PRELIMINARY DRAINAGE REPORT

FOR

PLAZA LA MEDIA - NORTH

February 28, 2019

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Civil Engineering ◦ Hydrology ◦ Hydraulics ◦ Sedimentation

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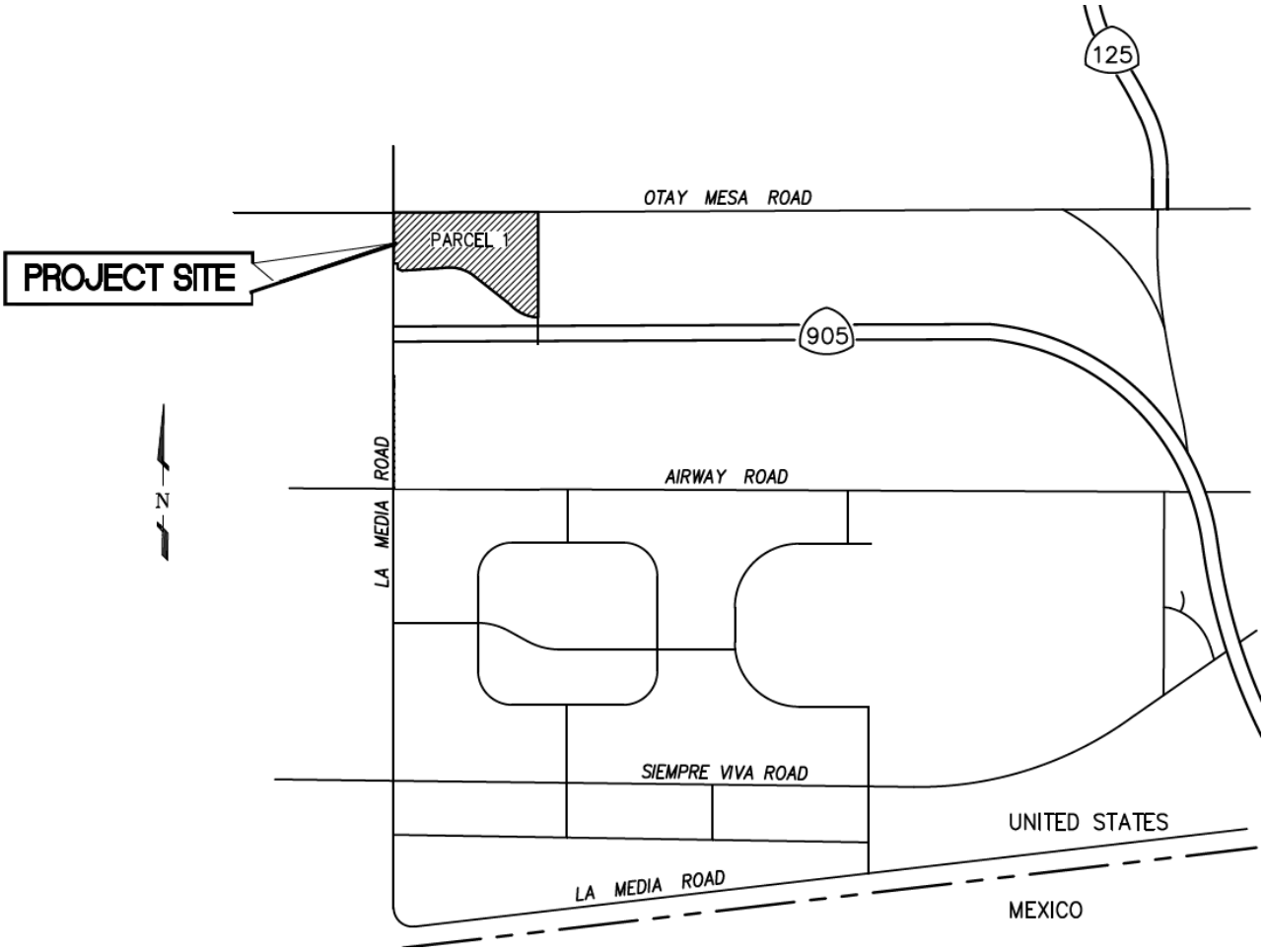
APPENDIX

MAP POCKET

INTRODUCTION

La Media & Airway, LLC an Arizona limited liability corporation is proposing to develop a 17.91-acre commercial site located southeast of the intersection of Otay Mesa Road and La Media Road in the city of San Diego (see the Vicinity Map). The site is bounded by Otay Mesa Road to the north, La Media Road to the west, Interstate 905 to the south, and an undeveloped Sunroad parcel to the east. The site is currently undeveloped, gently sloping, and supports natural low-lying vegetation. The potential commercial/retail tenants include major retail, small shops, a grocery store, drive-through restaurants, and a gas station. A parking lot will be constructed within the site.



Vicinity Map

Under existing conditions, the on-site storm runoff flows in two directions. The majority of the on-site runoff (combined with off-site runoff from the undeveloped area to the east) sheet flows in a southwest direction over the gently-sloping ground surface. The runoff is conveyed to a storm drain at the southwest corner of the site that connects to existing Caltrans box culverts along the westerly property boundary.

Storm runoff from a smaller on-site area along the northerly boundary is conveyed by a small natural swale to a storm drain at the northwest corner. The storm drain also connects to the existing Caltrans box culverts.

A portion of the existing runoff within the south half of Otay Mesa Road flows onto the site from small spillways along the roadway. This off-site runoff combines with the on-site runoff and is collected by the Caltrans box culverts.

After development, the overall existing condition on-site drainage patterns will be maintained by the project since the majority of the on-site and tributary off-site runoff will continue to be conveyed to the Caltrans culverts along the westerly project boundary. The project runoff will enter the Caltrans culverts through the existing storm drain near the southwest corner of the site as well as at two new connection points midway along the site. The on-site runoff will be collected and conveyed by proposed private drainage facilities (inlets, pipes, curb and gutter, parking lots, etc.). The runoff will be treated by a series of biofiltration basins before entering the Caltrans culverts.

Otay Mesa Road will be widened and improved with curb, gutter, and sidewalk along the site. The off-site runoff from the tributary portion of Otay Mesa Road will be conveyed by a proposed storm drain system in the street into the Caltrans culverts near the northwest corner of the site. The street improvements will meet the green street requirements.

There is a small area of project runoff along the easterly boundary that will be conveyed to the adjacent Sunroad site to the east. The runoff includes a portion of the project's access driveway that is on the Sunroad parcel. The project applicant has coordinated with Sunroad to identify an off-site treatment BMP for this runoff. As a result, the project proposes a temporary biofiltration basin on the adjacent undeveloped Sunroad site. Once the Sunroad site is developed, it will include a BMP to treat the small area of run-on from this project site.

Under existing conditions, storm runoff from the undeveloped Sunroad site sheet flows westerly onto the project site. This off-site area covers approximately 31.05 acres. The combined on- and off-site runoff enters the Caltrans culverts. After development, the off-site area runoff will be redirected to an existing culvert to the south. The project will detain the runoff to avoid impacting the culvert to the south. A temporary detention basin will be constructed on the adjacent Sunroad site. When the Sunroad site develops, it will replace the temporary basin will a permanent solution.

This preliminary drainage report has been prepared in support of Kettler Leweck Engineering’s grading and drainage plan for the project entitlement. This report provides hydrologic analyses in order to determine preliminary flow rates and demonstrate feasibility as well as compliance with drainage regulations.

HYDROLOGIC RESULTS

The overall proposed condition study area covers 20.94 acres, so the City of San Diego's 2017 *Drainage Design Manual's* rational method procedure was the basis for the existing and proposed condition hydrologic analyses. The *Manual* states that "the underground storm drain system shall be based upon a 50-year frequency storm," and "the combination of storm drain system capacity and overflow (streets and gutter) will be able to carry the 100-year frequency storm. . . ." Both 50- and 100-year analyses are included. The project's storm runoff flows into Mexico. The City requires 5-, 10-, 25-, and 50-year analyses to also be performed for projects in the Otay area that flow into Mexico.

The CivilDesign Rational Method Hydrology Program is based on the City criteria and was used for the analyses. The rational method input parameters are summarized below and the supporting data is included in Appendix A:

- Intensity-Duration-Frequency: The City's 100-year Intensity-Duration-Frequency curve from the *Drainage Design Manual* was used.

- Drainage area: The existing condition drainage basins were delineated from the 1-foot contour interval base topographic mapping prepared for the project, and the proposed condition drainage basins were delineated using Kettler Leweck Engineering's entitlement grading plan. The project's base mapping does not cover the off-site area along Otay Mesa Road east of the site. For this area, 1-foot contour interval mapping was obtained from the Sunroad project. The overall existing condition drainage basin boundary was set equal to the overall proposed condition boundary to allow a comparison of results. The drainage basin boundaries and grading are shown on the Rational Method Work Maps in the map pocket.

- Hydrologic soil groups: The soil group within the site is entirely 'D' according to City criteria.

- Runoff coefficients: Under existing conditions, the site is undeveloped, so a rural land use was assumed (C=0.45).

  The proposed condition on-site runoff coefficients were determined by delineating the pervious and impervious areas within the study area. The delineation is included in the accompanying SWQMP and shows that the overall impervious and pervious areas in the on-site study limits are 11.72 and 5.14 acres, respectively, i.e., the overall site is just under 70 percent impervious. For this impervious percentage, the formula given in Note 2 of Table A-1 from the *Drainage Design Manual* yields C=0.74. This C value was assigned to all of the proposed condition on-site drainage subareas for the entitlement-level analysis in this report. Furthermore, the proposed condition off-site street areas along Otay Mesa Road are mostly impervious, so these areas were assigned with an industrial land use.

- Flow lengths and elevations: The flow lengths and elevations were obtained from the topographic mapping and grading plan.

The 5- to 100-year rational method results are included in Appendix A and summarized in Table 1. The table provides the existing and proposed condition flow rates to the two receiving locations. The results show that the overall unmitigated runoff to the Caltrans culvert will decrease under all five storm events, and the overall study area runoff decreases as well. This occurs because the project will detain the 31.05 acres of off-site runoff from the east as discussed in the Introduction.

The project proposes a temporary detention basin on the adjacent Sunroad site to capture and slowly release storm runoff from the 31.05 acre off-site area. The basin has been sized to store the entire tributary 100-year storm volume. Storing the entire 100-year storm volume will essentially eliminate the outflow from the basin and avoid increasing the flow rate to the existing receiving storm drain to the south during all events between the 5- to 100-year. The 100-year flow volume at the basin is determined by multiplying the 100-year, 6-hour precipitation (2.5 inches) by the tributary area (31.05 acres) and runoff coefficient (0.45 for the primarily natural, undeveloped area). Based on these values, the volume is 126,800 cubic feet [(2.5/12) × (31.05×43,560) × 0.45 = 126,800]. The temporary detention basin has been designed to store this entire volume as well as the small contribution from the on-site area. Therefore, the basin can mitigate for the 5-, 10-, 25-, 50-, and 100-year flows directed towards the southerly culvert.

CONCLUSION

This preliminary drainage report shows that the project flows are of a magnitude that can be conveyed by typical drainage facilities. The project will not increase the 100-year flow rate entering the Caltrans culverts because storm runoff from the off-site area to the east will be detained and directed to a southerly culvert. The temporary detention basin will mitigate the off-site area flows.

There is a minor amount of flow that will be discharged onto the Sunroad property east of the site. This flow will be treated by a temporary biofiltration basin and conveyed through the Sunroad site. The drainage facilities and BMP will be further coordinated with Sunroad during final engineering to verify the preferred location and method of the discharge and treatment as well as integration with Sunroad's ultimate development/timing of their site.

