.52
   TOTAL AREA(ACRES) =      167.6
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    124.00 =    4347.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   7
 ----------------------------------------------------------------------------
----
   >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

============================================================================
===
   USER-SPECIFIED VALUES ARE AS FOLLOWS:
   TC(MIN) =  21.52   RAIN INTENSITY(INCH/HOUR) =  3.19
```

```
   TOTAL AREA(ACRES) =   167.56   TOTAL RUNOFF(CFS) =    196.36

****************************************************************************
***
   FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   358.00
   FLOW LENGTH(FEET) =   156.00   MANNING'S N =  0.012
   DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.7 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  28.00
   ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     196.36
   PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   21.61
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    125.00 =    4503.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

============================================================================
===
   TOTAL NUMBER OF STREAMS =  3
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   21.61
   RAINFALL INTENSITY(INCH/HR) =   3.18
   TOTAL STREAM AREA(ACRES) =   167.56
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    196.36


****************************************************************************
***
   FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .5350
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
   UPSTREAM ELEVATION(FEET) =    625.00
   DOWNSTREAM ELEVATION(FEET) =    553.00
   ELEVATION DIFFERENCE(FEET) =     72.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.721
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.01
   TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      1.01


****************************************************************************
***
   FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    553.00  DOWNSTREAM(FEET) =
400.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   381.00   CHANNEL SLOPE =  0.4016
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.507
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3890
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.86
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.50
   AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.98
   Tc(MIN.) =    5.70
   SUBAREA AREA(ACRES) =     1.26       SUBAREA RUNOFF(CFS) =    3.68
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.412
   TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =
4.60

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   7.27
   LONGEST FLOWPATH FROM NODE    314.00 TO NODE    316.00 =     481.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    316.00 TO NODE    125.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =
358.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   118.00   CHANNEL SLOPE =  0.3559
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.281
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.78
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
   AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   0.28
   Tc(MIN.) =    5.98
   SUBAREA AREA(ACRES) =     0.14       SUBAREA RUNOFF(CFS) =    0.36
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.406
   TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =
4.82

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   7.15
   LONGEST FLOWPATH FROM NODE    314.00 TO NODE    125.00 =     599.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

================================================================================
===
   TOTAL NUMBER OF STREAMS =  3
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    5.98
   RAINFALL INTENSITY(INCH/HR) =   7.28
   TOTAL STREAM AREA(ACRES) =     1.63
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.82


****************************************************************************
***
   FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  21
 ----------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

================================================================================
===
   *USER SPECIFIED(SUBAREA):
```

```
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    745.00
   DOWNSTREAM ELEVATION(FEET) =    713.00
   ELEVATION DIFFERENCE(FEET) =     32.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =      0.40
   TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.40


****************************************************************************
***
   FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =    713.00  DOWNSTREAM(FEET) =
435.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   779.00   CHANNEL SLOPE =  0.3569
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.972
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.99
   AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.86
   Tc(MIN.) =    8.12
   SUBAREA AREA(ACRES) =     3.63       SUBAREA RUNOFF(CFS) =    7.59
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
   TOTAL AREA(ACRES) =        3.8         PEAK FLOW RATE(CFS) =
7.92

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   8.23
   LONGEST FLOWPATH FROM NODE    408.00 TO NODE    410.00 =     879.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    410.00 TO NODE    125.00 IS CODE =  51
 ----------------------------------------------------------------------------
----
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =
358.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   778.00   CHANNEL SLOPE =  0.0990
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =  10.000
   MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.068
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .4050
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.79
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.50
   AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   2.36
   Tc(MIN.) =   10.48
   SUBAREA AREA(ACRES) =     2.79       SUBAREA RUNOFF(CFS) =    5.73
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.373
   TOTAL AREA(ACRES) =        6.6         PEAK FLOW RATE(CFS) =
12.45

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   5.73
   LONGEST FLOWPATH FROM NODE    408.00 TO NODE    125.00 =    1657.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
 ----------------------------------------------------------------------------
----
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

================================================================================
===
   TOTAL NUMBER OF STREAMS =  3
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.48
   RAINFALL INTENSITY(INCH/HR) =   5.07
   TOTAL STREAM AREA(ACRES) =     6.58
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.45

   ** CONFLUENCE DATA **
   STREAM     RUNOFF       Tc      INTENSITY      AREA
   NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
       1      196.36    21.61        3.177        167.56
       2        4.82     5.98        7.281          1.63
       3       12.45    10.48        5.068          6.58