The slope of the project's proposed drainage system is governed by the existing Caltrans box culverts and the adjacent ground elevations. The Caltrans box culverts receive most of the project runoff and these are large facilities whose elevations cannot be changed. The existing topography at the site and surrounding area is very level and not much higher than the box culverts. These constraints require portions of the proposed storm drain systems to slope at less than 0.5 percent. For instance, the Caltrans culvert inverts and existing elevations along Otay Mesa Road allow a maximum pipe slope of 0.36 percent in the main line. Since the Caltrans culverts and Otay Mesa Road are existing major improvements, altering them is not

practically feasible. Similarly, portions of the on-site storm drain are at 0.30 percent due to the Caltrans culverts and site grading constraints. Section 4.2.1 of the 2017 *Drainage Design Manual,* specifies a 0.5 percent minimum pipe gradient, but states that "flatter grades may be approved where no other practical solution is available." This applies to the proposed pipe segments with slopes less than 0.5 percent.

An August 7, 1987 notice from the City of San Diego provides drainage requirements for Otay Mesa development projects (see attachment after this report text). The notice specifies that detention facilities shall be designed for the 5-, 10-, 25-, and 50-year storms. The project will not increase the flow rate to the Caltrans culverts, so detention is not required for these flows. On the other hand, the project will temporarily redirect the easterly off-site runoff. The conceptual detention volume analysis in this report was used to size a detention basin with enough volume to store the entire 100-year runoff. Since the detention basin can store the 100-year runoff, it will also store the smaller 5-, 10-, 25-, and 50-year runoff.

Discharge Location	5-Year Flow Rate, cfs		10-Year Flow Rate, cfs		25-Year Flow Rate, cfs		50-Year Flow Rate, cfs		100-Year Flow Rate, cfs	
	Exist.	**Prop.**	**Exist.**	**Prop.**	**Exist.**	**Prop.**	**Exist.**	**Prop.**	**Exist.**	**Prop.**
To Caltrans Culvert[1]	39	28	47	33	52	36	61	42	66	44
To East[2]	0	0.9	0	1.1	0	1.1	0	1.2	0	1.3
Total	39	29	47	34	52	37	61	43	66	45

[1]Existing condition flow rates are from Nodes 16 and 24. Proposed condition flow rates are from Nodes 96, 102, 112, and 136.
[2]Proposed condition flow rates are from Nodes 202 and 212.

Table 1. Comparison of Rational Method Results

Reproduction of 1987 NOTICE from Engineering and Development Department

NOTICE

Date: August 7, 1987

To: All Private Engineers

From: Subdivision Engineer

Subject: Drainage requirements for development in Otay Mesa

In order to minimize the effects of increased storm water runoff in Mexico, due to development of property in Otay Mesa, all property in Otay Mesa that is within the water shed that drains into Mexico, shall be developed with the following requirements:

1. Each property owner shall provide storm water detention facilities so that there will be no increase in the rate of runoff due to development of the property.

2. The detention facilities shall be designed so that the rate of runoff from the property will not be greater after development than it was before development for a 5 year, 10 year, 25 year and 50 year storm.

3. All drainage facilities crossing four-lane major or higher classification streets shall be designed for a Q100 (existing). Other facilities, except the major channel referred to in paragraph 5, may be designed for Q50 (existing).

4. The Drainage Design Manual shall be used as guidelines for design of drainage facilities and computing design discharges.

5. The City Engineer's Office, Flood Control Section, is preparing a preliminary plan for the main north-south channel from Otay Mesa Road near La Media to the Mexican Border. The preliminary design will include the design "Q" (Q100 existing), the invert grade, and the water surface elevation at the major road crossings.

C.R. Lockhead
Subdivision Engineer

APPENDIX A

RATIONAL METHOD RESULTS

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_C for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_C calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

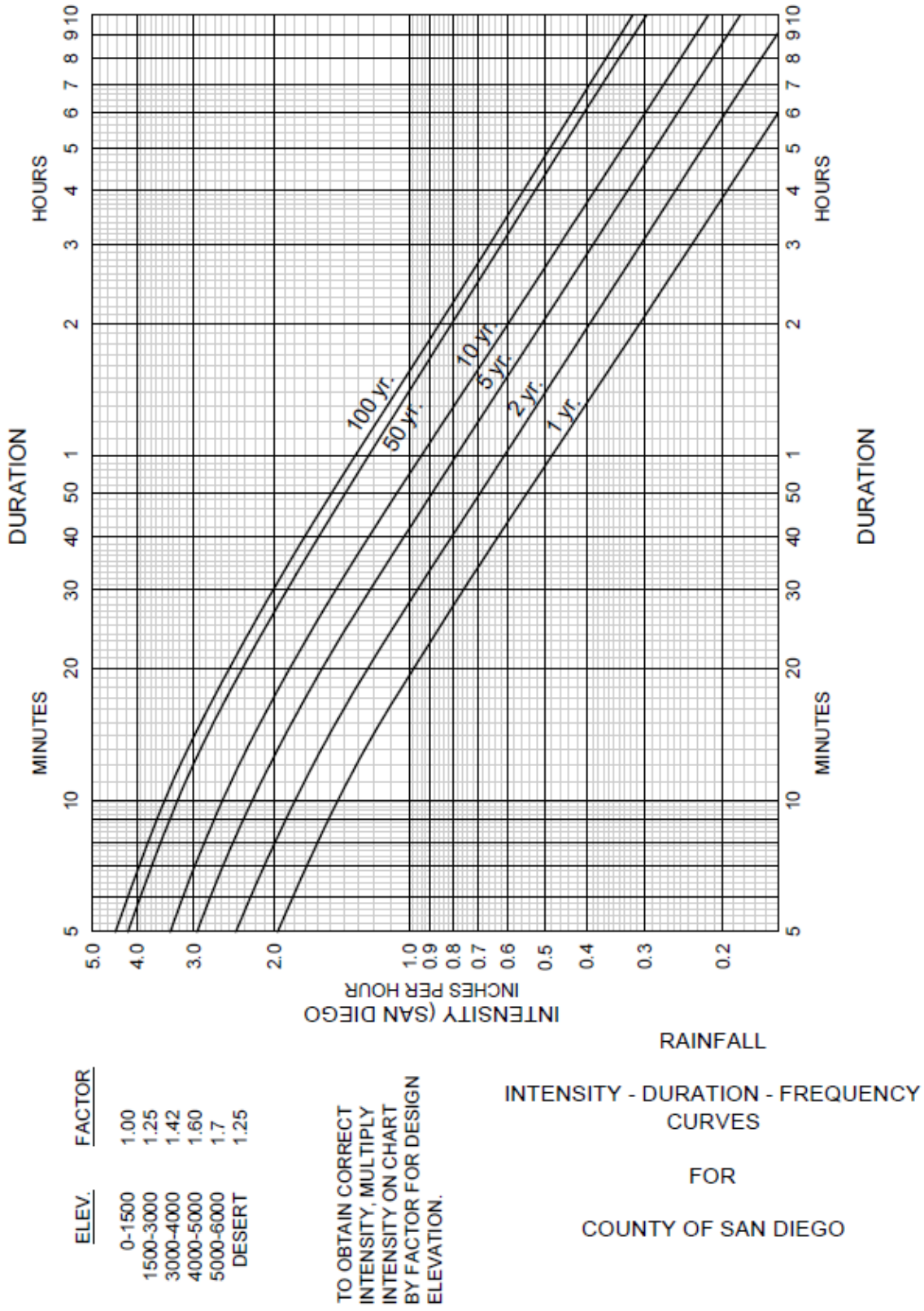


Figure A-1. Intensity-Duration-Frequency Design Chart

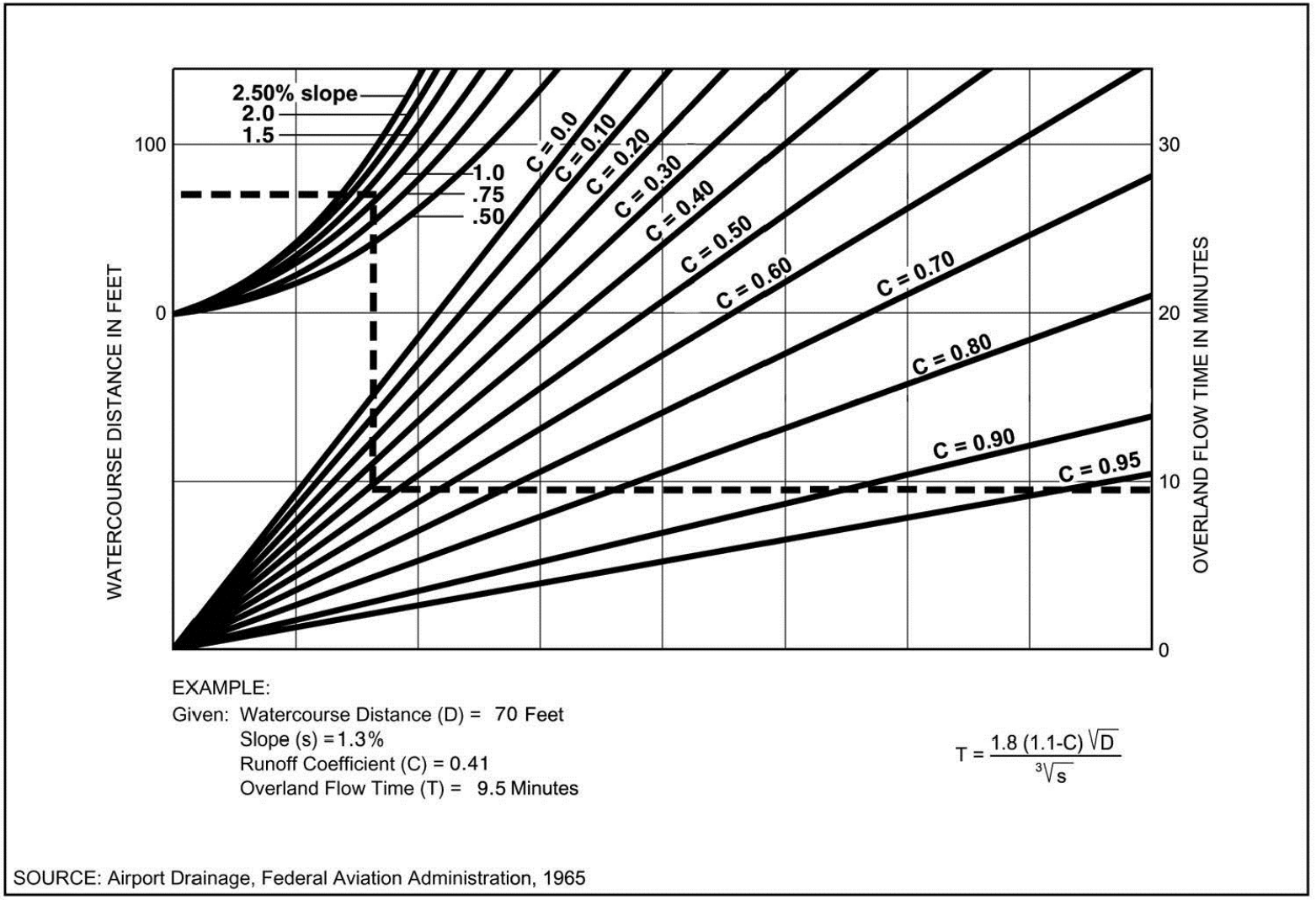


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

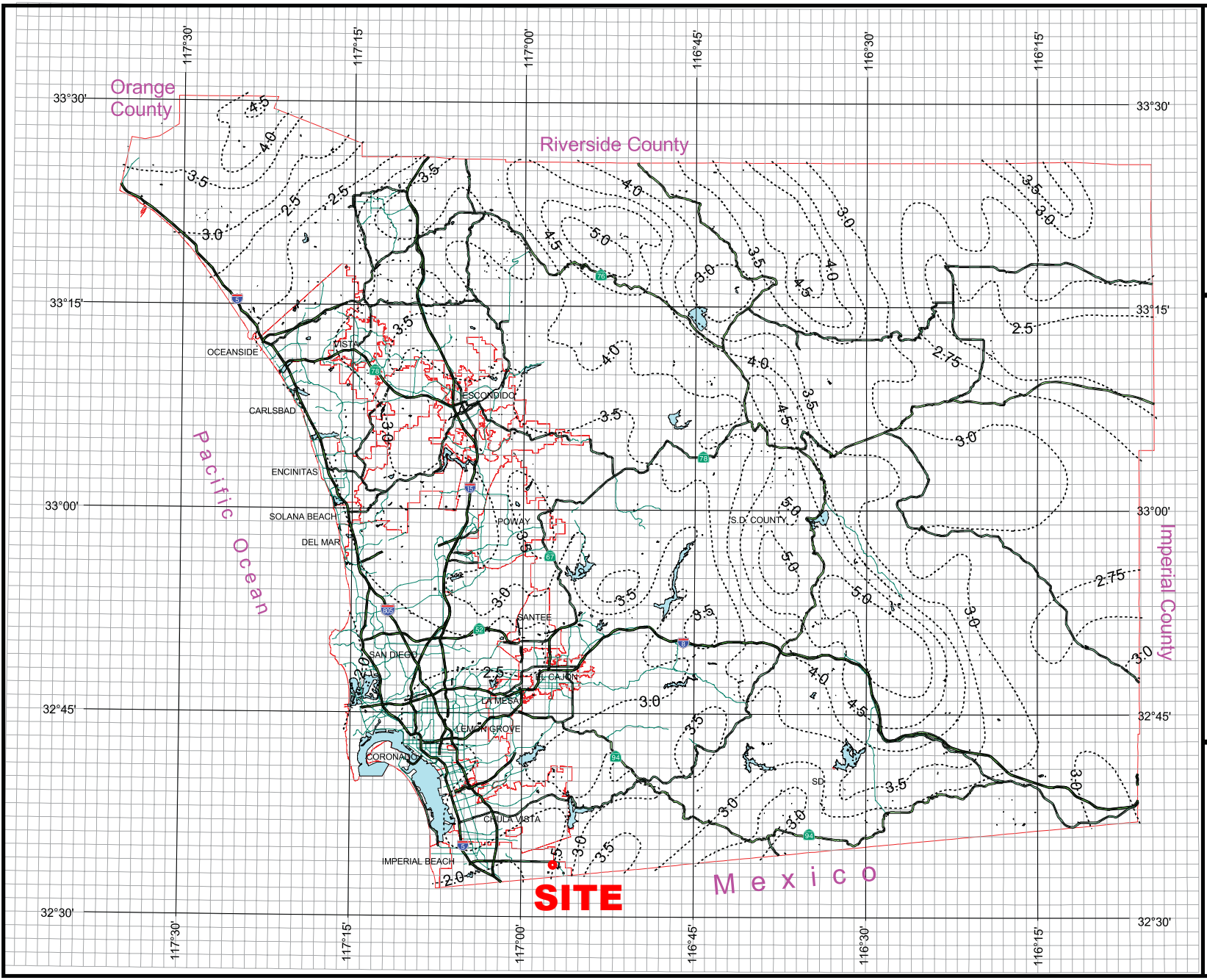
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

P6=2.5"



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Department of Public Works
Geographic Information Services

SanGIS
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San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
Rational Hydrology Study Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Existing Conditions
5-Year Flow Rate

********* Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is 5.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

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Process from Point/Station 10.000 to Point/Station 12.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type]
Initial subarea flow distance = 910.000(Ft.)
Highest elevation = 514.000(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference = 25.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 5.82 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(910.000^.5)/(2.747^(1/3)]= 5.82
Rainfall intensity (I) = 2.910(In/Hr) for a 5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950

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Subarea runoff =      2.378(CFS)
Total initial stream area =        0.860(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   489.000(Ft.)
End of street segment elevation =   485.000(Ft.)
Length of street segment  =   819.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   5.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      4.078(CFS)
Depth of flow =   0.313(Ft.), Average velocity =   1.660(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  15.674(Ft.)
Flow velocity =   1.66(Ft/s)
Travel time =    8.22 min.     TC =   14.04  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      1.876(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.038(CFS) for    1.230(Ac.)
Total runoff =      3.416(CFS)   Total area =        2.09(Ac.)
Street flow at end of street =      3.416(CFS)
Half street flow at end of street =      3.416(CFS)
Depth of flow =   0.293(Ft.), Average velocity =   1.588(Ft/s)
Flow width (from curb towards crown)=  14.666(Ft.)


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Process from Point/Station       14.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   485.000(Ft.)
Downstream point elevation =   479.700(Ft.)
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Channel length thru subarea  =  1121.000(Ft.)
Channel base width    =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =     42.896(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     42.896(CFS)
Depth of flow =   1.026(Ft.), Average velocity =   2.380(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =   20.000(Ft.)
Flow Velocity =    2.38(Ft/s)
Travel time  =    7.85 min.
Time of concentration =   21.89 min.
Critical depth =      0.648(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      1.494(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     32.473(CFS) for   48.310(Ac.)
Total runoff =     35.889(CFS)   Total area =       50.40(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Initial subarea flow distance  =  192.000(Ft.)
Highest elevation =  485.600(Ft.)
Lowest elevation =  484.500(Ft.)
Elevation difference =    1.100(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.50 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 192.000^.5)/(   0.573^(1/3)]=   4.50
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      3.149(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.543(CFS)
Total initial stream area =        0.850(Ac.)
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Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   482.000(Ft.)
Downstream point elevation =   478.800(Ft.)
Channel length thru subarea  =   591.000(Ft.)
Channel base width    =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      3.635(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      3.635(CFS)
Depth of flow =   0.675(Ft.), Average velocity =   1.607(Ft/s)
Channel flow top width =    4.701(Ft.)
Flow Velocity =    1.61(Ft/s)
Travel time  =    6.13 min.
Time of concentration =   11.13 min.
Critical depth =      0.406(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.103(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.691(CFS) for    0.730(Ac.)
Total runoff =      3.234(CFS)   Total area =        1.58(Ac.)
End of computations, total study area =          51.980 (Ac.)
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San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Existing Conditions
10-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   10.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

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Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type   ]
Initial subarea flow distance = 910.000(Ft.)
Highest elevation = 514.000(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   25.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   5.82 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(910.000^.5)/(2.747^(1/3)]=   5.82
Rainfall intensity (I) =   3.329(In/Hr) for a   10.0 year storm

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Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.720(CFS)
Total initial stream area =        0.860(Ac.)


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Process from Point/Station       12.000 to Point/Station       14.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   489.000(Ft.)
End of street segment elevation =   485.000(Ft.)
Length of street segment  =   819.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   5.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      4.665(CFS)
Depth of flow =   0.330(Ft.), Average velocity =   1.717(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.485(Ft.)
Flow velocity =   1.72(Ft/s)
Travel time =    7.95 min.     TC =   13.77  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.208(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.222(CFS) for    1.230(Ac.)
Total runoff =      3.942(CFS)   Total area =        2.09(Ac.)
Street flow at end of street =      3.942(CFS)
Half street flow at end of street =      3.942(CFS)
Depth of flow =   0.310(Ft.), Average velocity =   1.646(Ft/s)
Flow width (from curb towards crown)=  15.476(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   485.000(Ft.)
```

```
Downstream point elevation =   479.700(Ft.)
Channel length thru subarea  =  1121.000(Ft.)
Channel base width    =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =     49.506(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     49.506(CFS)
Depth of flow =   1.107(Ft.), Average velocity =   2.520(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =   20.000(Ft.)
Flow Velocity =    2.52(Ft/s)
Travel time  =    7.41 min.
Time of concentration =   21.18 min.
Critical depth =      0.703(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      1.786(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     38.834(CFS) for   48.310(Ac.)
Total runoff =     42.777(CFS)   Total area =       50.40(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  192.000(Ft.)
Highest elevation =  485.600(Ft.)
Lowest elevation =  484.500(Ft.)
Elevation difference =    1.100(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.50 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 192.000^.5)/(   0.573^(1/3)]=   4.50
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      3.592(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.901(CFS)
Total initial stream area =        0.850(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____________________________________________________________________________
Upstream point elevation =   482.000(Ft.)
Downstream point elevation =   478.800(Ft.)
Channel length thru subarea  =   591.000(Ft.)
Channel base width    =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.147(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      4.147(CFS)
Depth of flow =   0.722(Ft.), Average velocity =   1.666(Ft/s)
Channel flow top width =    4.890(Ft.)
Flow Velocity =    1.67(Ft/s)
Travel time  =    5.91 min.
Time of concentration =   10.91 min.
Critical depth =      0.438(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.463(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.809(CFS) for    0.730(Ac.)
Total runoff =      3.710(CFS)   Total area =        1.58(Ac.)
End of computations, total study area =          51.980 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Existing Conditions
25-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   25.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type   ]
Initial subarea flow distance = 910.000(Ft.)
Highest elevation = 514.000(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   25.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   5.82 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(910.000^.5)/(2.747^(1/3)]=   5.82
Rainfall intensity (I) =   3.581(In/Hr) for a   25.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.926(CFS)
Total initial stream area =        0.860(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   489.000(Ft.)
End of street segment elevation =   485.000(Ft.)
Length of street segment  =   819.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   5.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      5.018(CFS)
Depth of flow =   0.339(Ft.), Average velocity =   1.748(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.942(Ft.)
Flow velocity =   1.75(Ft/s)
Travel time =    7.81 min.     TC =   13.62  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.459(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.361(CFS) for    1.230(Ac.)
Total runoff =      4.287(CFS)   Total area =        2.09(Ac.)
Street flow at end of street =      4.287(CFS)
Half street flow at end of street =      4.287(CFS)
Depth of flow =   0.319(Ft.), Average velocity =   1.681(Ft/s)
Flow width (from curb towards crown)=  15.970(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   485.000(Ft.)
```

```
Downstream point elevation =   479.700(Ft.)
Channel length thru subarea  =  1121.000(Ft.)
Channel base width    =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =     53.832(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     53.832(CFS)
Depth of flow =   1.158(Ft.), Average velocity =   2.606(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =   20.000(Ft.)
Flow Velocity =    2.61(Ft/s)
Travel time  =    7.17 min.
Time of concentration =   20.79 min.
Critical depth =      0.734(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.023(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     43.970(CFS) for   48.310(Ac.)
Total runoff =     48.257(CFS)   Total area =       50.40(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  192.000(Ft.)
Highest elevation =  485.600(Ft.)
Lowest elevation =  484.500(Ft.)
Elevation difference =    1.100(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.50 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 192.000^.5)/(   0.573^(1/3)]=   4.50
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      3.845(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      3.105(CFS)
Total initial stream area =        0.850(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   482.000(Ft.)
Downstream point elevation =   478.800(Ft.)
Channel length thru subarea  =   591.000(Ft.)
Channel base width    =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.438(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      4.438(CFS)
Depth of flow =   0.748(Ft.), Average velocity =   1.697(Ft/s)
Channel flow top width =    4.992(Ft.)
Flow Velocity =    1.70(Ft/s)
Travel time  =    5.80 min.
Time of concentration =   10.80 min.
Critical depth =      0.457(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.720(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.893(CFS) for    0.730(Ac.)
Total runoff =      3.998(CFS)   Total area =        1.58(Ac.)
End of computations, total study area =          51.980 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Existing Conditions
50-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   50.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type   ]
Initial subarea flow distance = 910.000(Ft.)
Highest elevation = 514.000(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   25.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   5.82 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(910.000^.5)/(2.747^(1/3)]=   5.82
Rainfall intensity (I) =   3.991(In/Hr) for a   50.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      3.261(CFS)
Total initial stream area =        0.860(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   489.000(Ft.)
End of street segment elevation =   485.000(Ft.)
Length of street segment  =   819.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   5.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      5.592(CFS)
Depth of flow =   0.353(Ft.), Average velocity =   1.796(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.644(Ft.)
Flow velocity =   1.80(Ft/s)
Travel time =    7.60 min.     TC =   13.41  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.835(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.569(CFS) for    1.230(Ac.)
Total runoff =      4.830(CFS)   Total area =        2.09(Ac.)
Street flow at end of street =      4.830(CFS)
Half street flow at end of street =      4.830(CFS)
Depth of flow =   0.334(Ft.), Average velocity =   1.732(Ft/s)
Flow width (from curb towards crown)=  16.700(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   485.000(Ft.)
```