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

```
   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc      INTENSITY
   NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
       1       66.21     5.98       7.281
       2      111.02    10.48       5.068
       3      206.27    21.61       3.177

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     206.27   Tc(MIN.) =   21.61
   TOTAL AREA(ACRES) =      175.8
   LONGEST FLOWPATH FROM NODE    201.00 TO NODE    125.00 =    4503.00
FEET.

================================================================================
===
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)     =      175.8  TC(MIN.) =     21.61
   PEAK FLOW RATE(CFS)   =     206.27

================================================================================
===

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

Appendix B- Hydraulic Calculations

Concrete: 0.013 (Mannings coefficient)

Peak flow Q when flowing full

D\slope	*0.0025*	*0.0033*	*0.005*	*0.0067*	*0.008*	*0.01*	*0.015*	*0.02*	*0.03*	*0.04*	*0.05*	*0.075*	*0.1*
18	5.25	6.06	7.43	8.58	9.40	10.50	12.87	14.86	18.2	21.0	23.5	28.8	33.2
21	7.92	9.15	11.20	12.94	14.17	15.85	19.41	22.4	27.4	31.7	35.4	43.4	50.1
24	11.31	13.06	16.00	18.47	20.23	22.62	27.7	32.0	39.2	45.2	50.6	62.0	**71.5**
30	20.51	23.68	29.00	33.49	36.69	41.02	50.2	58.0	71.0	82.0	91.7	**112.3**	**129.7**
36	33.35	38.51	47.16	54.46	59.66	66.7	81.7	94.3	115.5	133.4	149.1	**182.7**	**210.9**
42	50.30	58.09	71.14	82.15	90.0	100.6	123.2	142.3	174.3	201.2	**225.0**	**275.5**	**318.2**
48	71.82	82.93	101.57	117.3	128.5	143.6	175.9	203.1	248.8	**287.3**	**321.2**	**393.4**	**454.2**
54	98.32	113.54	139.05	160.6	175.9	196.6	240.8	278.1	340.6	**393.3**	**439.7**	**538.5**	**621.9**
60	130.22	150.37	184.2	212.7	232.9	260.4	319.0	368.3	**451.1**	**520.9**	**582.4**	**713.3**	**823.6**
66	167.90	193.88	237.5	274.2	300.4	335.8	411.3	474.9	**581.6**	**671.6**	**750.9**	**919.7**	**1061.9**
72	211.75	244.51	299.5	345.8	378.8	423.5	518.7	598.9	**733.5**	**847.0**	**947.0**	**1159.8**	**1339.3**
78	262.14	302.69	370.7	428.1	468.9	524.3	642.1	**741.4**	**908.1**	**1048.6**	**1172.3**	**1435.8**	**1657.9**

Maximum Velocity V (when the depth is 0.82D the capacity is the same than when the pipe is flowing full)

D\slope	*0.0025*	*0.0033*	*0.005*	*0.0067*	*0.008*	*0.01*	*0.015*	*0.02*	*0.03*	*0.04*	*0.05*	*0.075*	*0.1*
18	3.39	3.91	4.79	5.53	6.06	6.78	8.30	9.58	11.7	13.6	15.2	18.6	21.4
21	3.75	4.34	5.31	6.13	6.72	7.51	9.20	10.6	13.0	15.0	16.8	20.6	23.7
24	4.10	4.74	5.80	6.70	7.34	8.21	10.1	11.6	14.2	16.4	18.4	22.5	**26.0**
30	4.76	5.50	6.74	7.78	8.52	9.53	11.7	13.5	16.5	19.1	21.3	**26.1**	**30.1**
36	5.38	6.21	7.61	8.78	9.62	10.8	13.2	15.2	18.6	21.5	24.1	**29.5**	**34.0**
42	5.96	6.88	8.43	9.73	10.7	11.9	14.6	16.9	20.6	23.8	**26.7**	**32.6**	**37.7**
48	6.52	7.52	9.21	10.6	11.7	13.0	16.0	18.4	22.6	**26.1**	**29.1**	**35.7**	**41.2**
54	7.05	8.14	9.97	11.5	12.6	14.1	17.3	19.9	24.4	**28.2**	**31.5**	**38.6**	**44.6**
60	7.56	8.73	10.7	12.3	13.5	15.1	18.5	21.4	**26.2**	**30.2**	**33.8**	**41.4**	**47.8**
66	8.06	9.30	11.4	13.2	14.4	16.1	19.7	22.8	**27.9**	**32.2**	**36.0**	**44.1**	**51.0**
72	8.54	9.86	12.1	13.9	15.3	17.1	20.9	24.1	**29.6**	**34.2**	**38.2**	**46.8**	**54.0**
78	9.01	10.40	12.7	14.7	16.1	18.0	22.1	**25.5**	**31.2**	**36.0**	**40.3**	**49.3**	**57.0**

Note: avoid velocities larger than 25 ft/s. Concrete pipes can be designed for larger velocities but carefull consideration of confluences and bends must be taken. Excess of energy should be reduced.

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 1

Circular

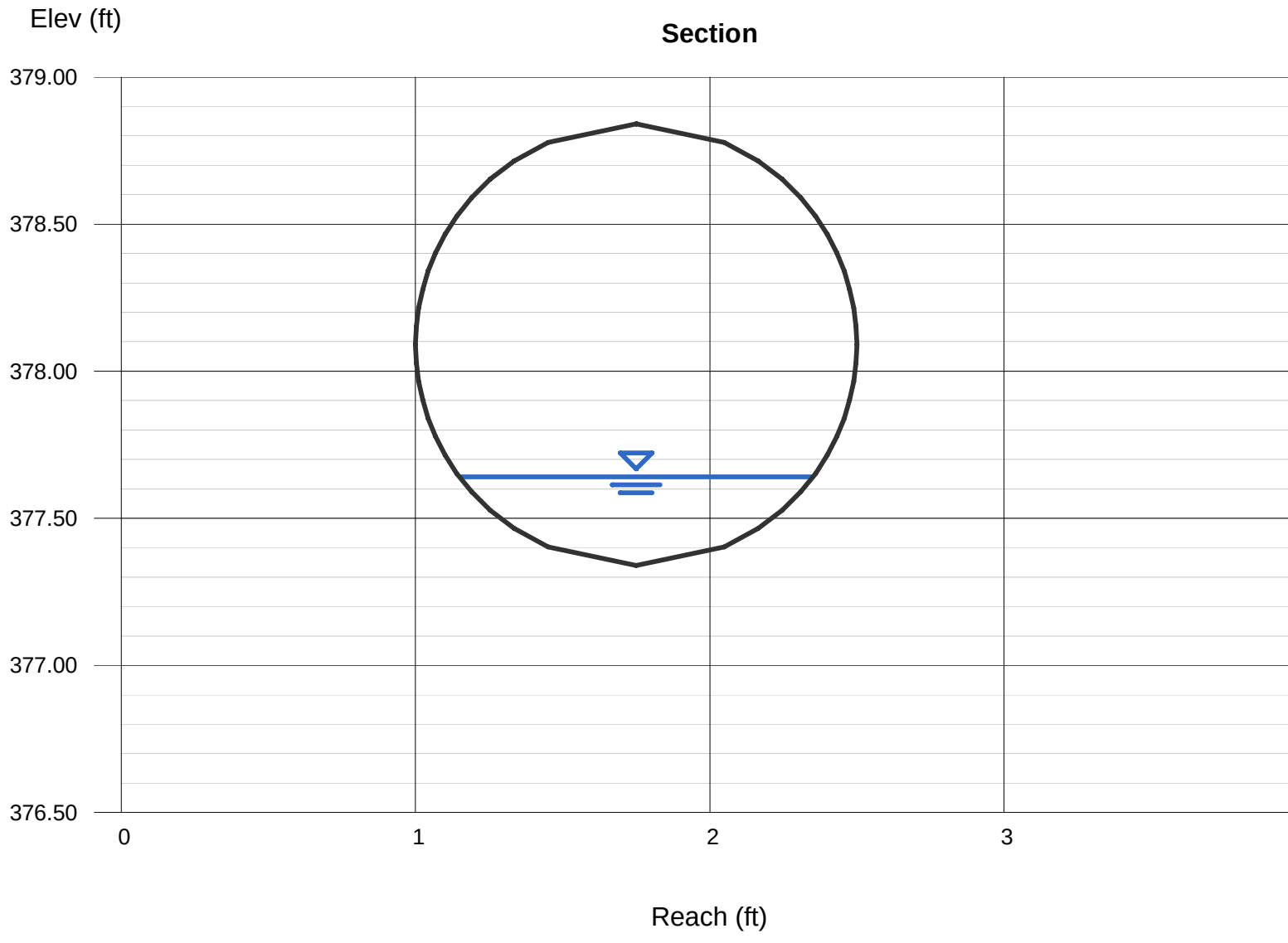
Diameter (ft)	= 1.50
Invert Elev (ft)	= 377.34
Slope (%)	= 8.10
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.85

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 2.850
Area (sqft)	= 0.25
Velocity (ft/s)	= 11.24
Wetted Perim (ft)	= 1.39
Crit Depth, Yc (ft)	= 0.65
Top Width (ft)	= 1.20
EGL (ft)	= 2.26



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 2

Circular

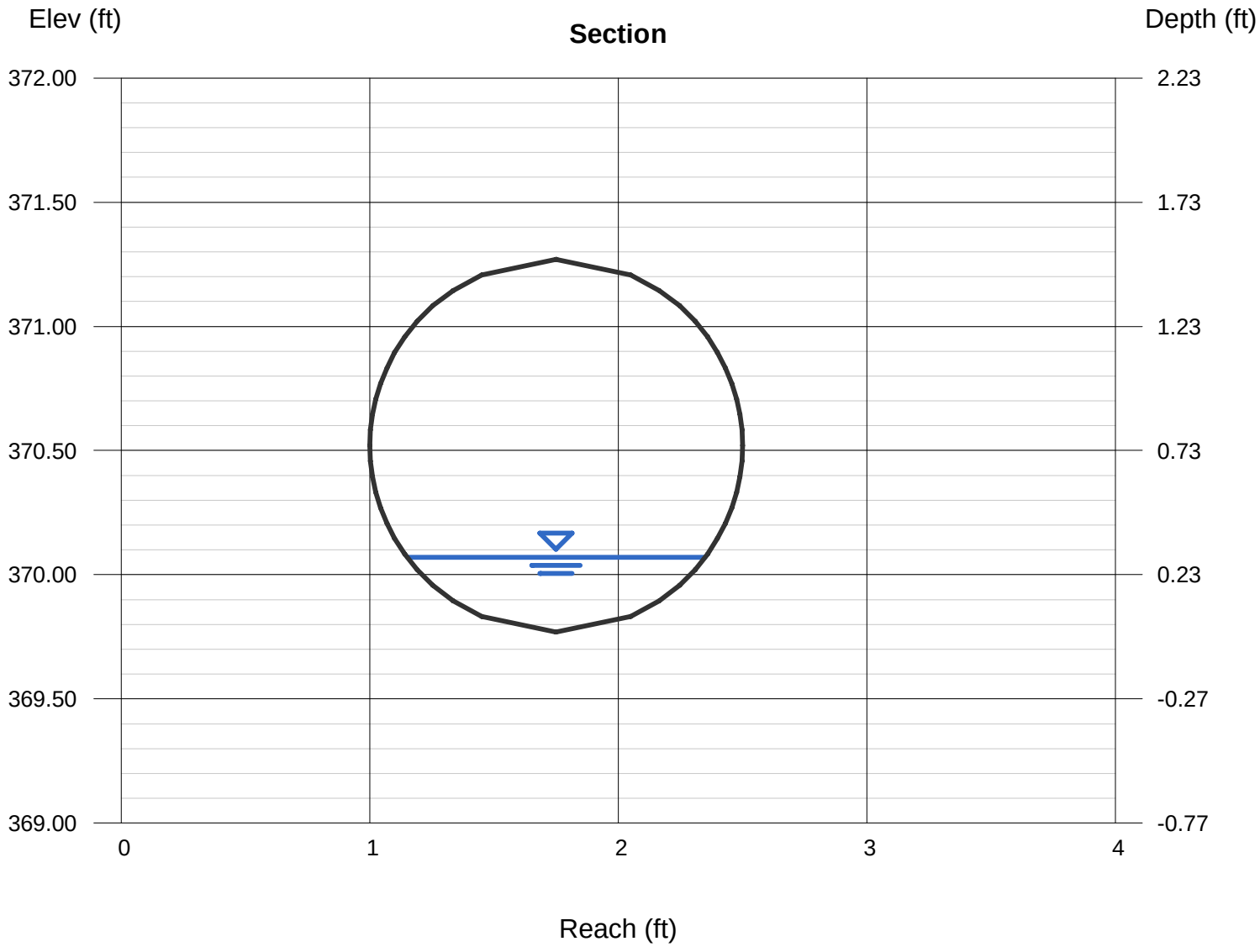
Diameter (ft)	= 1.50
Invert Elev (ft)	= 369.77
Slope (%)	= 2.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.57

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 1.570
Area (sqft)	= 0.25
Velocity (ft/s)	= 6.19
Wetted Perim (ft)	= 1.39
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 1.20
EGL (ft)	= 0.90



Channel Report

Storm Drain Line 3

Circular

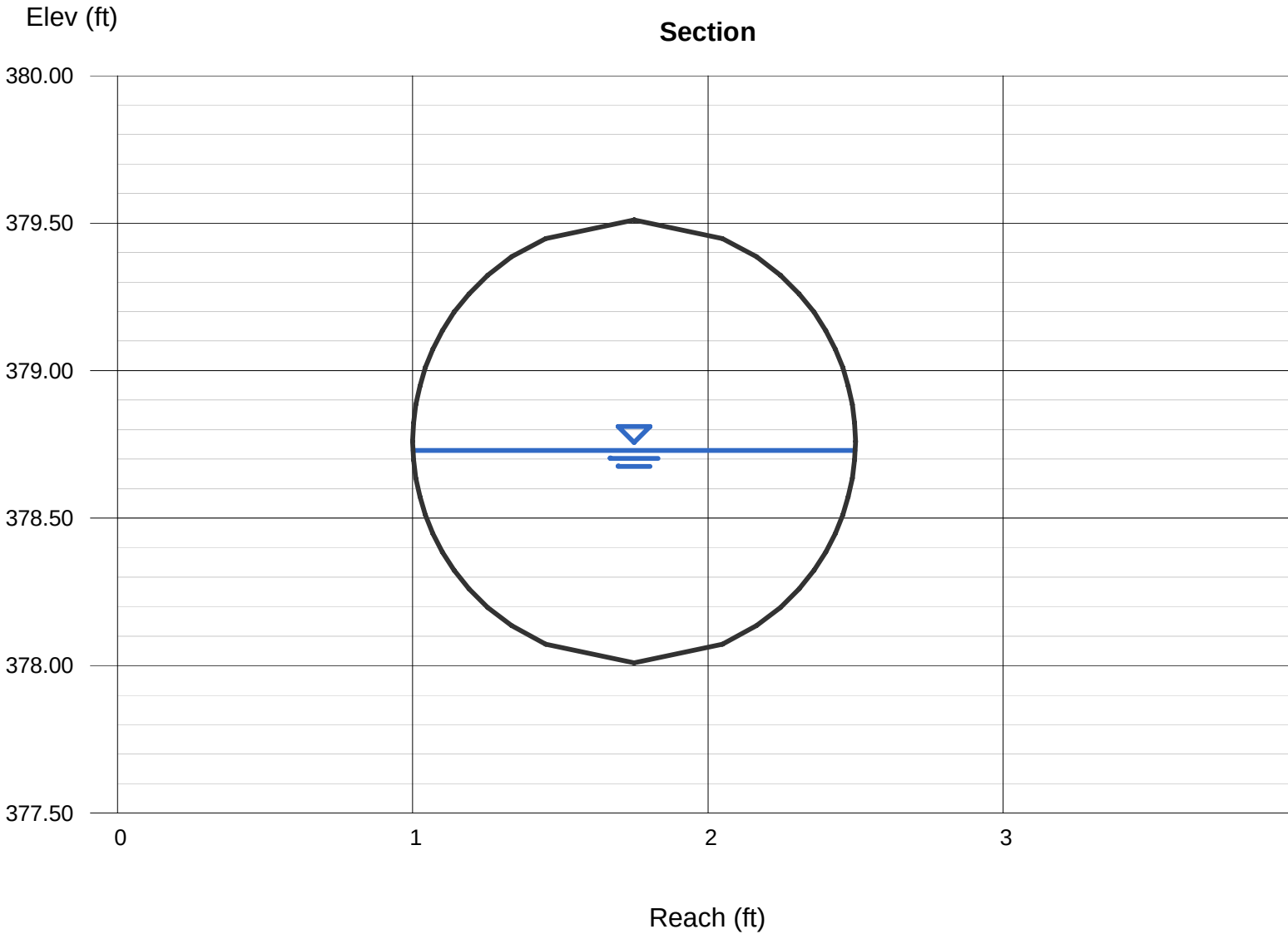
Diameter (ft)	= 1.50
Invert Elev (ft)	= 378.01
Slope (%)	= 8.10
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.95

Highlighted

Depth (ft)	= 0.72
Q (cfs)	= 14.95
Area (sqft)	= 0.84
Velocity (ft/s)	= 17.73
Wetted Perim (ft)	= 2.30
Crit Depth, Yc (ft)	= 1.41
Top Width (ft)	= 1.50
EGL (ft)	= 5.61



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 4

Circular

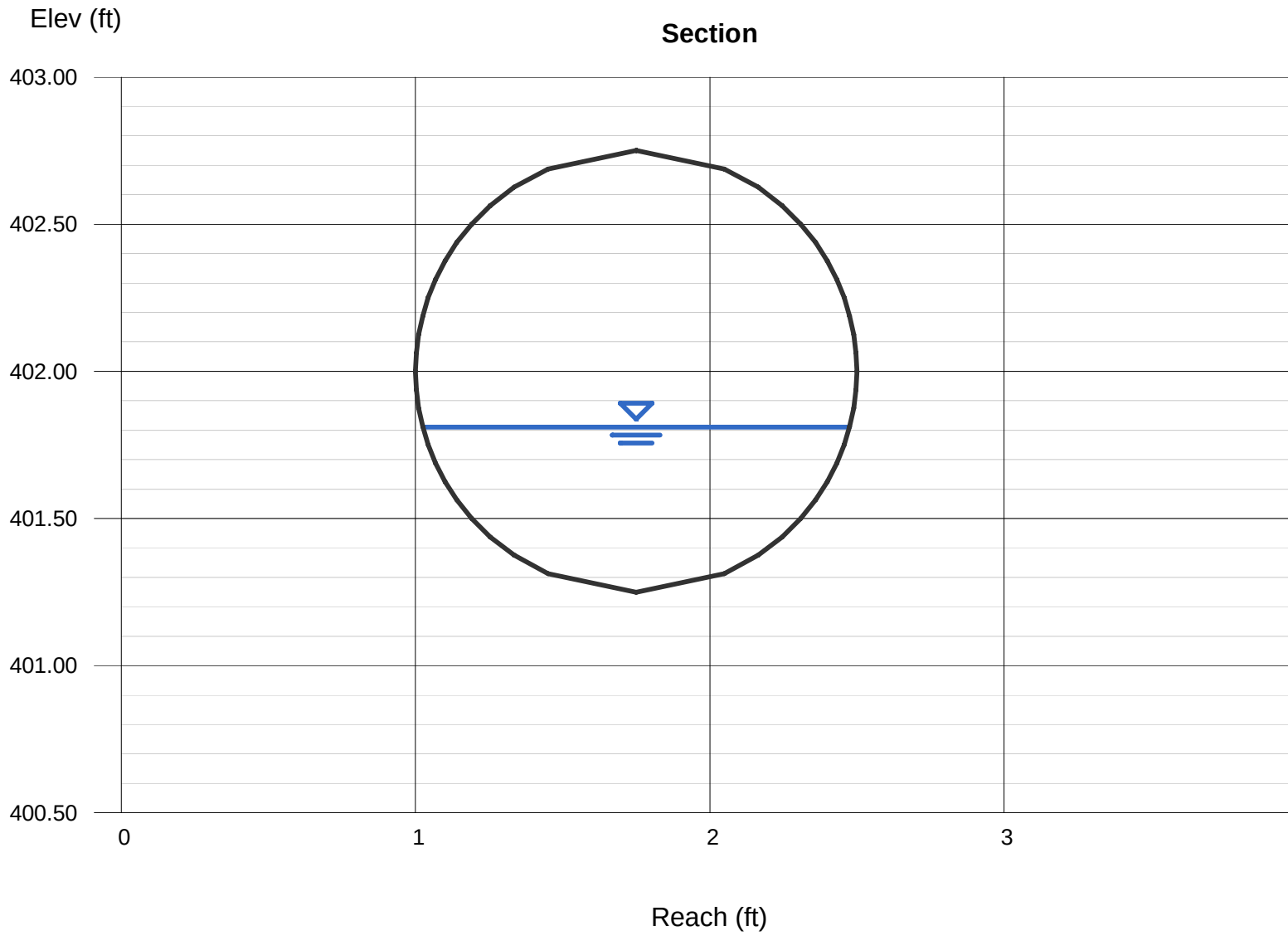
Diameter (ft)	= 1.50
Invert Elev (ft)	= 400.35
Slope (%)	= 10.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 10.77

Highlighted

Depth (ft)	= 0.56
Q (cfs)	= 10.77
Area (sqft)	= 0.60
Velocity (ft/s)	= 17.89
Wetted Perim (ft)	= 1.97
Crit Depth, Yc (ft)	= 1.26
Top Width (ft)	= 1.45
EGL (ft)	= 5.54



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Mar 7 2022

Storm Drain Line 5

Circular

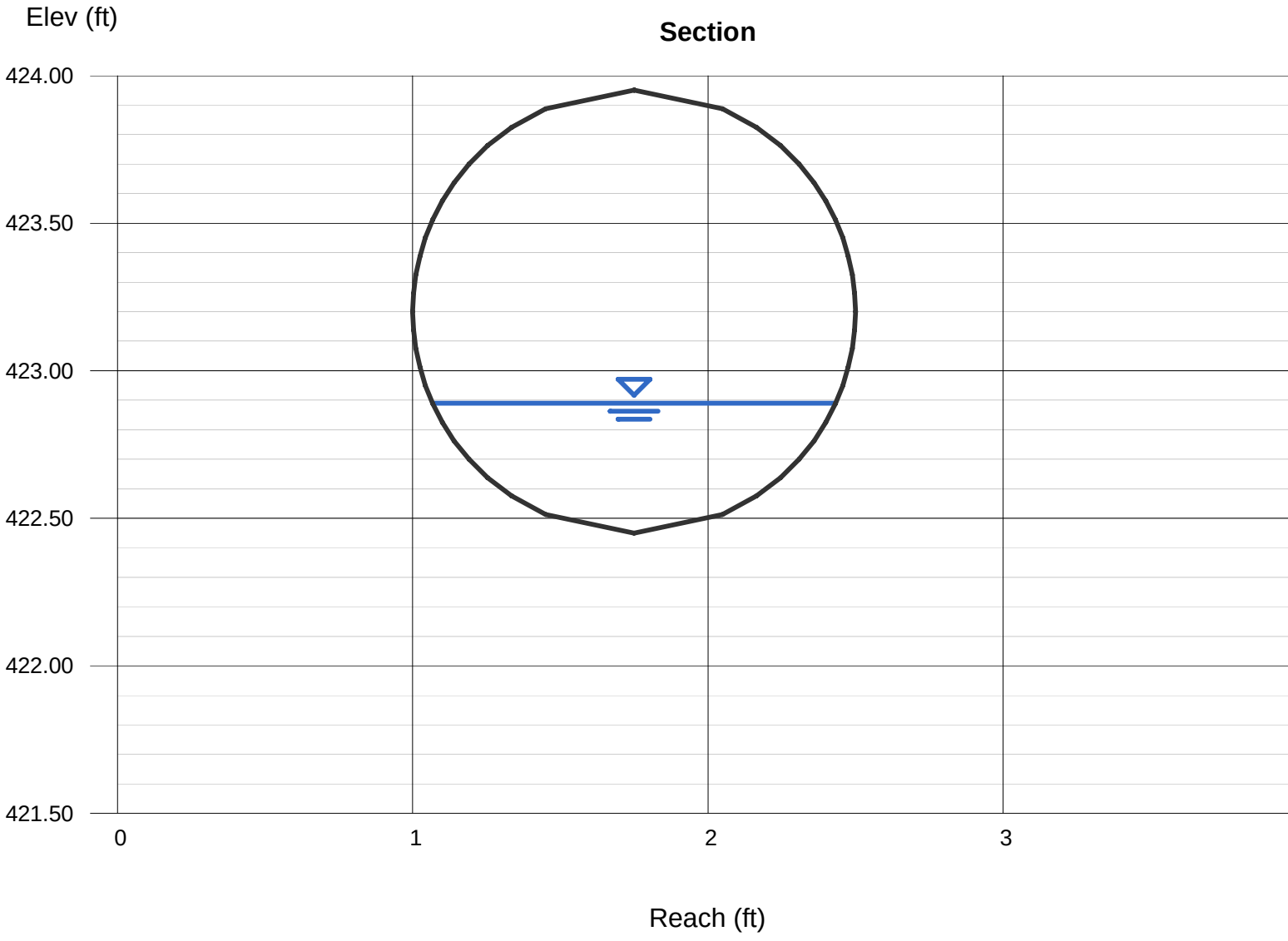
Diameter (ft)	= 1.50
Invert Elev (ft)	= 422.45
Slope (%)	= 23.40
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 10.23

Highlighted

Depth (ft)	= 0.44
Q (cfs)	= 10.23
Area (sqft)	= 0.43
Velocity (ft/s)	= 23.65
Wetted Perim (ft)	= 1.72
Crit Depth, Yc (ft)	= 1.23
Top Width (ft)	= 1.37
EGL (ft)	= 9.14



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 6

Circular

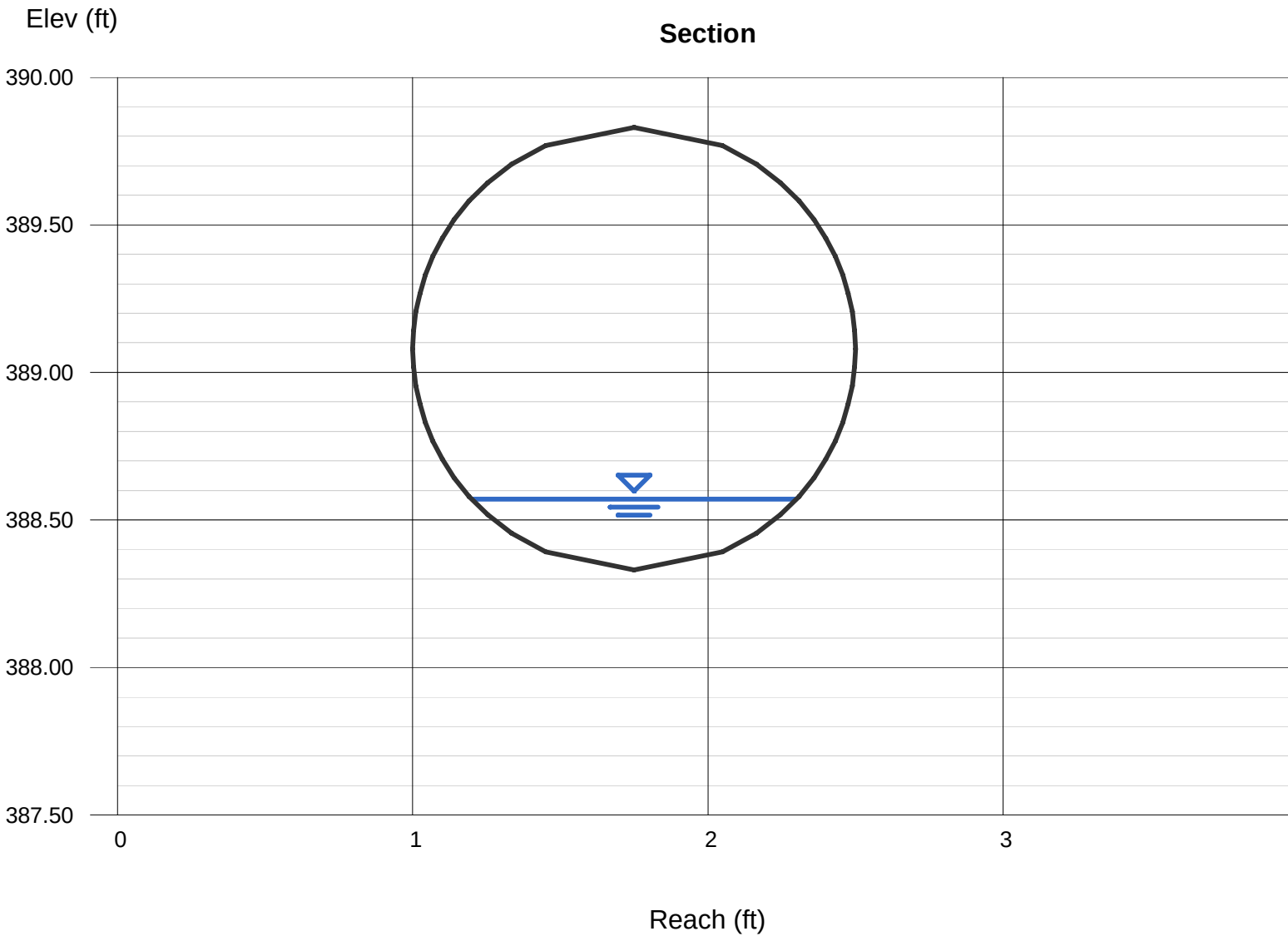
Diameter (ft)	= 1.50
Invert Elev (ft)	= 388.33
Slope (%)	= 7.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.70

Highlighted

Depth (ft)	= 0.24
Q (cfs)	= 1.700
Area (sqft)	= 0.18
Velocity (ft/s)	= 9.25
Wetted Perim (ft)	= 1.24
Crit Depth, Yc (ft)	= 0.49
Top Width (ft)	= 1.10
EGL (ft)	= 1.57



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Mar 7 2022

Storm Drain Line 7

Circular

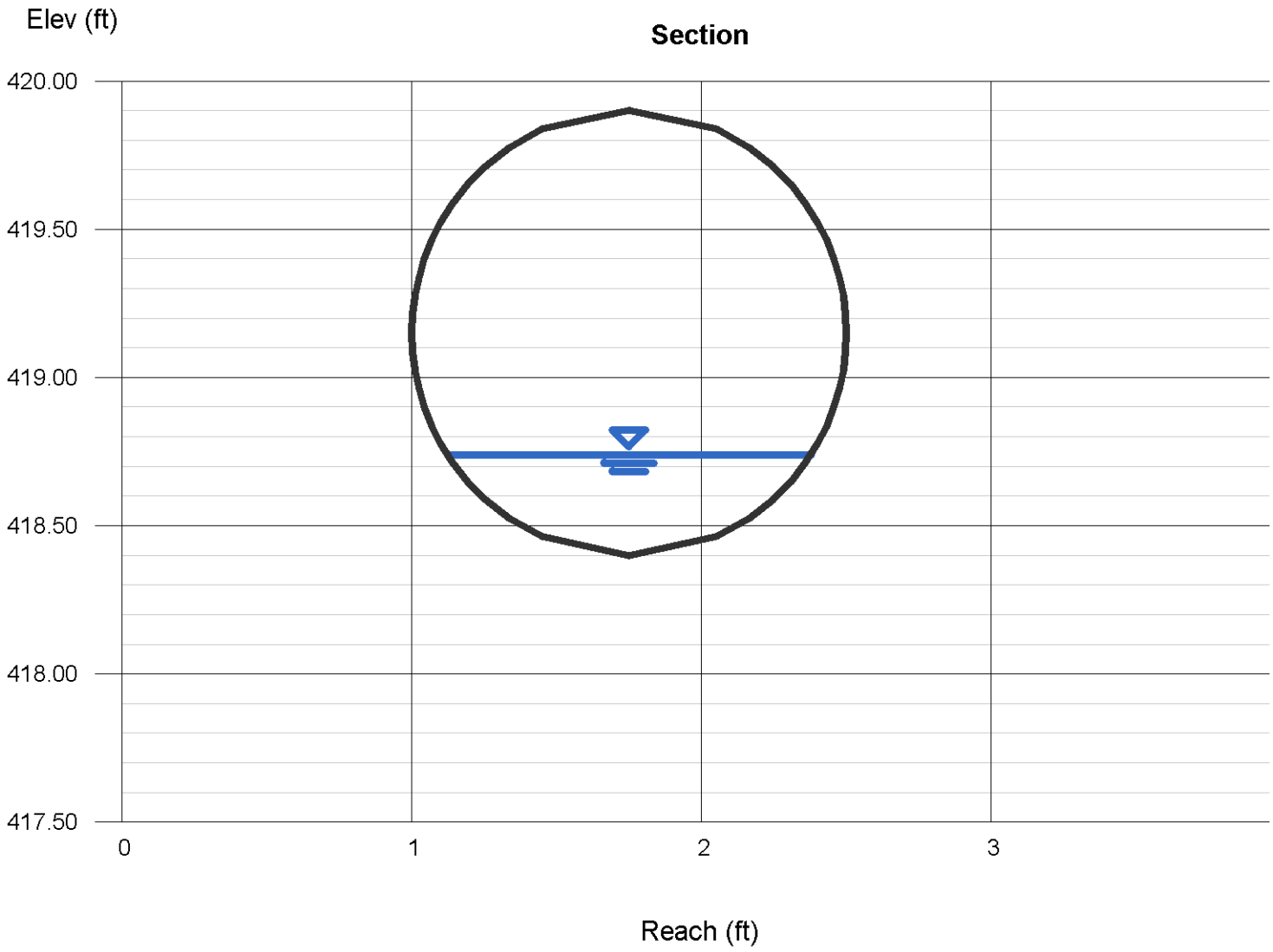
Diameter (ft)	= 1.50
Invert Elev (ft)	= 418.40
Slope (%)	= 20.60
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.71

Highlighted

Depth (ft)	= 0.34
Q (cfs)	= 5.710
Area (sqft)	= 0.30
Velocity (ft/s)	= 18.86
Wetted Perim (ft)	= 1.49
Crit Depth, Yc (ft)	= 0.93
Top Width (ft)	= 1.26
EGL (ft)	= 5.87



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 8

Circular

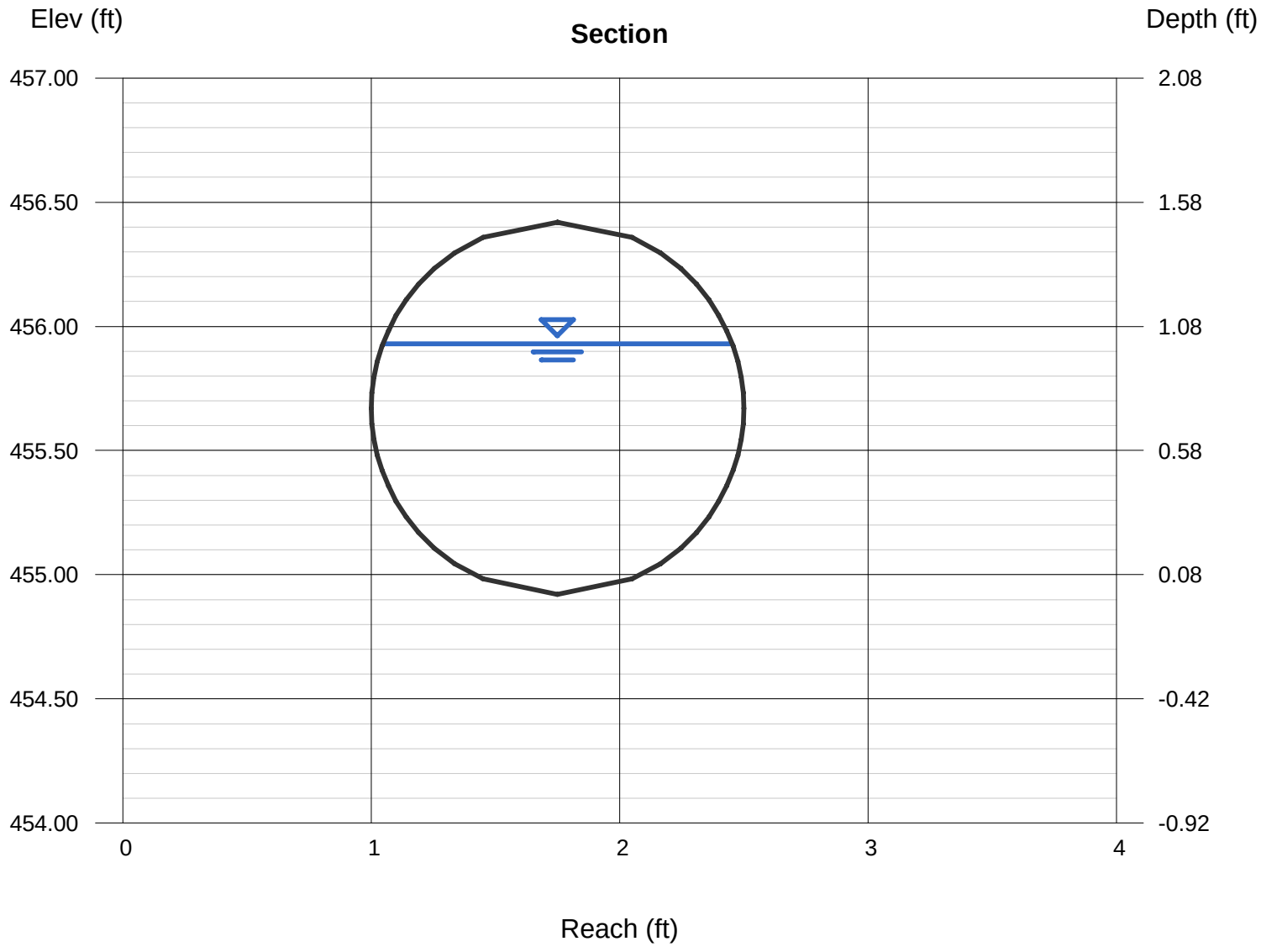
Diameter (ft)	= 1.50
Invert Elev (ft)	= 454.08
Slope (%)	= 6.30
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 22.65

Highlighted

Depth (ft)	= 1.01
Q (cfs)	= 22.65
Area (sqft)	= 1.27
Velocity (ft/s)	= 17.89
Wetted Perim (ft)	= 2.89
Crit Depth, Yc (ft)	= 1.48
Top Width (ft)	= 1.41
EGL (ft)	= 5.99



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 9

Circular