```
Downstream point elevation =   479.700(Ft.)
Channel length thru subarea  =  1121.000(Ft.)
Channel base width    =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =     60.648(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     60.648(CFS)
Depth of flow =   1.235(Ft.), Average velocity =   2.733(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =   20.000(Ft.)
Flow Velocity =    2.73(Ft/s)
Travel time  =    6.84 min.
Time of concentration =   20.25 min.
Critical depth =      0.781(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.371(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     51.547(CFS) for   48.310(Ac.)
Total runoff =     56.376(CFS)   Total area =       50.40(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  192.000(Ft.)
Highest elevation =  485.600(Ft.)
Lowest elevation =  484.500(Ft.)
Elevation difference =    1.100(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.50 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 192.000^.5)/(   0.573^(1/3)]=   4.50
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.265(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      3.444(CFS)
Total initial stream area =        0.850(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   482.000(Ft.)
Downstream point elevation =   478.800(Ft.)
Channel length thru subarea  =   591.000(Ft.)
Channel base width    =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      4.923(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      4.923(CFS)
Depth of flow =   0.788(Ft.), Average velocity =   1.746(Ft/s)
Channel flow top width =    5.154(Ft.)
Flow Velocity =    1.75(Ft/s)
Travel time  =    5.64 min.
Time of concentration =   10.64 min.
Critical depth =      0.484(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.112(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.022(CFS) for    0.730(Ac.)
Total runoff =      4.466(CFS)   Total area =        1.58(Ac.)
End of computations, total study area =          51.980 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 09/07/17

Plaza La Media - North
Preliminary Hydrology
Existing Conditions
100-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type   ]
Initial subarea flow distance = 910.000(Ft.)
Highest elevation = 514.000(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   25.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   5.82 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*(910.000^.5)/(2.747^(1/3)]=   5.82
Rainfall intensity (I) =   4.131(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950

```
Subarea runoff =      3.375(CFS)
Total initial stream area =        0.860(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   489.000(Ft.)
End of street segment elevation =   485.000(Ft.)
Length of street segment  =   819.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   5.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
Estimated mean flow rate at midpoint of street =      5.788(CFS)
Depth of flow =   0.357(Ft.), Average velocity =   1.812(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.874(Ft.)
Flow velocity =   1.81(Ft/s)
Travel time =    7.53 min.     TC =   13.35  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.036(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.681(CFS) for    1.230(Ac.)
Total runoff =      5.056(CFS)   Total area =        2.09(Ac.)
Street flow at end of street =      5.056(CFS)
Half street flow at end of street =      5.056(CFS)
Depth of flow =   0.340(Ft.), Average velocity =   1.752(Ft/s)
Flow width (from curb towards crown)=  16.989(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   485.000(Ft.)
Downstream point elevation =   479.700(Ft.)
```

```
Channel length thru subarea  =  1121.000(Ft.)
Channel base width    =   10.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =     63.485(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     63.485(CFS)
Depth of flow =   1.265(Ft.), Average velocity =   2.784(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =   20.000(Ft.)
Flow Velocity =    2.78(Ft/s)
Travel time  =    6.71 min.
Time of concentration =   20.06 min.
Critical depth =      0.805(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.577(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     56.021(CFS) for   48.310(Ac.)
Total runoff =     61.077(CFS)   Total area =       50.40(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  192.000(Ft.)
Highest elevation =  485.600(Ft.)
Lowest elevation =  484.500(Ft.)
Elevation difference =    1.100(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.50 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 192.000^.5)/(   0.573^(1/3)]=   4.50
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      3.544(CFS)
Total initial stream area =        0.850(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   482.000(Ft.)
Downstream point elevation =   478.800(Ft.)
Channel length thru subarea  =   591.000(Ft.)
Channel base width    =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      5.066(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      5.066(CFS)
Depth of flow =   0.800(Ft.), Average velocity =   1.759(Ft/s)
Channel flow top width =    5.200(Ft.)
Flow Velocity =    1.76(Ft/s)
Travel time  =    5.60 min.
Time of concentration =   10.60 min.
Critical depth =      0.492(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.304(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.085(CFS) for    0.730(Ac.)
Total runoff =      4.629(CFS)   Total area =        1.58(Ac.)
End of computations, total study area =          51.980 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Proposed Conditions
5-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   5.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance = 222.000(Ft.)
Highest elevation = 491.400(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   2.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   9.41 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*(222.000^.5)/(1.081^(1/3)]=   9.41
Rainfall intensity (I) =   2.284(In/Hr) for a   5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =   1.470(CFS)
Total initial stream area =   0.870(Ac.)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =     9.41 min.
Rainfall intensity =      2.284(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.845(CFS) for    0.500(Ac.)
Total runoff =      2.315(CFS)   Total area =        1.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.300(Ft.)
Downstream point elevation =   484.900(Ft.)
Channel length thru subarea  =    80.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      2.501(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.501(CFS)
Depth of flow =   0.183(Ft.), Average velocity =   0.665(Ft/s)
Channel flow top width =   21.099(Ft.)
Flow Velocity =    0.66(Ft/s)
Travel time  =    2.01 min.
Time of concentration =   11.41 min.
Critical depth =      0.078(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.077(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.338(CFS) for    0.220(Ac.)
Total runoff =      2.653(CFS)   Total area =        1.59(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   311.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.653(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.653(CFS)
Normal flow depth in pipe =    9.82(In.)
Flow top width inside pipe =   14.26(In.)
```

```
Critical Depth =    7.84(In.)
Pipe flow velocity =      3.12(Ft/s)
Travel time through pipe =    1.66 min.
Time of concentration (TC) =    13.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.590(Ac.)
Runoff from this stream =      2.653(CFS)
Time of concentration =   13.08 min.
Rainfall intensity =     1.943(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  522.000(Ft.)
Highest elevation =  491.400(Ft.)
Lowest elevation =  487.000(Ft.)
Elevation difference =    4.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    15.67 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 522.000^.5)/( 0.843^(1/3)]=  15.67
Rainfall intensity (I) =      1.776(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.588(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   484.300(Ft.)
Downstream point elevation =   484.000(Ft.)
Channel length thru subarea  =    62.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.588(CFS)
Depth of flow =   0.244(Ft.), Average velocity =   0.785(Ft/s)
```

```
Channel flow top width =   19.464(Ft.)
Flow Velocity =    0.78(Ft/s)
Travel time  =    1.32 min.
Time of concentration =   16.99 min.
Critical depth =      0.106(Ft.)


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Process from Point/Station       22.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.730(Ac.)
Runoff from this stream =      3.588(CFS)
Time of concentration =   16.99 min.
Rainfall intensity =     1.705(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       32.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  187.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.500(Ft.)
Elevation difference =    1.700(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 187.000^.5)/( 0.909^(1/3)]=   9.15
Rainfall intensity (I) =      2.315(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.565(CFS)
Total initial stream area =        0.330(Ac.)


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Process from Point/Station       32.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   486.500(Ft.)
Downstream point elevation =   484.100(Ft.)
Channel length thru subarea  =   367.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      0.565(CFS)
Depth of flow =   0.074(Ft.), Average velocity =   0.420(Ft/s)
Channel flow top width =   18.444(Ft.)
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Flow Velocity =    0.42(Ft/s)
Travel time  =   14.58 min.
Time of concentration =   23.72 min.
Critical depth =      0.031(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.330(Ac.)
Runoff from this stream =      0.565(CFS)
Time of concentration =   23.72 min.
Rainfall intensity =     1.429(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.588     16.99            1.705
2        0.565     23.72            1.429
Qmax(1) =
        1.000 *    1.000 *     3.588) +
        1.000 *    0.716 *     0.565) + =       3.993
Qmax(2) =
        0.838 *    1.000 *     3.588) +
        1.000 *    1.000 *     0.565) + =       3.573

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.588       0.565
Maximum flow rates at confluence using above data:
        3.993        3.573
Area of streams before confluence:
        2.730        0.330
Results of confluence:
Total flow rate =      3.993(CFS)
Time of concentration =    16.990 min.
Effective stream area after confluence =      3.060(Ac.)


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Process from Point/Station       24.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.99 min.
Rainfall intensity =      1.705(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.543(CFS) for    0.430(Ac.)
```

```
Total runoff =      4.536(CFS)   Total area =        3.49(Ac.)


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Process from Point/Station       24.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   480.100(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.536(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.536(CFS)
Normal flow depth in pipe =   12.52(In.)
Flow top width inside pipe =   16.57(In.)
Critical Depth =    9.80(In.)
Pipe flow velocity =      3.46(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =    17.88 min.


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Process from Point/Station       24.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
Runoff from this stream =      4.536(CFS)
Time of concentration =   17.88 min.
Rainfall intensity =     1.661(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.653     13.08            1.943
2        4.536     17.88            1.661
Qmax(1) =
        1.000 *    1.000 *     2.653) +
        1.000 *    0.731 *     4.536) + =       5.970
Qmax(2) =
        0.855 *    1.000 *     2.653) +
        1.000 *    1.000 *     4.536) + =       6.804

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.653       4.536
Maximum flow rates at confluence using above data:
        5.970        6.804
Area of streams before confluence:
```

```
        1.590        3.490


Results of confluence:
Total flow rate =      6.804(CFS)
Time of concentration =    17.882 min.
Effective stream area after confluence  =      5.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.600(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   161.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.804(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     6.804(CFS)
Normal flow depth in pipe =   13.83(In.)
Flow top width inside pipe =   19.92(In.)
Critical Depth =   11.57(In.)
Pipe flow velocity =      4.05(Ft/s)
Travel time through pipe =    0.66 min.
Time of concentration (TC) =    18.54 min.


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Process from Point/Station       36.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.54 min.
Rainfall intensity =      1.631(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.845(CFS) for    0.700(Ac.)
Total runoff =      7.649(CFS)   Total area =        5.78(Ac.)


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Process from Point/Station       34.000 to Point/Station       38.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.500(Ft.)
Pipe length  =   190.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.649(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.649(CFS)
Normal flow depth in pipe =   15.00(In.)
Flow top width inside pipe =   18.97(In.)
Critical Depth =   12.29(In.)
```

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Pipe flow velocity =      4.16(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =    19.31 min.