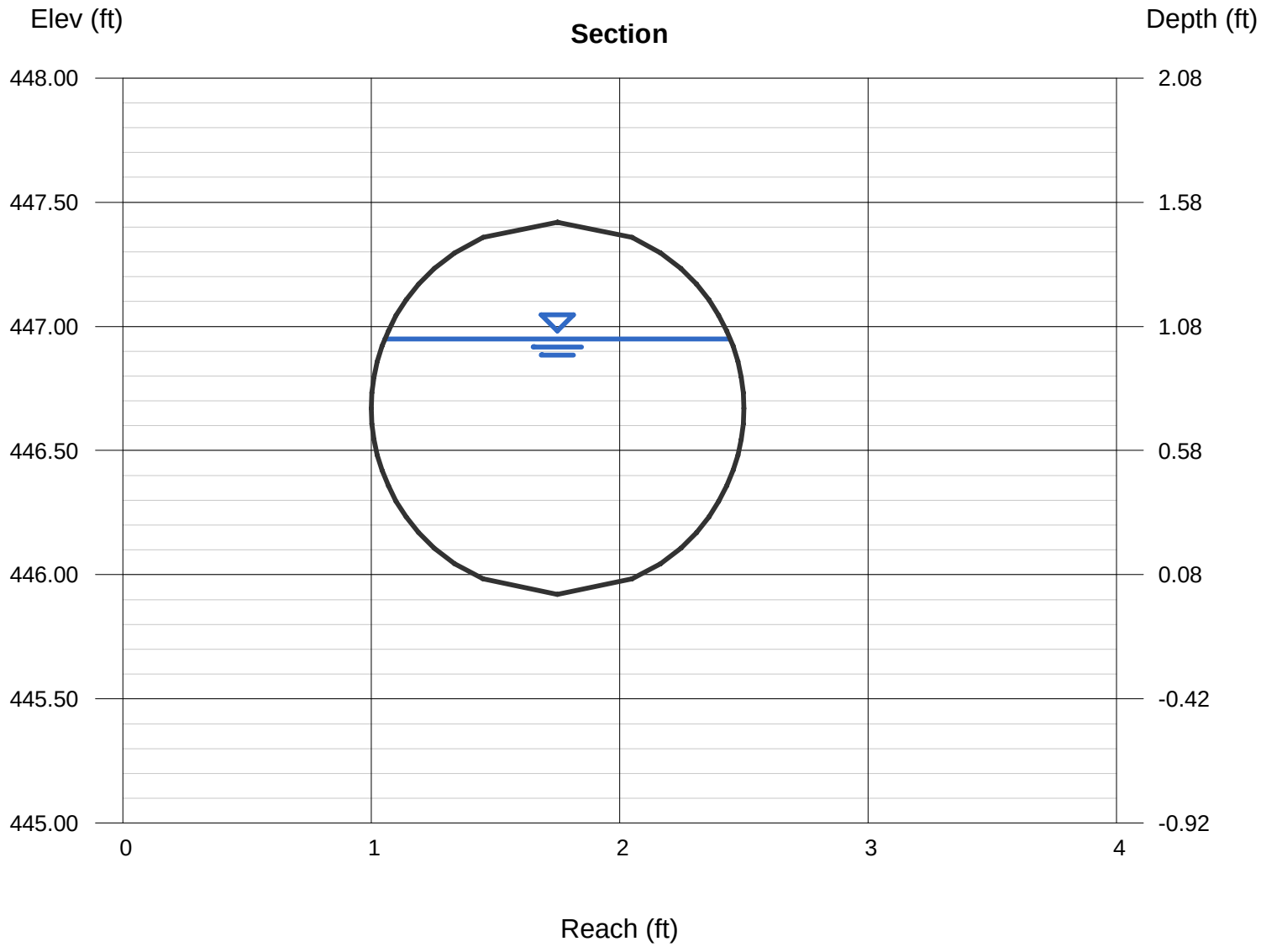
Diameter (ft)	= 1.50
Invert Elev (ft)	= 445.82
Slope (%)	= 6.40
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.28

Highlighted

Depth (ft)	= 1.03
Q (cfs)	= 23.28
Area (sqft)	= 1.30
Velocity (ft/s)	= 17.97
Wetted Perim (ft)	= 2.93
Crit Depth, Yc (ft)	= 1.49
Top Width (ft)	= 1.39
EGL (ft)	= 6.05



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Mar 7 2022

Storm Drain Line 10

Circular

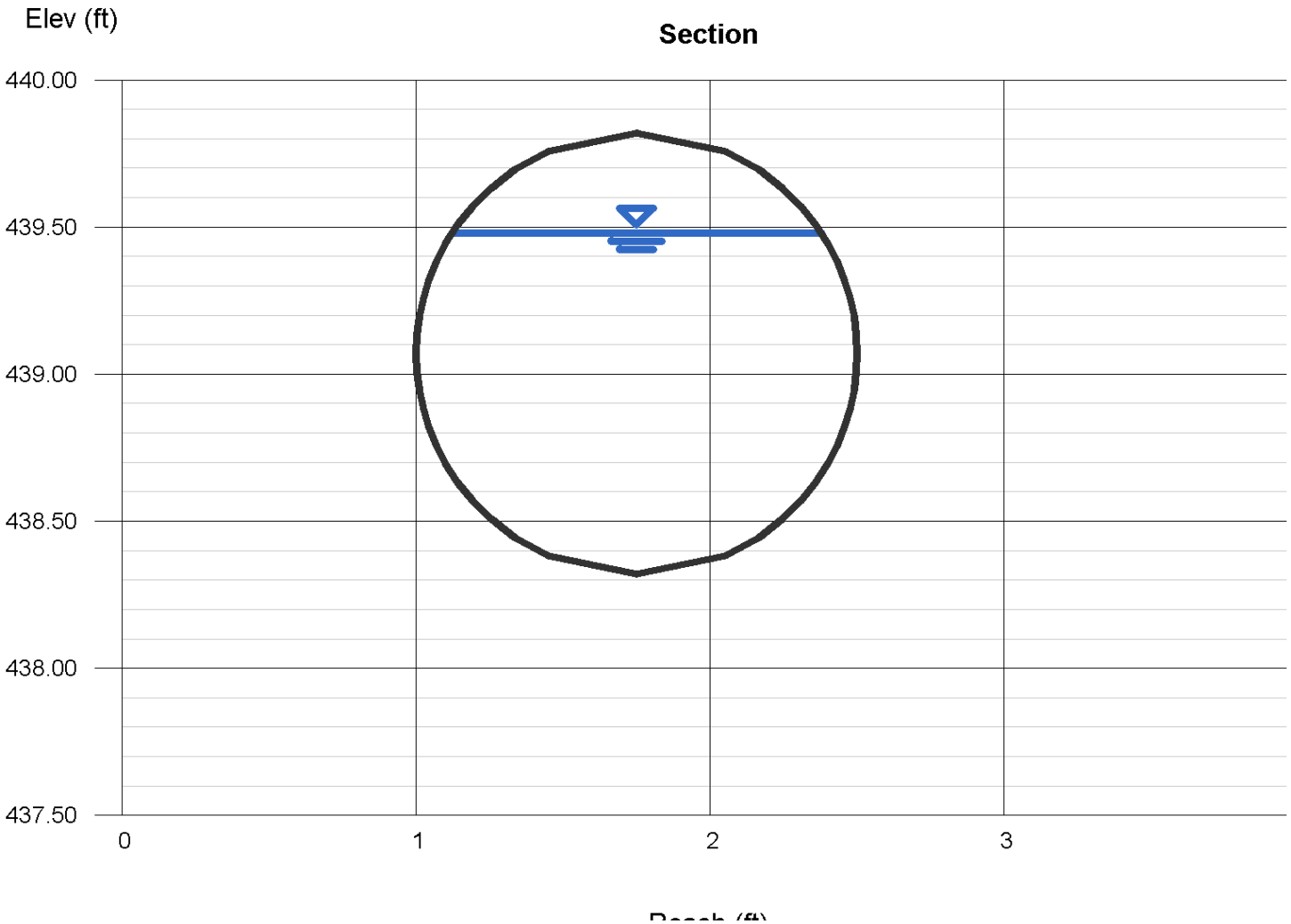
Diameter (ft)	= 1.50
Invert Elev (ft)	= 438.32
Slope (%)	= 4.80
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.47

Highlighted

Depth (ft)	= 1.16
Q (cfs)	= 23.47
Area (sqft)	= 1.47
Velocity (ft/s)	= 16.00
Wetted Perim (ft)	= 3.23
Crit Depth, Yc (ft)	= 1.49
Top Width (ft)	= 1.26
EGL (ft)	= 5.14



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Mar 7 2022

Storm Drain Line 11

Circular

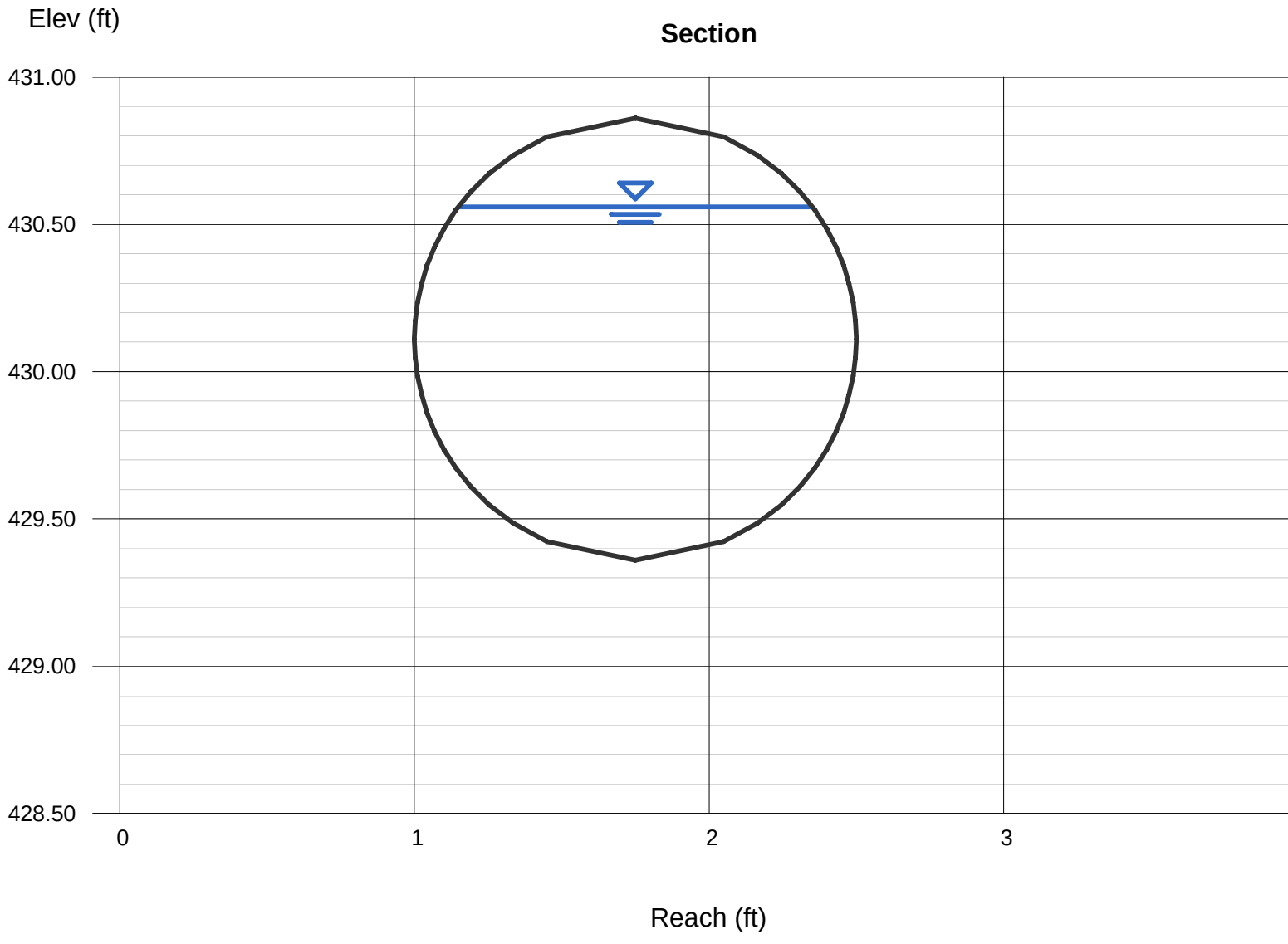
Diameter (ft)	= 1.50
Invert Elev (ft)	= 429.36
Slope (%)	= 4.80
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 24.19

Highlighted

Depth (ft)	= 1.20
Q (cfs)	= 24.19
Area (sqft)	= 1.52
Velocity (ft/s)	= 15.96
Wetted Perim (ft)	= 3.32
Crit Depth, Yc (ft)	= 1.49
Top Width (ft)	= 1.20
EGL (ft)	= 5.16



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 12

Circular

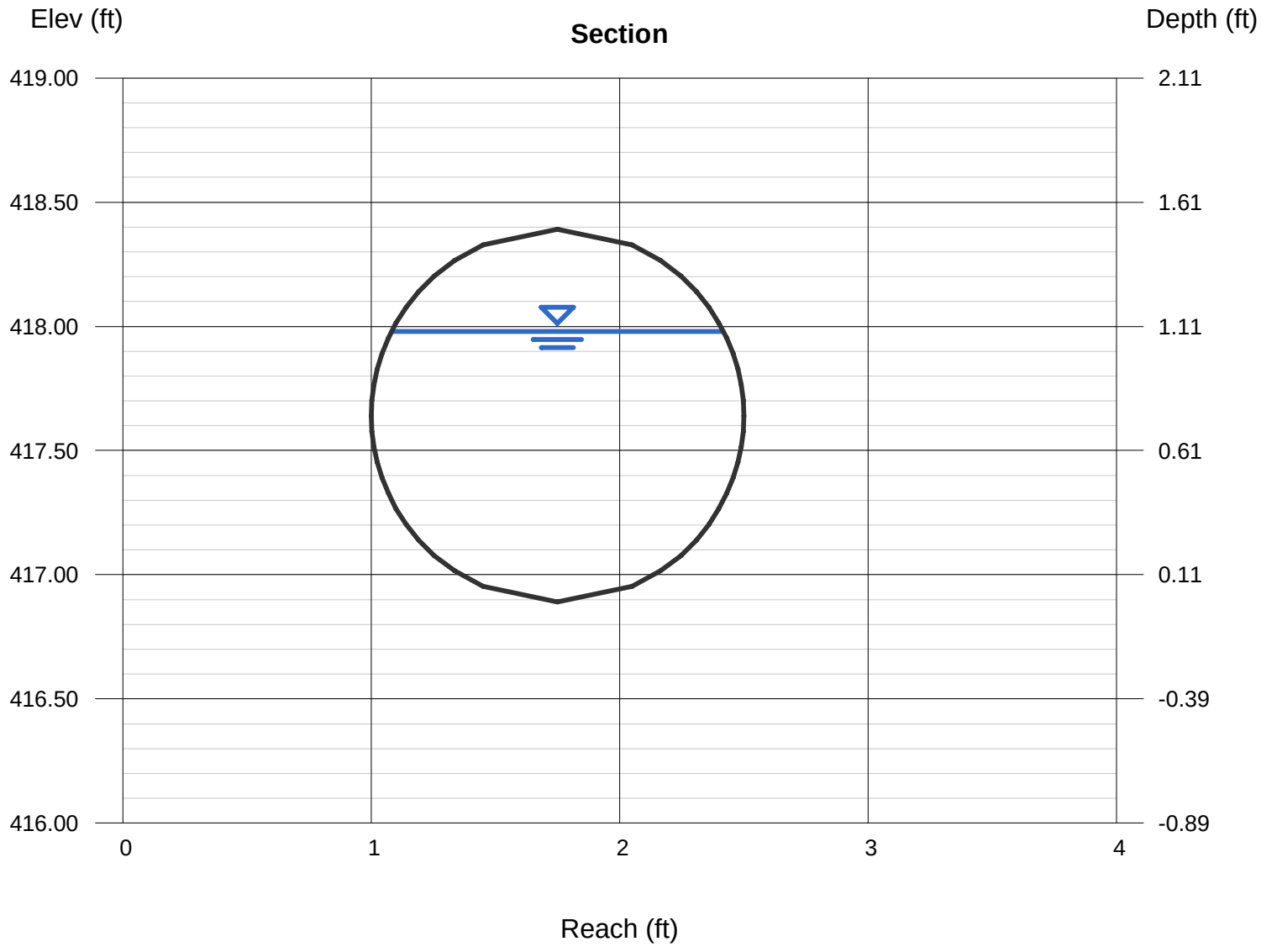
Diameter (ft)	= 1.50
Invert Elev (ft)	= 416.44
Slope (%)	= 6.10
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 24.59

Highlighted

Depth (ft)	= 1.09
Q (cfs)	= 24.59
Area (sqft)	= 1.38
Velocity (ft/s)	= 17.83
Wetted Perim (ft)	= 3.07
Crit Depth, Yc (ft)	= 1.49
Top Width (ft)	= 1.33
EGL (ft)	= 6.03



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 13

Circular

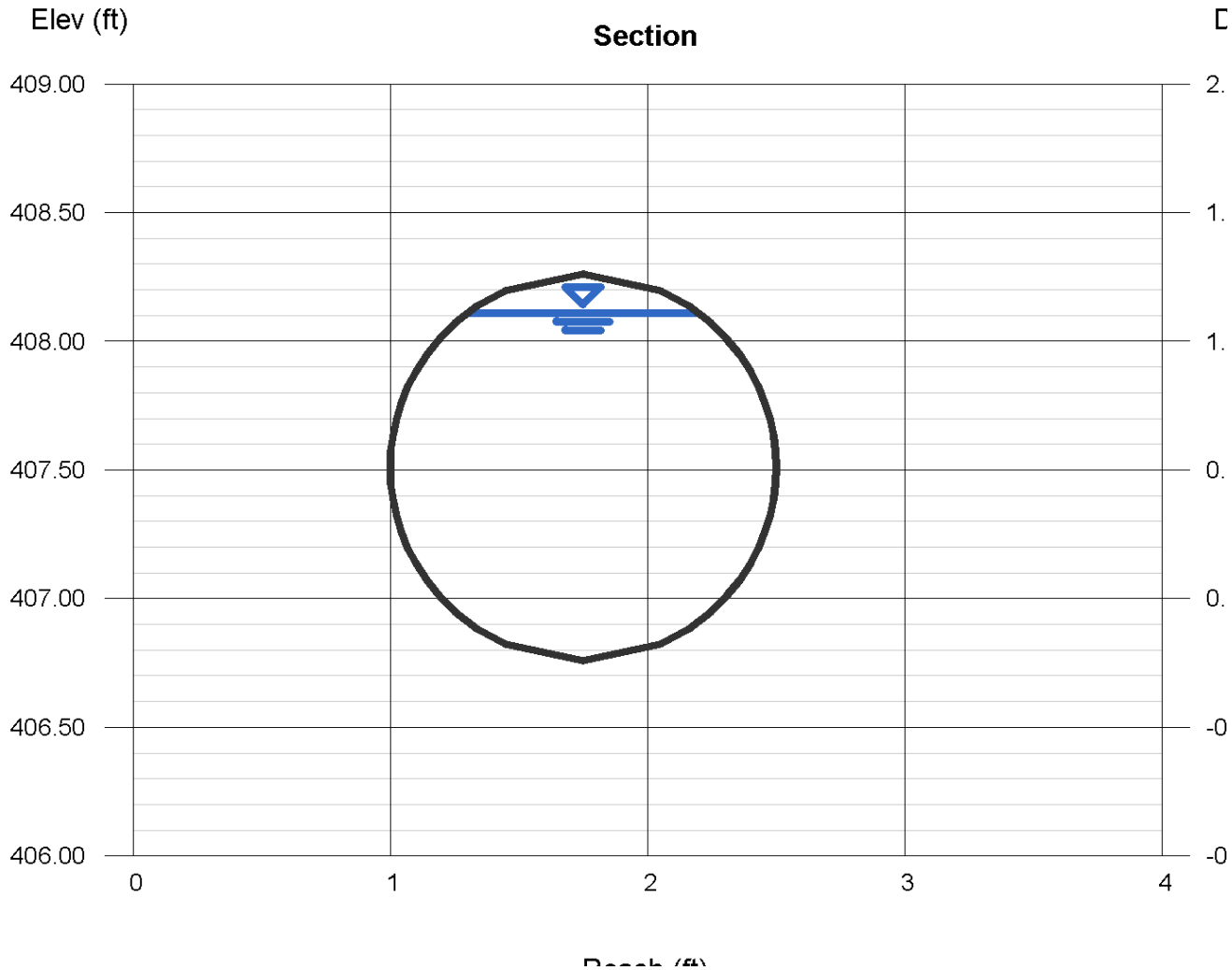
Diameter (ft)	= 1.50
Invert Elev (ft)	= 406.76
Slope (%)	= 4.30
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 25.12

Highlighted

Depth (ft)	= 1.35
Q (cfs)	= 25.12
Area (sqft)	= 1.68
Velocity (ft/s)	= 14.99
Wetted Perim (ft)	= 3.75
Crit Depth, Yc (ft)	= 1.49
Top Width (ft)	= 0.90
EGL (ft)	= 4.84



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 14

Circular

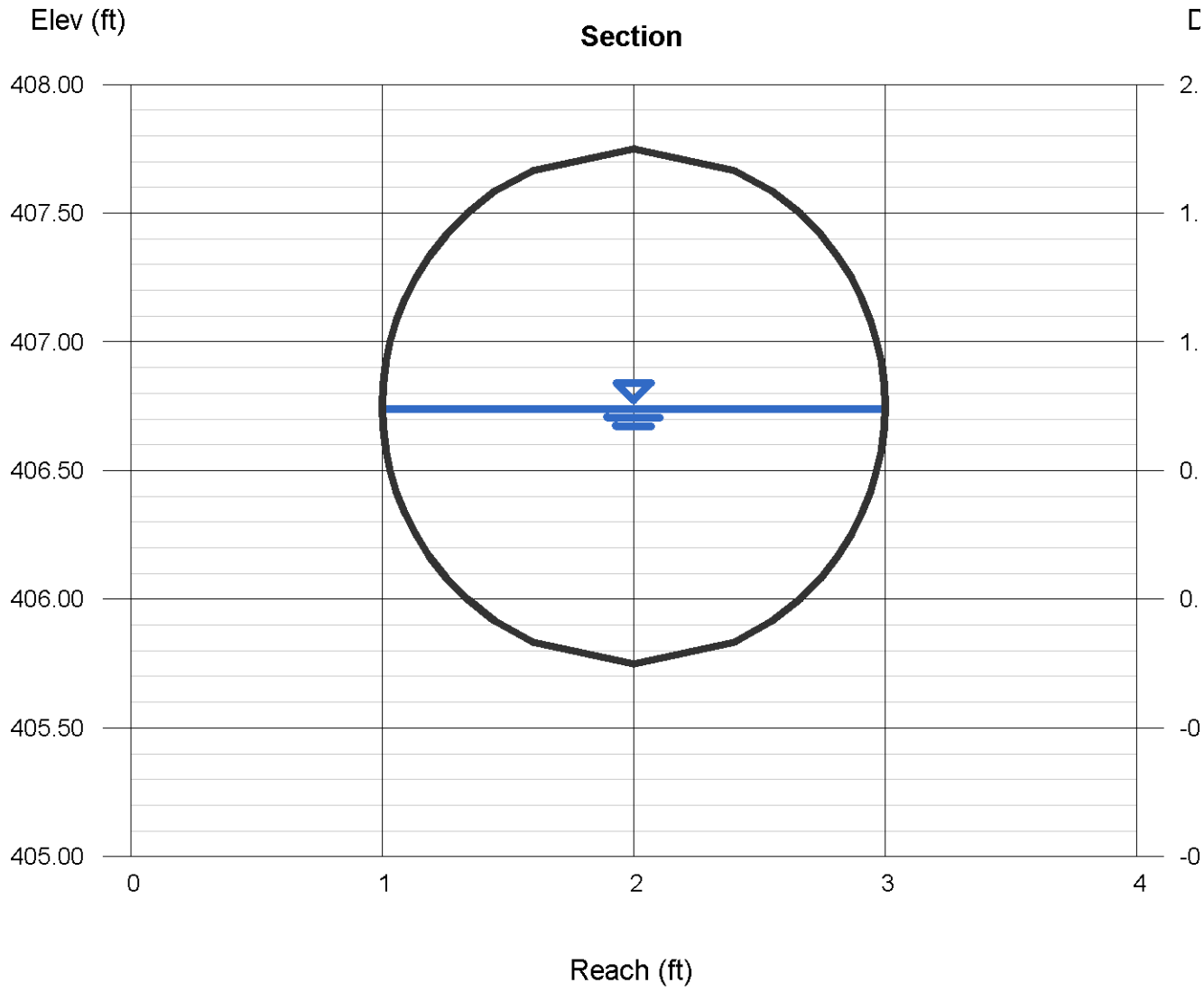
Diameter (ft)	= 2.00
Invert Elev (ft)	= 405.75
Slope (%)	= 5.40
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 28.00

Highlighted

Depth (ft)	= 0.99
Q (cfs)	= 28.00
Area (sqft)	= 1.56
Velocity (ft/s)	= 17.96
Wetted Perim (ft)	= 3.13
Crit Depth, Yc (ft)	= 1.83
Top Width (ft)	= 2.00
EGL (ft)	= 6.00



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Mar 4 2022

Storm Drain Line 15

Circular

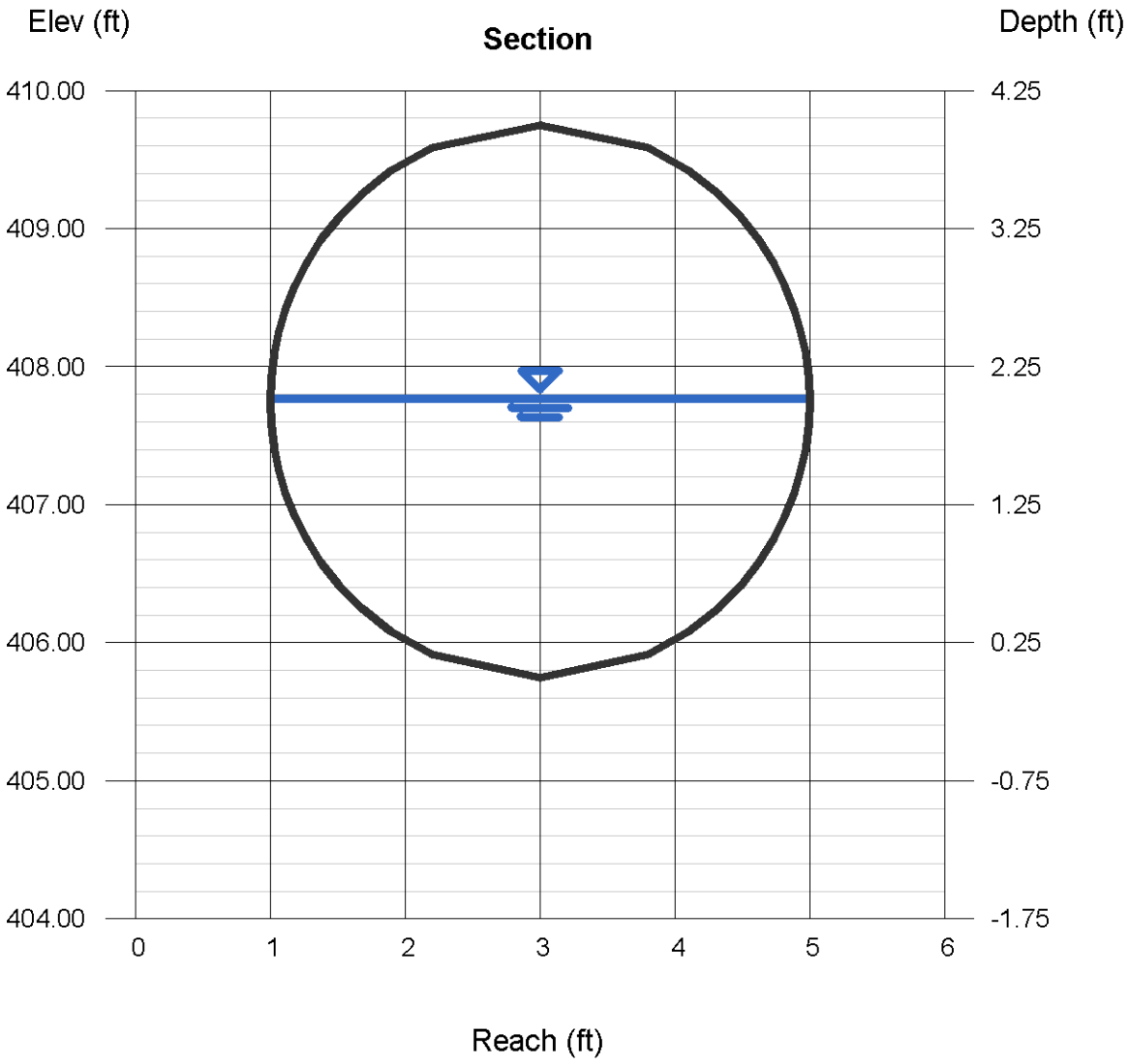
Diameter (ft)	= 4.00
Invert Elev (ft)	= 405.75
Slope (%)	= 2.10
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 114.86

Highlighted

Depth (ft)	= 2.02
Q (cfs)	= 114.86
Area (sqft)	= 6.40
Velocity (ft/s)	= 17.96
Wetted Perim (ft)	= 6.34
Crit Depth, Yc (ft)	= 3.24
Top Width (ft)	= 4.00
EGL (ft)	= 7.03



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Mar 7 2022

Storm Drain Lines 16, 17&18

Invert Elev Dn (ft)	=	361.90
Pipe Length (ft)	=	140.60
Slope (%)	=	4.00
Invert Elev Up (ft)	=	367.52
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	3
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Rough tapered inlet throat
Coeff. K,M,c,Y,k	=	0.519, 0.64, 0.021, 0.9, 0.5

Embankment

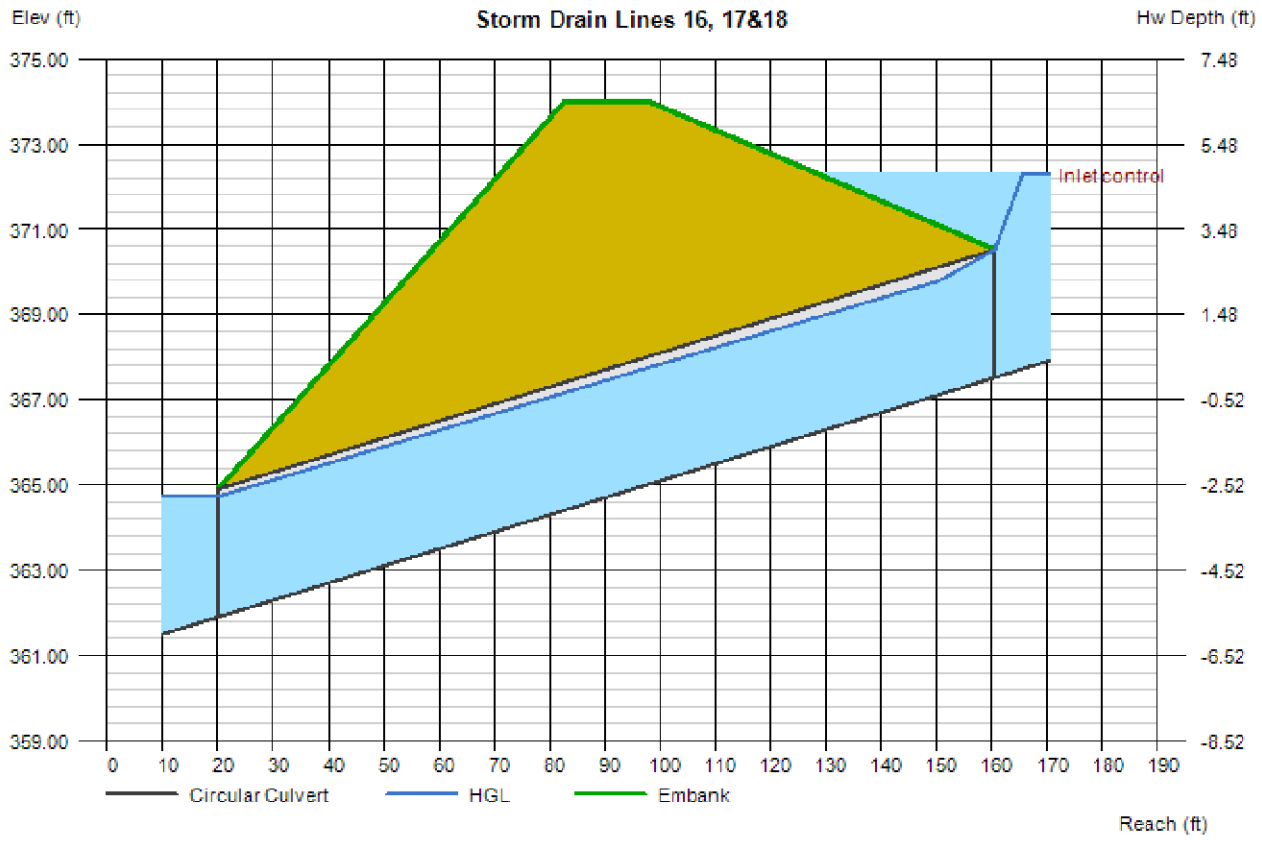
Top Elevation (ft)	=	374.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	211.17
Qmax (cfs)	=	211.17
Tailwater Elev (ft)	=	(dc+D)/2

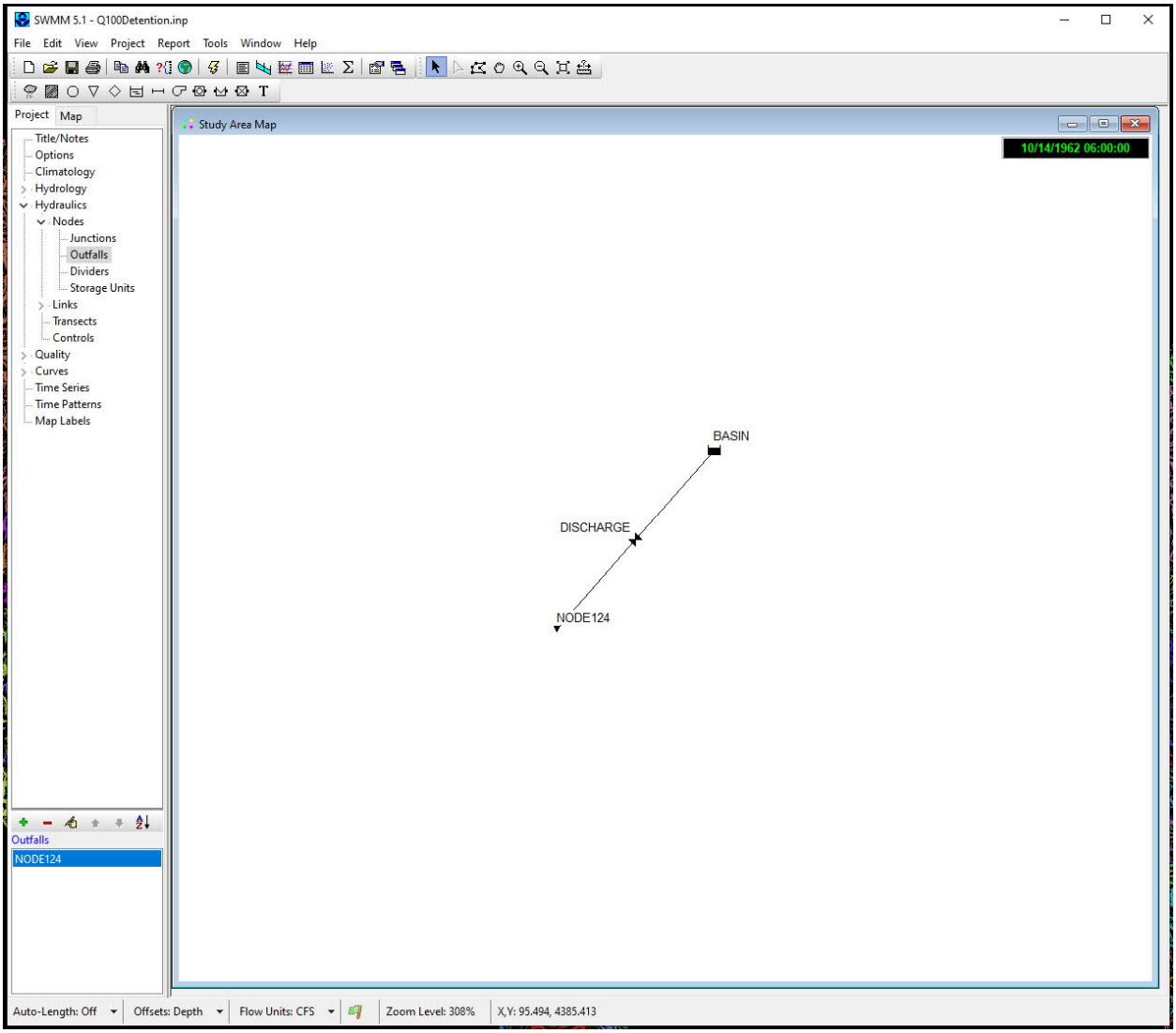
Highlighted

Qtotal (cfs)	=	211.17
Qpipe (cfs)	=	211.17
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	10.19
Veloc Up (ft/s)	=	10.62
HGL Dn (ft)	=	364.73
HGL Up (ft)	=	370.18
Hw Elev (ft)	=	372.29
Hw/D (ft)	=	1.59
Flow Regime	=	Inlet Control



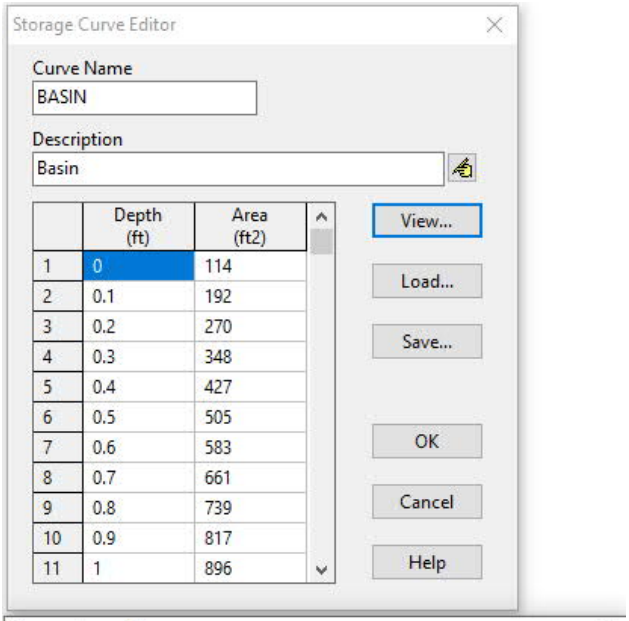
Appendix C- Detention Analysis

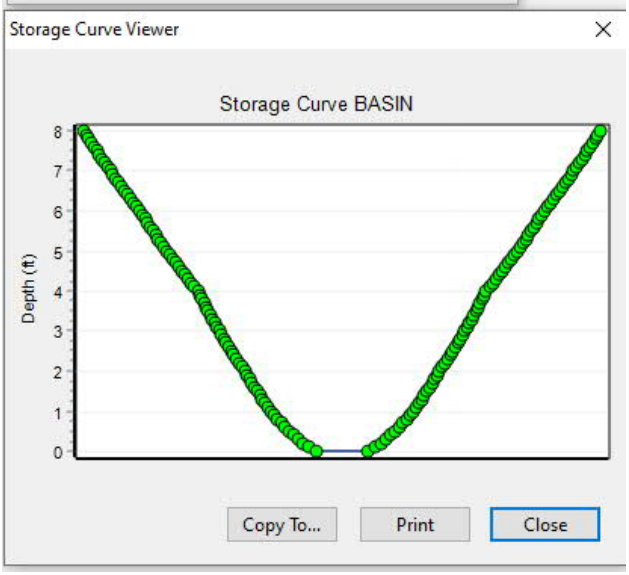
DETENTION ANALYSIS:



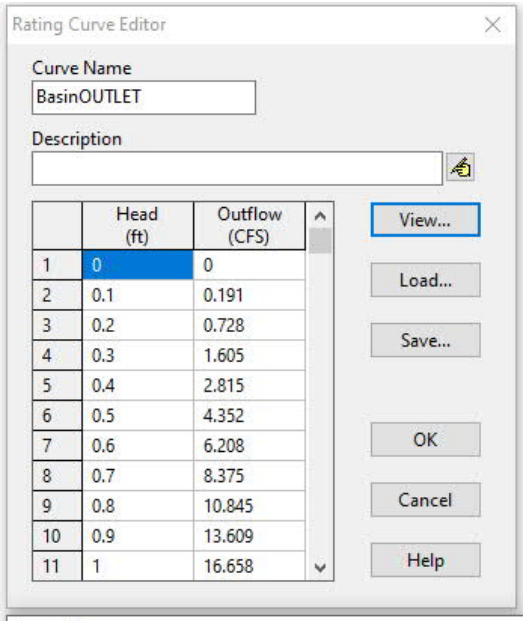
CURVES:

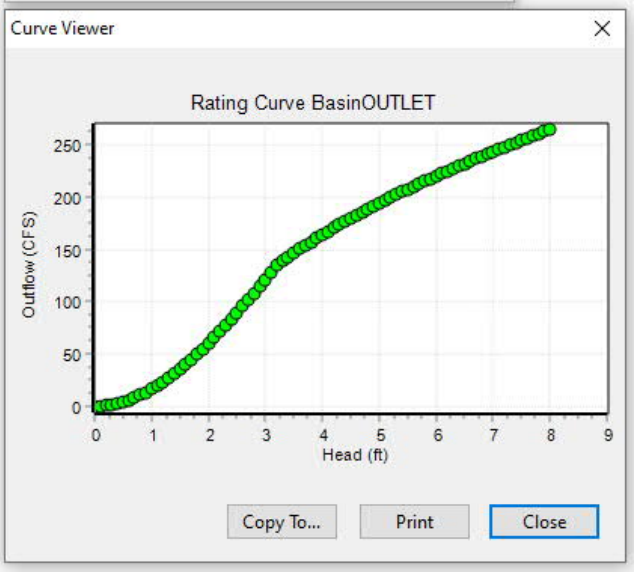
STAGE-STORAGE





STAGE-DISCHARGE





1923 Dentro de Lomas

Channel

Stage Storage Table

Elev (ft.)	Area (s.f.)	Area (ac.)	Elevation (ft.)	Volume (c.f.)	Volume (ac. Ft.)
368.0	114	0.0026	368.0	0	0.00
368.1	192	0.0044	368.1	15	0.00
368.2	270	0.0062	368.2	38	0.00
368.3	348	0.0080	368.3	69	0.00
368.4	427	0.0098	368.4	108	0.00
368.5	505	0.0116	368.5	155	0.00
368.6	583	0.0134	368.6	209	0.00
368.7	661	0.0152	368.7	271	0.01
368.8	739	0.0170	368.8	341	0.01
368.9	817	0.0188	368.9	419	0.01
369.0	896	0.0206	369.0	505	0.01
369.1	974	0.0224	369.1	598	0.01
369.2	1052	0.0241	369.2	699	0.02
369.3	1130	0.0259	369.3	809	0.02
369.4	1208	0.0277	369.4	925	0.02
369.5	1286	0.0295	369.5	1050	0.02
369.6	1364	0.0313	369.6	1183	0.03
369.7	1443	0.0331	369.7	1323	0.03
369.8	1521	0.0349	369.8	1471	0.03
369.9	1599	0.0367	369.9	1627	0.04
370.0	1677	0.0385	370.0	1791	0.04
370.1	1778	0.0408	370.1	1964	0.05
370.2	1879	0.0431	370.2	2147	0.05
370.3	1980	0.0455	370.3	2340	0.05
370.4	2081	0.0478	370.4	2543	0.06
370.5	2182	0.0501	370.5	2756	0.06
370.6	2283	0.0524	370.6	2979	0.07
370.7	2384	0.0547	370.7	3212	0.07
370.8	2485	0.0570	370.8	3456	0.08
370.9	2586	0.0594	370.9	3709	0.09
371.0	2687	0.0617	371.0	3973	0.09
371.1	2788	0.06	739.1	4247	0.10
371.2	2889	0.07	739.2	4531	0.10
371.3	2990	0.07	739.3	4825	0.11
371.4	3091	0.07	739.4	5129	0.12
371.5	3192	0.07	739.5	5443	0.12
371.6	3293	0.08	739.6	5767	0.13
371.7	3394	0.08	739.7	6101	0.14
371.8	3495	0.08	739.8	6446	0.15
371.9	3596	0.08	739.9	6800	0.16
372.0	3697	0.08	740.0	7165	0.16
372.1	3875	0.09	740.1	7544	0.17
372.2	4053	0.09	740.2	7940	0.18
372.3	4231	0.10	740.3	8354	0.19
372.4	4408	0.10	740.4	8786	0.20
372.5	4586	0.11	740.5	9236	0.21
372.6	4764	0.11	740.6	9703	0.22
372.7	4942	0.11	740.7	10189	0.23
372.8	5120	0.12	740.8	10692	0.25
372.9	5298	0.12	740.9	11213	0.26
373.0	5476	0.13	741.0	11751	0.27
373.1	5653	0.13	741.1	12308	0.28
373.2	5831	0.13	741.2	12882	0.30
373.3	6009	0.14	741.3	13474	0.31
373.4	6187	0.14	741.4	14084	0.32
373.5	6365	0.15	741.5	14711	0.34
373.6	6543	0.15	741.6	15357	0.35
373.7	6720	0.15	741.7	16020	0.37
373.8	6898	0.16	741.8	16701	0.38
373.9	7076	0.16	741.9	17399	0.40
374.0	7254	0.17	742.0	18116	0.42
374.1	7486	0.17	742.1	18853	0.43
374.2	7719	0.18	742.2	19613	0.45
374.3	7951	0.18	742.3	20397	0.47
374.4	8183	0.19	742.4	21203	0.49
374.5	8415	0.19	742.5	22033	0.51
374.6	8648	0.20	742.6	22887	0.53
374.7	8880	0.20	742.7	23763	0.55
374.8	9112	0.21	742.8	24663	0.57
374.9	9345	0.21	742.9	25585	0.59
375.0	9577	0.22	743.0	26532	0.61
375.1	9809	0.23	743.1	27501	0.63
375.2	10042	0.23	743.2	28493	0.65
375.3	10274	0.24	743.3	29509	0.68
375.4	10506	0.24	743.4	30548	0.70
375.5	10739	0.25	743.5	31610	0.73
375.6	10971	0.25	743.6	32696	0.75
375.7	11203	0.26	743.7	33805	0.78
375.8	11435	0.26	743.8	34936	0.80
375.9	11668	0.27	743.9	36092	0.83
376.0	11900	0.27	744.0	37270	0.86

1923 Dentro de Lomas

Channel

Stage Discharge Table

Low orifice:	36 "	Top orifice:	1 "
Number:	3	Number:	0
Cg-low:	0.61	Cg-low:	0.61
invert elev:	368.00 ft	invert elev:	580.00 ft