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Process from Point/Station       40.000 to Point/Station       38.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    19.31 min.
Rainfall intensity =      1.597(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.307(CFS) for    0.260(Ac.)
Total runoff =      7.956(CFS)   Total area =        6.04(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.500(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.956(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.956(CFS)
Normal flow depth in pipe =   15.30(In.)
Flow top width inside pipe =   18.67(In.)
Critical Depth =   12.55(In.)
Pipe flow velocity =      4.24(Ft/s)
Travel time through pipe =    0.61 min.
Time of concentration (TC) =    19.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.040(Ac.)
Runoff from this stream =      7.956(CFS)
Time of concentration =   19.91 min.
Rainfall intensity =     1.571(In/Hr)


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Process from Point/Station       50.000 to Point/Station       52.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  455.000(Ft.)
```

```
Highest elevation =  488.400(Ft.)
Lowest elevation =  485.500(Ft.)
Elevation difference =    2.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    16.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 455.000^.5)/( 0.637^(1/3)]=  16.06
Rainfall intensity (I) =      1.754(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.531(CFS)
Total initial stream area =        2.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       54.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   483.800(Ft.)
Downstream point elevation =   483.000(Ft.)
Channel length thru subarea  =   164.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.836(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.836(CFS)
Depth of flow =   0.238(Ft.), Average velocity =   0.778(Ft/s)
Channel flow top width =   21.429(Ft.)
Flow Velocity =    0.78(Ft/s)
Travel time  =    3.51 min.
Time of concentration =   19.58 min.
Critical depth =      0.104(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.585(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.551(CFS) for    0.470(Ac.)
Total runoff =      4.083(CFS)   Total area =        3.19(Ac.)


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Process from Point/Station       54.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.000(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   207.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.083(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.083(CFS)
Normal flow depth in pipe =   11.23(In.)
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Flow top width inside pipe =   13.02(In.)
Critical Depth =    9.81(In.)
Pipe flow velocity =      4.15(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =    20.41 min.


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Process from Point/Station       54.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      4.083(CFS)
Time of concentration =   20.41 min.
Rainfall intensity =     1.551(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        7.956     19.91            1.571
2        4.083     20.41            1.551
Qmax(1) =
        1.000 *    1.000 *     7.956) +
        1.000 *    0.976 *     4.083) + =      11.939
Qmax(2) =
        0.987 *    1.000 *     7.956) +
        1.000 *    1.000 *     4.083) + =      11.936

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.956       4.083
Maximum flow rates at confluence using above data:
       11.939       11.936
Area of streams before confluence:
        6.040        3.190
Results of confluence:
Total flow rate =     11.939(CFS)
Time of concentration =    19.911 min.
Effective stream area after confluence =      9.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.939(CFS)
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Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    11.939(CFS)
Normal flow depth in pipe =   18.70(In.)
Flow top width inside pipe =   19.91(In.)
Critical Depth =   14.91(In.)
Pipe flow velocity =      4.55(Ft/s)
Travel time through pipe =    1.19 min.
Time of concentration (TC) =    21.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.230(Ac.)
Runoff from this stream =     11.939(CFS)
Time of concentration =   21.10 min.
Rainfall intensity =     1.523(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       70.000 to Point/Station       72.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  264.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  490.700(Ft.)
Elevation difference =    2.300(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    11.02 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 264.000^.5)/( 0.871^(1/3)]=  11.02
Rainfall intensity (I) =      2.112(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.032(CFS)
Total initial stream area =        1.300(Ac.)


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Process from Point/Station       72.000 to Point/Station       74.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   488.300(Ft.)
Downstream point elevation =   487.300(Ft.)
Channel length thru subarea  =   180.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
```

```
Estimated mean flow rate at midpoint of channel =      2.431(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.431(CFS)
Depth of flow =   0.174(Ft.), Average velocity =   0.679(Ft/s)
Channel flow top width =   21.047(Ft.)
Flow Velocity =    0.68(Ft/s)
Travel time  =    4.42 min.
Time of concentration =   15.44 min.
Critical depth =      0.077(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.789(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.675(CFS) for    0.510(Ac.)
Total runoff =      2.707(CFS)   Total area =        1.81(Ac.)


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Process from Point/Station       74.000 to Point/Station       76.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   483.300(Ft.)
Downstream point/station elevation =   482.400(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.707(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.707(CFS)
Normal flow depth in pipe =    8.30(In.)
Flow top width inside pipe =   14.92(In.)
Critical Depth =    7.92(In.)
Pipe flow velocity =      3.89(Ft/s)
Travel time through pipe =    0.77 min.
Time of concentration (TC) =    16.21 min.


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Process from Point/Station       77.000 to Point/Station       76.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.21 min.
Rainfall intensity =      1.746(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.065(CFS) for    0.050(Ac.)
Total runoff =      2.772(CFS)   Total area =        1.86(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       76.000 to Point/Station       78.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
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```
Upstream point/station elevation =   482.400(Ft.)
Downstream point/station elevation =   481.300(Ft.)
Pipe length  =   241.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.772(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.772(CFS)
Normal flow depth in pipe =    8.68(In.)
Flow top width inside pipe =   14.81(In.)
Critical Depth =    8.03(In.)
Pipe flow velocity =      3.77(Ft/s)
Travel time through pipe =    1.07 min.
Time of concentration (TC) =    17.28 min.


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Process from Point/Station       79.000 to Point/Station       78.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    17.28 min.
Rainfall intensity =      1.691(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.038(CFS) for    0.030(Ac.)
Total runoff =      2.810(CFS)   Total area =        1.89(Ac.)


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Process from Point/Station       78.000 to Point/Station       80.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   481.300(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.810(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.810(CFS)
Normal flow depth in pipe =    8.30(In.)
Flow top width inside pipe =   14.92(In.)
Critical Depth =    8.07(In.)
Pipe flow velocity =      4.03(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =    18.04 min.


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Process from Point/Station       78.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.890(Ac.)
Runoff from this stream =      2.810(CFS)
Time of concentration =   18.04 min.
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Rainfall intensity =     1.654(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       82.000 to Point/Station       84.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  814.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  487.800(Ft.)
Elevation difference =    5.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    21.47 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 814.000^.5)/( 0.639^(1/3)]=  21.47
Rainfall intensity (I) =      1.510(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.050(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       84.000 to Point/Station       86.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.500(Ft.)
Downstream point elevation =   484.500(Ft.)
Channel length thru subarea  =   216.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.329(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.329(CFS)
Depth of flow =   0.222(Ft.), Average velocity =   0.725(Ft/s)
Channel flow top width =   21.333(Ft.)
Flow Velocity =    0.72(Ft/s)
Travel time  =    4.97 min.
Time of concentration =   26.43 min.
Critical depth =      0.095(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.344(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.497(CFS) for    0.500(Ac.)
Total runoff =      3.547(CFS)   Total area =        3.23(Ac.)


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Process from Point/Station       86.000 to Point/Station       80.000
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =    32.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.547(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.547(CFS)
Normal flow depth in pipe =    9.20(In.)
Flow top width inside pipe =   14.61(In.)
Critical Depth =    9.13(In.)
Pipe flow velocity =      4.50(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    26.55 min.


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Process from Point/Station       86.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.230(Ac.)
Runoff from this stream =      3.547(CFS)
Time of concentration =   26.55 min.
Rainfall intensity =     1.341(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.810     18.04            1.654
2        3.547     26.55            1.341
Qmax(1) =
        1.000 *    1.000 *     2.810) +
        1.000 *    0.679 *     3.547) + =       5.220
Qmax(2) =
        0.811 *    1.000 *     2.810) +
        1.000 *    1.000 *     3.547) + =       5.825

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.810       3.547
Maximum flow rates at confluence using above data:
        5.220        5.825
Area of streams before confluence:
        1.890        3.230
Results of confluence:
Total flow rate =      5.825(CFS)
Time of concentration =    26.552 min.
Effective stream area after confluence =      5.120(Ac.)
```

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Process from Point/Station       80.000 to Point/Station       88.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.300(Ft.)
Downstream point/station elevation =   478.300(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.825(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.825(CFS)
Normal flow depth in pipe =   11.98(In.)
Flow top width inside pipe =   16.99(In.)
Critical Depth =   11.18(In.)
Pipe flow velocity =      4.66(Ft/s)
Travel time through pipe =    1.42 min.
Time of concentration (TC) =    27.98 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       89.000 to Point/Station       88.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    27.98 min.
Rainfall intensity =      1.300(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.029(CFS) for    0.030(Ac.)
Total runoff =      5.854(CFS)   Total area =        5.15(Ac.)


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Process from Point/Station       88.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.300(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   264.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.854(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.854(CFS)
Normal flow depth in pipe =   12.12(In.)
Flow top width inside pipe =   16.89(In.)
Critical Depth =   11.21(In.)
Pipe flow velocity =      4.63(Ft/s)
Travel time through pipe =    0.95 min.
Time of concentration (TC) =    28.93 min.


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Process from Point/Station       88.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
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The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.150(Ac.)
Runoff from this stream =      5.854(CFS)
Time of concentration =   28.93 min.
Rainfall intensity =     1.275(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station       90.000 to Point/Station       92.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  389.000(Ft.)
Highest elevation =  488.500(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    3.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    12.77 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 389.000^.5)/( 1.003^(1/3)]=  12.77
Rainfall intensity (I) =      1.966(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.138(CFS)
Total initial stream area =        1.470(Ac.)


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Process from Point/Station       92.000 to Point/Station       94.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   482.700(Ft.)
Downstream point elevation =   482.000(Ft.)
Channel length thru subarea  =   133.000(Ft.)
Channel base width    =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      2.313(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.313(CFS)
Depth of flow =   0.100(Ft.), Average velocity =   0.576(Ft/s)
Channel flow top width =   40.598(Ft.)
Flow Velocity =    0.58(Ft/s)
Travel time  =    3.85 min.
Time of concentration =   16.62 min.
Critical depth =      0.047(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.725(In/Hr) for a     5.0 year storm
```

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Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.306(CFS) for    0.240(Ac.)
Total runoff =      2.444(CFS)   Total area =        1.71(Ac.)


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Process from Point/Station       94.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =    88.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.444(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.444(CFS)
Normal flow depth in pipe =    7.00(In.)
Flow top width inside pipe =   11.83(In.)
Critical Depth =    8.03(In.)
Pipe flow velocity =      5.14(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    16.90 min.


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Process from Point/Station       94.000 to Point/Station       66.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.710(Ac.)
Runoff from this stream =      2.444(CFS)
Time of concentration =   16.90 min.
Rainfall intensity =     1.710(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       11.939     21.10            1.523
2        5.854     28.93            1.275
3        2.444     16.90            1.710
Qmax(1) =
        1.000 *    1.000 *    11.939) +
        1.000 *    0.730 *     5.854) +
        0.891 *    1.000 *     2.444) + =      18.388
Qmax(2) =
        0.837 *    1.000 *    11.939) +
        1.000 *    1.000 *     5.854) +
        0.746 *    1.000 *     2.444) + =      17.668
Qmax(3) =
        1.000 *    0.801 *    11.939) +
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        1.000 *    0.584 *     5.854) +
        1.000 *    1.000 *     2.444) + =      15.429

Total of 3 main streams to confluence:
Flow rates before confluence point:
      11.939       5.854       2.444
Maximum flow rates at confluence using above data:
       18.388       17.668       15.429
Area of streams before confluence:
        9.230        5.150        1.710


Results of confluence:
Total flow rate =     18.388(CFS)
Time of concentration =    21.103 min.
Effective stream area after confluence  =     16.090(Ac.)


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Process from Point/Station       60.000 to Point/Station       96.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   477.000(Ft.)
Downstream point/station elevation =   476.680(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.388(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    18.388(CFS)
Normal flow depth in pipe =   20.67(In.)
Flow top width inside pipe =   27.77(In.)
Critical Depth =   17.41(In.)
Pipe flow velocity =      5.10(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =    21.45 min.


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Process from Point/Station       60.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     16.090(Ac.)
Runoff from this stream =     18.388(CFS)
Time of concentration =   21.45 min.
Rainfall intensity =     1.510(In/Hr)


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Process from Point/Station       98.000 to Point/Station       96.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
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Initial subarea flow distance  =  539.000(Ft.)
Highest elevation =  489.300(Ft.)
Lowest elevation =  482.700(Ft.)
Elevation difference =    6.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    14.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 539.000^.5)/( 1.224^(1/3)]=  14.06
Rainfall intensity (I) =      1.874(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      1.290(CFS)
Total initial stream area =        0.930(Ac.)