Middle orifice:	1 "	Emergency Inlet:	
number of orif:	0	Rim Elev:	1000.00 ft
Cg-middle:	0.61	Area	1.00 sq ft
invert elev:	579.00 ft	Circumference	4.00 ft

Elev	H/D-low	H/D-mid	H/D-top	Qlow-orif	Qlow-weir	Qtot-low	Qmid-orif	Qmid-weir	Qtot-med	Qtop-orif	Qtop-weir	Qtot-top	Qemerg	Qtot
(ft)	-	-	-	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
368.0	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
368.1	0.03	0.00	0.00	0.000	0.191	0.191	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.191
368.2	0.07	0.00	0.00	0.000	0.728	0.728	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.728
368.3	0.10	0.00	0.00	0.000	1.605	1.605	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.605
368.4	0.13	0.00	0.00	0.000	2.815	2.815	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.815
368.5	0.17	0.00	0.00	0.000	4.352	4.352	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.352
368.6	0.20	0.00	0.00	0.000	6.208	6.208	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.208
368.7	0.23	0.00	0.00	0.000	8.375	8.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.375
368.8	0.27	0.00	0.00	0.000	10.845	10.845	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.845
368.9	0.30	0.00	0.00	0.000	13.609	13.609	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.609
369.0	0.33	0.00	0.00	0.000	16.658	16.658	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.658
369.1	0.37	0.00	0.00	0.000	19.983	19.983	0.000	0.000	0.000	0.000	0.000	0.000	0.000	19.983
369.2	0.40	0.00	0.00	0.000	23.574	23.574	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.574
369.3	0.43	0.00	0.00	0.000	27.422	27.422	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.422
369.4	0.47	0.00	0.00	0.000	31.516	31.516	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.516
369.5	0.50	0.00	0.00	0.000	35.846	35.846	0.000	0.000	0.000	0.000	0.000	0.000	0.000	35.846
369.6	0.53	0.00	0.00	32.827	40.401	40.401	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.401
369.7	0.57	0.00	0.00	46.424	45.171	45.171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	45.171
369.8	0.60	0.00	0.00	56.857	50.144	50.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	50.144
369.9	0.63	0.00	0.00	65.653	55.309	55.309	0.000	0.000	0.000	0.000	0.000	0.000	0.000	55.309
370.0	0.67	0.00	0.00	73.403	60.654	60.654	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.654
370.1	0.70	0.00	0.00	80.409	66.169	66.169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.169
370.2	0.73	0.00	0.00	86.851	71.841	71.841	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.841
370.3	0.77	0.00	0.00	92.848	77.659	77.659	0.000	0.000	0.000	0.000	0.000	0.000	0.000	77.659
370.4	0.80	0.00	0.00	98.480	83.611	83.611	0.000	0.000	0.000	0.000	0.000	0.000	0.000	83.611
370.5	0.83	0.00	0.00	103.807	89.686	89.686	0.000	0.000	0.000	0.000	0.000	0.000	0.000	89.686
370.6	0.87	0.00	0.00	108.874	95.870	95.870	0.000	0.000	0.000	0.000	0.000	0.000	0.000	95.870
370.7	0.90	0.00	0.00	113.715	102.152	102.152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	102.152
370.8	0.93	0.00	0.00	118.358	108.521	108.521	0.000	0.000	0.000	0.000	0.000	0.000	0.000	108.521
370.9	0.97	0.00	0.00	122.826	114.963	114.963	0.000	0.000	0.000	0.000	0.000	0.000	0.000	114.963
371.0	1.00	0.00	0.00	127.137	121.468	121.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	121.468
371.1	1.03	0.00	0.00	131.307	128.023	128.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	128.023
371.2	1.07	0.00	0.00	135.348	134.617	134.617	0.000	0.000	0.000	0.000	0.000	0.000	0.000	134.617
371.3	1.10	0.00	0.00	139.272	141.237	139.272	0.000	0.000	0.000	0.000	0.000	0.000	0.000	139.272
371.4	1.13	0.00	0.00	143.088	147.872	143.088	0.000	0.000	0.000	0.000	0.000	0.000	0.000	143.088
371.5	1.17	0.00	0.00	146.805	154.511	146.805	0.000	0.000	0.000	0.000	0.000	0.000	0.000	146.805
371.6	1.20	0.00	0.00	150.431	161.141	150.431	0.000	0.000	0.000	0.000	0.000	0.000	0.000	150.431
371.7	1.23	0.00	0.00	153.971	167.753	153.971	0.000	0.000	0.000	0.000	0.000	0.000	0.000	153.971
371.8	1.27	0.00	0.00	157.431	174.334	157.431	0.000	0.000	0.000	0.000	0.000	0.000	0.000	157.431
371.9	1.30	0.00	0.00	160.817	180.874	160.817	0.000	0.000	0.000	0.000	0.000	0.000	0.000	160.817
372.0	1.33	0.00	0.00	164.133	187.362	164.133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	164.133
372.1	1.37	0.00	0.00	167.384	193.788	167.384	0.000	0.000	0.000	0.000	0.000	0.000	0.000	167.384
372.2	1.40	0.00	0.00	170.572	200.142	170.572	0.000	0.000	0.000	0.000	0.000	0.000	0.000	170.572
372.3	1.43	0.00	0.00	173.702	206.413	173.702	0.000	0.000	0.000	0.000	0.000	0.000	0.000	173.702
372.4	1.47	0.00	0.00	176.777	212.592	176.777	0.000	0.000	0.000	0.000	0.000	0.000	0.000	176.777
372.5	1.50	0.00	0.00	179.799	218.670	179.799	0.000	0.000	0.000	0.000	0.000	0.000	0.000	179.799
372.6	1.53	0.00	0.00	182.771	224.637	182.771	0.000	0.000	0.000	0.000	0.000	0.000	0.000	182.771
372.7	1.57	0.00	0.00	185.696	230.485	185.696	0.000	0.000	0.000	0.000	0.000	0.000	0.000	185.696
372.8	1.60	0.00	0.00	188.575	236.206	188.575	0.000	0.000	0.000	0.000	0.000	0.000	0.000	188.575
372.9	1.63	0.00	0.00	191.411	241.791	191.411	0.000	0.000	0.000	0.000	0.000	0.000	0.000	191.411
373.0	1.67	0.00	0.00	194.205	247.233	194.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	194.205
373.1	1.70	0.00	0.00	196.960	252.526	196.960	0.000	0.000	0.000	0.000	0.000	0.000	0.000	196.960
373.2	1.73	0.00	0.00	199.677	257.662	199.677	0.000	0.000	0.000	0.000	0.000	0.000	0.000	199.677
373.3	1.77	0.00	0.00	202.357	262.634	202.357	0.000	0.000	0.000	0.000	0.000	0.000	0.000	202.357
373.4	1.80	0.00	0.00	205.002	267.438	205.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	205.002
373.5	1.83	0.00	0.00	207.614	272.068	207.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	207.614
373.6	1.87	0.00	0.00	210.193	276.520	210.193	0.000	0.000	0.000	0.000	0.000	0.000	0.000	210.193
373.7	1.90	0.00	0.00	212.741	280.788	212.741	0.000	0.000	0.000	0.000	0.000	0.000	0.000	212.741
373.8	1.93	0.00	0.00	215.259	284.869	215.259	0.000	0.000	0.000	0.000	0.000	0.000	0.000	215.259
373.9	1.97	0.00	0.00	217.747	288.760	217.747	0.000	0.000	0.000	0.000	0.000	0.000	0.000	217.747
374.0	2.00	0.00	0.00	220.208	292.459	220.208	0.000	0.000	0.000	0.000	0.000	0.000	0.000	220.208
374.1	2.03	0.00	0.00	222.641	295.964	222.641	0.000	0.000	0.000	0.000	0.000	0.000	0.000	222.641
374.2	2.07	0.00	0.00	225.048	299.272	225.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	225.048
374.3	2.10	0.00	0.00	227.430	302.385	227.430	0.000	0.000	0.000	0.000	0.000	0.000	0.000	227.430
374.4	2.13	0.00	0.00	229.786	305.300	229.786	0.000	0.000	0.000	0.000	0.000	0.000	0.000	229.786
374.5	2.17	0.00	0.00	232.119	308.020	232.119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	232.119
374.6	2.20	0.00	0.00	234.429	310.545	234.429	0.000	0.000	0.000	0.000	0.000	0.000	0.000	234.429

374.7	2.23	0.00	0.00	236.716	312.877	236.716	0.000	0.000	0.000	0.000	0.000	0.000	0.000	236.716
374.8	2.27	0.00	0.00	238.982	315.019	238.982	0.000	0.000	0.000	0.000	0.000	0.000	0.000	238.982
374.9	2.30	0.00	0.00	241.226	316.975	241.226	0.000	0.000	0.000	0.000	0.000	0.000	0.000	241.226