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Process from Point/Station       98.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.290(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     1.874(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       18.388     21.45            1.510
2        1.290     14.06            1.874
Qmax(1) =
        1.000 *    1.000 *    18.388) +
        0.806 *    1.000 *     1.290) + =      19.427
Qmax(2) =
        1.000 *    0.656 *    18.388) +
        1.000 *    1.000 *     1.290) + =      13.343

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.388       1.290
Maximum flow rates at confluence using above data:
       19.427       13.343
Area of streams before confluence:
       16.090        0.930
Results of confluence:
Total flow rate =     19.427(CFS)
Time of concentration =    21.452 min.
Effective stream area after confluence =     17.020(Ac.)


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Process from Point/Station      100.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  191.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.19 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 191.000^.5)/( 1.309^(1/3)]=   8.19
Rainfall intensity (I) =      2.446(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.543(CFS)
Total initial stream area =        0.300(Ac.)


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Process from Point/Station      110.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  147.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.58 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 147.000^.5)/( 1.701^(1/3)]=   6.58
Rainfall intensity (I) =      2.731(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.485(CFS)
Total initial stream area =        0.240(Ac.)


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Process from Point/Station      120.000 to Point/Station      122.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  229.000(Ft.)
Highest elevation =  487.100(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.97 min.
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TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 229.000^.5)/(   1.092^(1/3)]=   3.97
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      3.149(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      1.915(CFS)
Total initial stream area =        0.640(Ac.)


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Process from Point/Station      122.000 to Point/Station      124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   481.000(Ft.)
Downstream point/station elevation =   479.800(Ft.)
Pipe length  =   254.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.915(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.915(CFS)
Normal flow depth in pipe =    7.98(In.)
Flow top width inside pipe =   11.33(In.)
Critical Depth =    7.08(In.)
Pipe flow velocity =      3.45(Ft/s)
Travel time through pipe =    1.23 min.
Time of concentration (TC) =     6.23 min.


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Process from Point/Station      126.000 to Point/Station      124.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Time of concentration =     6.23 min.
Rainfall intensity =      2.809(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.841(CFS) for    0.690(Ac.)
Total runoff =      3.756(CFS)   Total area =        1.33(Ac.)


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Process from Point/Station      124.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.800(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.756(CFS)
Nearest computed pipe diameter  =     18.00(In.)
```

```
Calculated individual pipe flow  =     3.756(CFS)
Normal flow depth in pipe =   10.22(In.)
Flow top width inside pipe =   17.83(In.)
Critical Depth =    8.89(In.)
Pipe flow velocity =      3.63(Ft/s)
Travel time through pipe =    0.96 min.
Time of concentration (TC) =     7.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      128.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Time of concentration =     7.18 min.
Rainfall intensity =      2.612(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.489(CFS) for    0.600(Ac.)
Total runoff =      5.245(CFS)   Total area =        1.93(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      132.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.400(Ft.)
Pipe length  =   191.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.245(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.245(CFS)
Normal flow depth in pipe =   12.46(In.)
Flow top width inside pipe =   16.62(In.)
Critical Depth =   10.59(In.)
Pipe flow velocity =      4.02(Ft/s)
Travel time through pipe =    0.79 min.
Time of concentration (TC) =     7.98 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      132.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
```

```
Time of concentration =     7.98 min.
Rainfall intensity =      2.479(In/Hr) for a     5.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.378(CFS) for    1.010(Ac.)
Total runoff =      7.624(CFS)   Total area =        2.94(Ac.)


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Process from Point/Station      132.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.400(Ft.)
Downstream point/station elevation =   476.700(Ft.)
Pipe length  =   455.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.624(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.624(CFS)
Normal flow depth in pipe =   14.04(In.)
Flow top width inside pipe =   19.77(In.)
Critical Depth =   12.27(In.)
Pipe flow velocity =      4.46(Ft/s)
Travel time through pipe =    1.70 min.
Time of concentration (TC) =     9.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.940(Ac.)
Runoff from this stream =      7.624(CFS)
Time of concentration =    9.68 min.
Rainfall intensity =     2.252(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  489.000(Ft.)
Lowest elevation =  457.000(Ft.)
Elevation difference =   32.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.32 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 179.000^.5)/(  17.877^(1/3)]=   3.32
Setting time of concentration to 5 minutes
```

```
Rainfall intensity (I) =      3.149(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.606(CFS)
Total initial stream area =        0.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      212.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  215.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.000(Ft.)
Elevation difference =    2.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.43 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 215.000^.5)/( 1.023^(1/3)]=   9.43
Rainfall intensity (I) =      2.281(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.304(CFS)
Total initial stream area =        0.180(Ac.)
End of computations, total study area =          20.940 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Proposed Conditions
10-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   10.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance = 222.000(Ft.)
Highest elevation = 491.400(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   2.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   9.41 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*(222.000^.5)/(1.081^(1/3)]=   9.41
Rainfall intensity (I) =   2.640(In/Hr) for a   10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =   1.700(CFS)
Total initial stream area =   0.870(Ac.)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =     9.41 min.
Rainfall intensity =      2.640(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.977(CFS) for    0.500(Ac.)
Total runoff =      2.676(CFS)   Total area =        1.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.300(Ft.)
Downstream point elevation =   484.900(Ft.)
Channel length thru subarea  =    80.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      2.891(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.891(CFS)
Depth of flow =   0.200(Ft.), Average velocity =   0.703(Ft/s)
Channel flow top width =   21.198(Ft.)
Flow Velocity =    0.70(Ft/s)
Travel time  =    1.90 min.
Time of concentration =   11.30 min.
Critical depth =      0.086(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.422(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.394(CFS) for    0.220(Ac.)
Total runoff =      3.071(CFS)   Total area =        1.59(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   311.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.071(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.071(CFS)
Normal flow depth in pipe =   10.96(In.)
Flow top width inside pipe =   13.31(In.)
```

```
Critical Depth =    8.46(In.)
Pipe flow velocity =      3.20(Ft/s)
Travel time through pipe =    1.62 min.
Time of concentration (TC) =    12.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.590(Ac.)
Runoff from this stream =      3.071(CFS)
Time of concentration =   12.93 min.
Rainfall intensity =     2.275(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  522.000(Ft.)
Highest elevation =  491.400(Ft.)
Lowest elevation =  487.000(Ft.)
Elevation difference =    4.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    15.67 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 522.000^.5)/( 0.843^(1/3)]=  15.67
Rainfall intensity (I) =      2.076(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      4.194(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   484.300(Ft.)
Downstream point elevation =   484.000(Ft.)
Channel length thru subarea  =    62.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      4.194(CFS)
Depth of flow =   0.268(Ft.), Average velocity =   0.833(Ft/s)
```

```
Channel flow top width =   19.607(Ft.)
Flow Velocity =    0.83(Ft/s)
Travel time  =    1.24 min.
Time of concentration =   16.91 min.
Critical depth =      0.118(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.730(Ac.)
Runoff from this stream =      4.194(CFS)
Time of concentration =   16.91 min.
Rainfall intensity =     2.001(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       32.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  187.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.500(Ft.)
Elevation difference =    1.700(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 187.000^.5)/( 0.909^(1/3)]=   9.15
Rainfall intensity (I) =      2.675(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.653(CFS)
Total initial stream area =        0.330(Ac.)


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Process from Point/Station       32.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   486.500(Ft.)
Downstream point elevation =   484.100(Ft.)
Channel length thru subarea  =   367.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      0.653(CFS)
Depth of flow =   0.081(Ft.), Average velocity =   0.444(Ft/s)
Channel flow top width =   18.484(Ft.)
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Flow Velocity =    0.44(Ft/s)
Travel time  =   13.77 min.
Time of concentration =   22.92 min.
Critical depth =      0.034(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.330(Ac.)
Runoff from this stream =      0.653(CFS)
Time of concentration =   22.92 min.
Rainfall intensity =     1.713(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.194     16.91            2.001
2        0.653     22.92            1.713
Qmax(1) =
        1.000 *    1.000 *     4.194) +
        1.000 *    0.738 *     0.653) + =       4.676
Qmax(2) =
        0.856 *    1.000 *     4.194) +
        1.000 *    1.000 *     0.653) + =       4.245

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.194       0.653
Maximum flow rates at confluence using above data:
        4.676        4.245
Area of streams before confluence:
        2.730        0.330
Results of confluence:
Total flow rate =      4.676(CFS)
Time of concentration =    16.914 min.
Effective stream area after confluence =      3.060(Ac.)


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Process from Point/Station       24.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.91 min.
Rainfall intensity =      2.001(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.637(CFS) for    0.430(Ac.)
```

```
Total runoff =      5.313(CFS)   Total area =        3.49(Ac.)


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Process from Point/Station       24.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   480.100(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.313(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.313(CFS)
Normal flow depth in pipe =   14.34(In.)
Flow top width inside pipe =   14.48(In.)
Critical Depth =   10.65(In.)
Pipe flow velocity =      3.52(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    17.79 min.


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Process from Point/Station       24.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
Runoff from this stream =      5.313(CFS)
Time of concentration =   17.79 min.
Rainfall intensity =     1.952(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.071     12.93            2.275
2        5.313     17.79            1.952
Qmax(1) =
        1.000 *    1.000 *     3.071) +
        1.000 *    0.727 *     5.313) + =       6.931
Qmax(2) =
        0.858 *    1.000 *     3.071) +
        1.000 *    1.000 *     5.313) + =       7.947

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.071       5.313
Maximum flow rates at confluence using above data:
        6.931        7.947
Area of streams before confluence:
```

```
        1.590        3.490


Results of confluence:
Total flow rate =      7.947(CFS)
Time of concentration =    17.789 min.
Effective stream area after confluence  =      5.080(Ac.)


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Process from Point/Station       16.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.600(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   161.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.947(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.947(CFS)
Normal flow depth in pipe =   15.56(In.)
Flow top width inside pipe =   18.40(In.)
Critical Depth =   12.55(In.)
Pipe flow velocity =      4.15(Ft/s)
Travel time through pipe =    0.65 min.
Time of concentration (TC) =    18.44 min.


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Process from Point/Station       36.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.44 min.
Rainfall intensity =      1.917(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.993(CFS) for    0.700(Ac.)
Total runoff =      8.940(CFS)   Total area =        5.78(Ac.)


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Process from Point/Station       34.000 to Point/Station       38.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.500(Ft.)
Pipe length  =   190.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.940(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.940(CFS)
Normal flow depth in pipe =   17.30(In.)
Flow top width inside pipe =   16.01(In.)
Critical Depth =   13.34(In.)
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Pipe flow velocity =      4.22(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =    19.19 min.


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Process from Point/Station       40.000 to Point/Station       38.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    19.19 min.
Rainfall intensity =      1.879(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.362(CFS) for    0.260(Ac.)
Total runoff =      9.302(CFS)   Total area =        6.04(Ac.)


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Process from Point/Station       38.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.500(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.302(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.302(CFS)
Normal flow depth in pipe =   17.86(In.)
Flow top width inside pipe =   14.98(In.)
Critical Depth =   13.60(In.)
Pipe flow velocity =      4.27(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =    19.79 min.


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Process from Point/Station       38.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.040(Ac.)
Runoff from this stream =      9.302(CFS)
Time of concentration =   19.79 min.
Rainfall intensity =     1.850(In/Hr)


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Process from Point/Station       50.000 to Point/Station       52.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  455.000(Ft.)
```

```
Highest elevation =  488.400(Ft.)
Lowest elevation =  485.500(Ft.)
Elevation difference =    2.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    16.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 455.000^.5)/( 0.637^(1/3)]=  16.06
Rainfall intensity (I) =      2.052(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      4.129(CFS)
Total initial stream area =        2.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       54.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   483.800(Ft.)
Downstream point elevation =   483.000(Ft.)
Channel length thru subarea  =   164.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      4.486(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      4.486(CFS)
Depth of flow =   0.261(Ft.), Average velocity =   0.826(Ft/s)
Channel flow top width =   21.568(Ft.)
Flow Velocity =    0.83(Ft/s)
Travel time  =    3.31 min.
Time of concentration =   19.37 min.
Critical depth =      0.115(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.870(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.650(CFS) for    0.470(Ac.)
Total runoff =      4.780(CFS)   Total area =        3.19(Ac.)