375.0	2.33	0.00	0.00	243.449	318.749	243.449	0.000	0.000	0.000	0.000	0.000	0.000	0.000	243.449
375.1	2.37	0.00	0.00	245.652	320.346	245.652	0.000	0.000	0.000	0.000	0.000	0.000	0.000	245.652
375.2	2.40	0.00	0.00	247.836	321.771	247.836	0.000	0.000	0.000	0.000	0.000	0.000	0.000	247.836
375.3	2.43	0.00	0.00	250.000	323.032	250.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	250.000
375.4	2.47	0.00	0.00	252.146	324.136	252.146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	252.146
375.5	2.50	0.00	0.00	254.274	325.091	254.274	0.000	0.000	0.000	0.000	0.000	0.000	0.000	254.274
375.6	2.53	0.00	0.00	256.384	325.907	256.384	0.000	0.000	0.000	0.000	0.000	0.000	0.000	256.384
375.7	2.57	0.00	0.00	258.477	326.594	258.477	0.000	0.000	0.000	0.000	0.000	0.000	0.000	258.477
375.8	2.60	0.00	0.00	260.553	327.162	260.553	0.000	0.000	0.000	0.000	0.000	0.000	0.000	260.553
375.9	2.63	0.00	0.00	262.613	327.624	262.613	0.000	0.000	0.000	0.000	0.000	0.000	0.000	262.613
376.0	2.67	0.00	0.00	264.657	327.992	264.657	0.000	0.000	0.000	0.000	0.000	0.000	0.000	264.657

HYDROGRPAH IN TO BASIN:

RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 1/4/2022
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 20 MIN.
6 HOUR RAINFALL 3.1 INCHES
BASIN AREA 167.56 ACRES
F FF COEFFICIENT 0.3714
P DISCHARGE 211.17 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 20	DISCHARGE (CFS) = 11.6
TIME (MIN) = 40	DISCHARGE (CFS) = 12.1
TIME (MIN) = 60	DISCHARGE (CFS) = 13.2
TIME (MIN) = 80	DISCHARGE (CFS) = 13.8
TIME (MIN) = 100	DISCHARGE (CFS) = 15.3
TIME (MIN) = 120	DISCHARGE (CFS) = 16.2
TIME (MIN) = 140	DISCHARGE (CFS) = 18.6
TIME (MIN) = 160	DISCHARGE (CFS) = 20.1
TIME (MIN) = 180	DISCHARGE (CFS) = 24.6
TIME (MIN) = 200	DISCHARGE (CFS) = 28
TIME (MIN) = 220	DISCHARGE (CFS) = 41.2
TIME (MIN) = 240	DISCHARGE (CFS) = 54.7
TIME (MIN) = 260	DISCHARGE (CFS) = 211.17
TIME (MIN) = 280	DISCHARGE (CFS) = 33
TIME (MIN) = 300	DISCHARGE (CFS) = 22.1
TIME (MIN) = 320	DISCHARGE (CFS) = 17.3
TIME (MIN) = 340	DISCHARGE (CFS) = 14.5
TIME (MIN) = 360	DISCHARGE (CFS) = 12.6
TIME (MIN) = 380	DISCHARGE (CFS) = 0

Time Series Editor

Time Series Name

BasinInflow

Description

Peak Flow Detention hydrograph

☐ Use external data file named below

☑ Enter time series data in the table below

No dates means times are relative to start of simulation.

Date (M/D/Y)	Time (H:M)	Value
	0:0	0
	0:20	11.6
	0:40	12.1
	1:0	13.2
	1:20	13.8
	1:40	15.3
	2:0	16.2
	2:20	18.6
	2:40	20.1
	3:0	24.6
	3:20	28

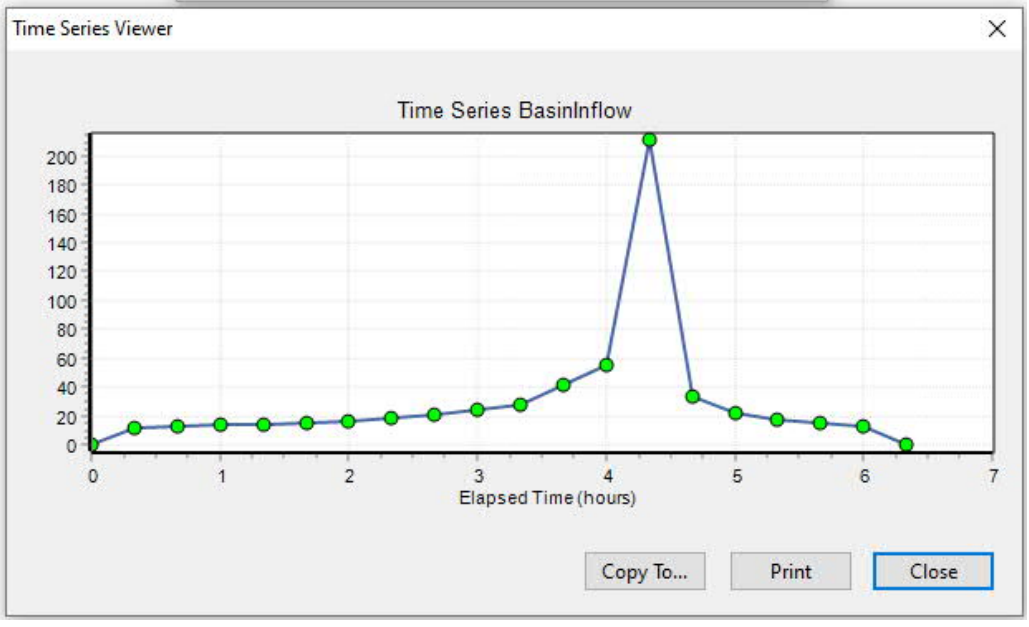
View

OK

Cancel

Help

Time Series Viewer



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DETENTION RESULTS:

Summary Results

Topic: Node Inflow — Click a column header to sort the column.

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Day of Maximum Inflow	Hour of Maximum Inflow	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
NODE124	OUTFALL	0.00	196.36	0	04:23	0	5.21	0.000
BASIN	STORAGE	211.17	211.17	0	04:21	5.21	5.21	-0.037

Summary Results

Topic: Node Depth — Click a column header to sort the column.

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Day of Maximum Depth	Hour of Maximum Depth	Maximum Reported Depth Feet
NODE124	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
BASIN	STORAGE	0.00	5.08	5.08	0	04:23	1.87

Summary Results

Topic: Storage Volume — Click a column header to sort the column.

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
BASIN	0.000	0	0	0	12.209	33	0	04:23	196.36