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Process from Point/Station       54.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.000(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   207.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.780(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.780(CFS)
Normal flow depth in pipe =   10.62(In.)
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Flow top width inside pipe =   17.71(In.)
Critical Depth =   10.08(In.)
Pipe flow velocity =      4.41(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    20.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      4.780(CFS)
Time of concentration =   20.15 min.
Rainfall intensity =     1.833(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        9.302     19.79            1.850
2        4.780     20.15            1.833
Qmax(1) =
        1.000 *    1.000 *     9.302) +
        1.000 *    0.982 *     4.780) + =      13.994
Qmax(2) =
        0.991 *    1.000 *     9.302) +
        1.000 *    1.000 *     4.780) + =      13.994

Total of 2 streams to confluence:
Flow rates before confluence point:
       9.302       4.780
Maximum flow rates at confluence using above data:
       13.994       13.994
Area of streams before confluence:
        6.040        3.190
Results of confluence:
Total flow rate =     13.994(CFS)
Time of concentration =    20.155 min.
Effective stream area after confluence =      9.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.994(CFS)
```

```
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    13.994(CFS)
Normal flow depth in pipe =   18.52(In.)
Flow top width inside pipe =   25.07(In.)
Critical Depth =   15.61(In.)
Pipe flow velocity =      4.82(Ft/s)
Travel time through pipe =    1.12 min.
Time of concentration (TC) =    21.28 min.


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Process from Point/Station       42.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.230(Ac.)
Runoff from this stream =     13.994(CFS)
Time of concentration =   21.28 min.
Rainfall intensity =     1.782(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       70.000 to Point/Station       72.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  264.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  490.700(Ft.)
Elevation difference =    2.300(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    11.02 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 264.000^.5)/( 0.871^(1/3)]=  11.02
Rainfall intensity (I) =      2.451(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.358(CFS)
Total initial stream area =        1.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       72.000 to Point/Station       74.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   488.300(Ft.)
Downstream point elevation =   487.300(Ft.)
Channel length thru subarea  =   180.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
```

```
Estimated mean flow rate at midpoint of channel =      2.820(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.820(CFS)
Depth of flow =   0.191(Ft.), Average velocity =   0.719(Ft/s)
Channel flow top width =   21.144(Ft.)
Flow Velocity =    0.72(Ft/s)
Travel time  =    4.17 min.
Time of concentration =   15.20 min.
Critical depth =      0.085(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.107(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.795(CFS) for    0.510(Ac.)
Total runoff =      3.153(CFS)   Total area =        1.81(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       74.000 to Point/Station       76.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =   483.300(Ft.)
Downstream point/station elevation =   482.400(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.153(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.153(CFS)
Normal flow depth in pipe =    9.14(In.)
Flow top width inside pipe =   14.64(In.)
Critical Depth =    8.58(In.)
Pipe flow velocity =      4.02(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =    15.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       77.000 to Point/Station       76.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    15.94 min.
Rainfall intensity =      2.059(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.076(CFS) for    0.050(Ac.)
Total runoff =      3.229(CFS)   Total area =        1.86(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       76.000 to Point/Station       78.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
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```
Upstream point/station elevation =   482.400(Ft.)
Downstream point/station elevation =   481.300(Ft.)
Pipe length  =   241.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.229(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.229(CFS)
Normal flow depth in pipe =    9.60(In.)
Flow top width inside pipe =   14.40(In.)
Critical Depth =    8.68(In.)
Pipe flow velocity =      3.89(Ft/s)
Travel time through pipe =    1.03 min.
Time of concentration (TC) =    16.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       79.000 to Point/Station       78.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.97 min.
Rainfall intensity =      1.997(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.044(CFS) for    0.030(Ac.)
Total runoff =      3.273(CFS)   Total area =        1.89(Ac.)


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Process from Point/Station       78.000 to Point/Station       80.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   481.300(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.273(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.273(CFS)
Normal flow depth in pipe =    9.15(In.)
Flow top width inside pipe =   14.63(In.)
Critical Depth =    8.75(In.)
Pipe flow velocity =      4.17(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =    17.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.890(Ac.)
Runoff from this stream =      3.273(CFS)
Time of concentration =   17.71 min.
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Rainfall intensity =     1.956(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       82.000 to Point/Station       84.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  814.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  487.800(Ft.)
Elevation difference =    5.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    21.47 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 814.000^.5)/( 0.639^(1/3)]=  21.47
Rainfall intensity (I) =      1.774(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.584(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       84.000 to Point/Station       86.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.500(Ft.)
Downstream point elevation =   484.500(Ft.)
Channel length thru subarea  =   216.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.912(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.912(CFS)
Depth of flow =   0.245(Ft.), Average velocity =   0.771(Ft/s)
Channel flow top width =   21.468(Ft.)
Flow Velocity =    0.77(Ft/s)
Travel time  =    4.67 min.
Time of concentration =   26.14 min.
Critical depth =      0.105(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.594(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.590(CFS) for    0.500(Ac.)
Total runoff =      4.173(CFS)   Total area =        3.23(Ac.)


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Process from Point/Station       86.000 to Point/Station       80.000
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =    32.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.173(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.173(CFS)
Normal flow depth in pipe =   10.31(In.)
Flow top width inside pipe =   13.91(In.)
Critical Depth =    9.93(In.)
Pipe flow velocity =      4.64(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    26.25 min.


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Process from Point/Station       86.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.230(Ac.)
Runoff from this stream =      4.173(CFS)
Time of concentration =   26.25 min.
Rainfall intensity =     1.590(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.273     17.71            1.956
2        4.173     26.25            1.590
Qmax(1) =
        1.000 *    1.000 *     3.273) +
        1.000 *    0.675 *     4.173) + =       6.089
Qmax(2) =
        0.813 *    1.000 *     3.273) +
        1.000 *    1.000 *     4.173) + =       6.833

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.273       4.173
Maximum flow rates at confluence using above data:
        6.089        6.833
Area of streams before confluence:
        1.890        3.230
Results of confluence:
Total flow rate =      6.833(CFS)
Time of concentration =    26.250 min.
Effective stream area after confluence =      5.120(Ac.)
```

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Process from Point/Station       80.000 to Point/Station       88.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.300(Ft.)
Downstream point/station elevation =   478.300(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.833(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.833(CFS)
Normal flow depth in pipe =   13.57(In.)
Flow top width inside pipe =   15.51(In.)
Critical Depth =   12.14(In.)
Pipe flow velocity =      4.78(Ft/s)
Travel time through pipe =    1.39 min.
Time of concentration (TC) =    27.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       89.000 to Point/Station       88.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    27.64 min.
Rainfall intensity =      1.543(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.034(CFS) for    0.030(Ac.)
Total runoff =      6.868(CFS)   Total area =        5.15(Ac.)


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Process from Point/Station       88.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.300(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   264.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.868(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.868(CFS)
Normal flow depth in pipe =   13.76(In.)
Flow top width inside pipe =   15.28(In.)
Critical Depth =   12.16(In.)
Pipe flow velocity =      4.74(Ft/s)
Travel time through pipe =    0.93 min.
Time of concentration (TC) =    28.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       88.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.150(Ac.)
Runoff from this stream =      6.868(CFS)
Time of concentration =   28.57 min.
Rainfall intensity =     1.514(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       90.000 to Point/Station       92.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  389.000(Ft.)
Highest elevation =  488.500(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    3.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    12.77 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 389.000^.5)/( 1.003^(1/3)]=  12.77
Rainfall intensity (I) =      2.288(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.489(CFS)
Total initial stream area =        1.470(Ac.)


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Process from Point/Station       92.000 to Point/Station       94.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   482.700(Ft.)
Downstream point elevation =   482.000(Ft.)
Channel length thru subarea  =   133.000(Ft.)
Channel base width    =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      2.692(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.692(CFS)
Depth of flow =   0.109(Ft.), Average velocity =   0.612(Ft/s)
Channel flow top width =   40.655(Ft.)
Flow Velocity =    0.61(Ft/s)
Travel time  =    3.62 min.
Time of concentration =   16.39 min.
Critical depth =      0.052(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.031(In/Hr) for a    10.0 year storm
```

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Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.361(CFS) for    0.240(Ac.)
Total runoff =      2.849(CFS)   Total area =        1.71(Ac.)


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Process from Point/Station       94.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =    88.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.849(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.849(CFS)
Normal flow depth in pipe =    7.76(In.)
Flow top width inside pipe =   11.47(In.)
Critical Depth =    8.69(In.)
Pipe flow velocity =      5.31(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    16.67 min.


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Process from Point/Station       94.000 to Point/Station       66.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.710(Ac.)
Runoff from this stream =      2.849(CFS)
Time of concentration =   16.67 min.
Rainfall intensity =     2.015(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       13.994     21.28            1.782
2        6.868     28.57            1.514
3        2.849     16.67            2.015
Qmax(1) =
        1.000 *    1.000 *    13.994) +
        1.000 *    0.745 *     6.868) +
        0.884 *    1.000 *     2.849) + =      21.630
Qmax(2) =
        0.849 *    1.000 *    13.994) +
        1.000 *    1.000 *     6.868) +
        0.751 *    1.000 *     2.849) + =      20.896
Qmax(3) =
        1.000 *    0.783 *    13.994) +
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        1.000 *    0.584 *     6.868) +
        1.000 *    1.000 *     2.849) + =      17.819

Total of 3 main streams to confluence:
Flow rates before confluence point:
      13.994       6.868       2.849
Maximum flow rates at confluence using above data:
       21.630       20.896       17.819
Area of streams before confluence:
        9.230        5.150        1.710


Results of confluence:
Total flow rate =     21.630(CFS)
Time of concentration =    21.280 min.
Effective stream area after confluence  =     16.090(Ac.)


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Process from Point/Station       60.000 to Point/Station       96.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   477.000(Ft.)
Downstream point/station elevation =   476.680(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.630(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    21.630(CFS)
Normal flow depth in pipe =   23.67(In.)
Flow top width inside pipe =   24.48(In.)
Critical Depth =   18.96(In.)
Pipe flow velocity =      5.21(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =    21.62 min.


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Process from Point/Station       60.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     16.090(Ac.)
Runoff from this stream =     21.630(CFS)
Time of concentration =   21.62 min.
Rainfall intensity =     1.767(In/Hr)


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Process from Point/Station       98.000 to Point/Station       96.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
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```
Initial subarea flow distance  =  539.000(Ft.)
Highest elevation =  489.300(Ft.)
Lowest elevation =  482.700(Ft.)
Elevation difference =    6.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    14.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 539.000^.5)/( 1.224^(1/3)]=  14.06
Rainfall intensity (I) =      2.186(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      1.505(CFS)
Total initial stream area =        0.930(Ac.)


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Process from Point/Station       98.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.505(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     2.186(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       21.630     21.62            1.767
2        1.505     14.06            2.186
Qmax(1) =
        1.000 *    1.000 *    21.630) +
        0.808 *    1.000 *     1.505) + =      22.846
Qmax(2) =
        1.000 *    0.650 *    21.630) +
        1.000 *    1.000 *     1.505) + =      15.572

Total of 2 streams to confluence:
Flow rates before confluence point:
      21.630       1.505
Maximum flow rates at confluence using above data:
       22.846       15.572
Area of streams before confluence:
       16.090        0.930
Results of confluence:
Total flow rate =     22.846(CFS)
Time of concentration =    21.622 min.
Effective stream area after confluence =     17.020(Ac.)


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Process from Point/Station      100.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  191.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.19 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 191.000^.5)/( 1.309^(1/3)]=   8.19
Rainfall intensity (I) =      2.819(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.626(CFS)
Total initial stream area =        0.300(Ac.)


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Process from Point/Station      110.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  147.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.58 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 147.000^.5)/( 1.701^(1/3)]=   6.58
Rainfall intensity (I) =      3.132(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.556(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      122.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  229.000(Ft.)
Highest elevation =  487.100(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.97 min.
```

```
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 229.000^.5)/(   1.092^(1/3)]=   3.97
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      3.592(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.184(CFS)
Total initial stream area =        0.640(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   481.000(Ft.)
Downstream point/station elevation =   479.800(Ft.)
Pipe length  =   254.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.184(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.184(CFS)
Normal flow depth in pipe =    8.84(In.)
Flow top width inside pipe =   10.57(In.)
Critical Depth =    7.58(In.)
Pipe flow velocity =      3.52(Ft/s)
Travel time through pipe =    1.20 min.
Time of concentration (TC) =     6.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      126.000 to Point/Station      124.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Time of concentration =     6.20 min.
Rainfall intensity =      3.225(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.114(CFS) for    0.690(Ac.)
Total runoff =      4.298(CFS)   Total area =        1.33(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.800(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.298(CFS)
Nearest computed pipe diameter  =     18.00(In.)
```

```
Calculated individual pipe flow  =     4.298(CFS)
Normal flow depth in pipe =   11.16(In.)
Flow top width inside pipe =   17.48(In.)
Critical Depth =    9.54(In.)
Pipe flow velocity =      3.74(Ft/s)
Travel time through pipe =    0.93 min.
Time of concentration (TC) =     7.13 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      128.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Time of concentration =     7.13 min.
Rainfall intensity =      3.013(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.717(CFS) for    0.600(Ac.)
Total runoff =      6.016(CFS)   Total area =        1.93(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      132.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.400(Ft.)
Pipe length  =   191.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.016(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.016(CFS)
Normal flow depth in pipe =   13.95(In.)
Flow top width inside pipe =   15.04(In.)
Critical Depth =   11.38(In.)
Pipe flow velocity =      4.09(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =     7.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      132.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
```

```
Time of concentration =     7.91 min.
Rainfall intensity =      2.867(In/Hr) for a    10.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.751(CFS) for    1.010(Ac.)
Total runoff =      8.766(CFS)   Total area =        2.94(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.400(Ft.)
Downstream point/station elevation =   476.700(Ft.)
Pipe length  =   455.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.766(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.766(CFS)
Normal flow depth in pipe =   15.66(In.)
Flow top width inside pipe =   18.29(In.)
Critical Depth =   13.21(In.)
Pipe flow velocity =      4.56(Ft/s)
Travel time through pipe =    1.66 min.
Time of concentration (TC) =     9.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.940(Ac.)
Runoff from this stream =      8.766(CFS)
Time of concentration =    9.57 min.
Rainfall intensity =     2.619(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  489.000(Ft.)
Lowest elevation =  457.000(Ft.)
Elevation difference =   32.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.32 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 179.000^.5)/(  17.877^(1/3)]=   3.32
Setting time of concentration to 5 minutes
```

```
Rainfall intensity (I) =      3.592(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.691(CFS)
Total initial stream area =        0.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      212.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  215.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.000(Ft.)
Elevation difference =    2.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.43 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 215.000^.5)/( 1.023^(1/3)]=   9.43
Rainfall intensity (I) =      2.637(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.351(CFS)
Total initial stream area =        0.180(Ac.)
End of computations, total study area =          20.940 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Proposed Conditions
25-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   25.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance = 222.000(Ft.)
Highest elevation = 491.400(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   2.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   9.41 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*(222.000^.5)/(1.081^(1/3)]=   9.41
Rainfall intensity (I) =   2.888(In/Hr) for a   25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =   1.859(CFS)
Total initial stream area =   0.870(Ac.)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =     9.41 min.
Rainfall intensity =      2.888(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.068(CFS) for    0.500(Ac.)
Total runoff =      2.928(CFS)   Total area =        1.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.300(Ft.)
Downstream point elevation =   484.900(Ft.)
Channel length thru subarea  =    80.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.163(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.163(CFS)
Depth of flow =   0.211(Ft.), Average velocity =   0.728(Ft/s)
Channel flow top width =   21.264(Ft.)
Flow Velocity =    0.73(Ft/s)
Travel time  =    1.83 min.
Time of concentration =   11.24 min.
Critical depth =      0.092(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.674(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.435(CFS) for    0.220(Ac.)
Total runoff =      3.363(CFS)   Total area =        1.59(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   311.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.363(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.363(CFS)
Normal flow depth in pipe =   11.88(In.)
Flow top width inside pipe =   12.17(In.)
```

```
Critical Depth =    8.87(In.)
Pipe flow velocity =      3.23(Ft/s)
Travel time through pipe =    1.61 min.
Time of concentration (TC) =    12.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.590(Ac.)
Runoff from this stream =      3.363(CFS)
Time of concentration =   12.85 min.
Rainfall intensity =     2.523(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  522.000(Ft.)
Highest elevation =  491.400(Ft.)
Lowest elevation =  487.000(Ft.)
Elevation difference =    4.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    15.67 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 522.000^.5)/( 0.843^(1/3)]=  15.67
Rainfall intensity (I) =      2.311(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      4.668(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   484.300(Ft.)
Downstream point elevation =   484.000(Ft.)
Channel length thru subarea  =    62.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      4.668(CFS)
Depth of flow =   0.285(Ft.), Average velocity =   0.867(Ft/s)
```

```
Channel flow top width =   19.712(Ft.)
Flow Velocity =    0.87(Ft/s)
Travel time  =    1.19 min.
Time of concentration =   16.86 min.
Critical depth =      0.127(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.730(Ac.)
Runoff from this stream =      4.668(CFS)
Time of concentration =   16.86 min.
Rainfall intensity =     2.235(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       32.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  187.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.500(Ft.)
Elevation difference =    1.700(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 187.000^.5)/( 0.909^(1/3)]=   9.15
Rainfall intensity (I) =      2.923(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.714(CFS)
Total initial stream area =        0.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   486.500(Ft.)
Downstream point elevation =   484.100(Ft.)
Channel length thru subarea  =   367.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      0.714(CFS)
Depth of flow =   0.085(Ft.), Average velocity =   0.460(Ft/s)
Channel flow top width =   18.510(Ft.)
```

```
Flow Velocity =    0.46(Ft/s)
Travel time  =   13.30 min.
Time of concentration =   22.45 min.
Critical depth =      0.037(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.330(Ac.)
Runoff from this stream =      0.714(CFS)
Time of concentration =   22.45 min.
Rainfall intensity =     1.946(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.668     16.86            2.235
2        0.714     22.45            1.946
Qmax(1) =
        1.000 *    1.000 *     4.668) +
        1.000 *    0.751 *     0.714) + =       5.204
Qmax(2) =
        0.871 *    1.000 *     4.668) +
        1.000 *    1.000 *     0.714) + =       4.778

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.668       0.714
Maximum flow rates at confluence using above data:
        5.204        4.778
Area of streams before confluence:
        2.730        0.330
Results of confluence:
Total flow rate =      5.204(CFS)
Time of concentration =    16.864 min.
Effective stream area after confluence =      3.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.86 min.
Rainfall intensity =      2.235(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.711(CFS) for    0.430(Ac.)
```

```
Total runoff =      5.915(CFS)   Total area =        3.49(Ac.)


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Process from Point/Station       24.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   480.100(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.915(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     5.915(CFS)
Normal flow depth in pipe =   13.17(In.)
Flow top width inside pipe =   20.31(In.)
Critical Depth =   10.75(In.)
Pipe flow velocity =      3.73(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =    17.69 min.


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Process from Point/Station       24.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
Runoff from this stream =      5.915(CFS)
Time of concentration =   17.69 min.
Rainfall intensity =     2.186(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.363     12.85            2.523
2        5.915     17.69            2.186
Qmax(1) =
        1.000 *    1.000 *     3.363) +
        1.000 *    0.726 *     5.915) + =       7.658
Qmax(2) =
        0.866 *    1.000 *     3.363) +
        1.000 *    1.000 *     5.915) + =       8.829

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.363       5.915
Maximum flow rates at confluence using above data:
        7.658        8.829
Area of streams before confluence:
```

```
        1.590        3.490


Results of confluence:
Total flow rate =      8.829(CFS)
Time of concentration =    17.692 min.
Effective stream area after confluence  =      5.080(Ac.)


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Process from Point/Station       16.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.600(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   161.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.829(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.829(CFS)
Normal flow depth in pipe =   17.20(In.)
Flow top width inside pipe =   16.16(In.)
Critical Depth =   13.24(In.)
Pipe flow velocity =      4.18(Ft/s)
Travel time through pipe =    0.64 min.
Time of concentration (TC) =    18.33 min.


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Process from Point/Station       36.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.33 min.
Rainfall intensity =      2.150(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.113(CFS) for    0.700(Ac.)
Total runoff =      9.942(CFS)   Total area =        5.78(Ac.)


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Process from Point/Station       34.000 to Point/Station       38.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.500(Ft.)
Pipe length  =   190.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.942(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =     9.942(CFS)
Normal flow depth in pipe =   15.98(In.)
Flow top width inside pipe =   22.64(In.)
Critical Depth =   13.54(In.)
```

```
Pipe flow velocity =      4.48(Ft/s)
Travel time through pipe =    0.71 min.
Time of concentration (TC) =    19.04 min.


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Process from Point/Station       40.000 to Point/Station       38.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    19.04 min.
Rainfall intensity =      2.111(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.406(CFS) for    0.260(Ac.)
Total runoff =     10.348(CFS)   Total area =        6.04(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.500(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.348(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.348(CFS)
Normal flow depth in pipe =   16.29(In.)
Flow top width inside pipe =   22.41(In.)
Critical Depth =   13.82(In.)
Pipe flow velocity =      4.56(Ft/s)
Travel time through pipe =    0.56 min.
Time of concentration (TC) =    19.60 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.040(Ac.)
Runoff from this stream =     10.348(CFS)
Time of concentration =   19.60 min.
Rainfall intensity =     2.082(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       52.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  455.000(Ft.)
```

```
Highest elevation =  488.400(Ft.)
Lowest elevation =  485.500(Ft.)
Elevation difference =    2.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    16.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 455.000^.5)/( 0.637^(1/3)]=  16.06
Rainfall intensity (I) =      2.285(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      4.599(CFS)
Total initial stream area =        2.720(Ac.)


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Process from Point/Station       52.000 to Point/Station       54.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   483.800(Ft.)
Downstream point elevation =   483.000(Ft.)
Channel length thru subarea  =   164.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      4.997(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      4.997(CFS)
Depth of flow =   0.279(Ft.), Average velocity =   0.860(Ft/s)
Channel flow top width =   21.672(Ft.)
Flow Velocity =    0.86(Ft/s)
Travel time  =    3.18 min.
Time of concentration =   19.24 min.
Critical depth =      0.124(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.101(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.731(CFS) for    0.470(Ac.)
Total runoff =      5.330(CFS)   Total area =        3.19(Ac.)


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Process from Point/Station       54.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.000(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   207.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.330(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.330(CFS)
Normal flow depth in pipe =   11.41(In.)
```

```
Flow top width inside pipe =   17.34(In.)
Critical Depth =   10.67(In.)
Pipe flow velocity =      4.51(Ft/s)
Travel time through pipe =    0.77 min.
Time of concentration (TC) =    20.00 min.


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Process from Point/Station       54.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      5.330(CFS)
Time of concentration =   20.00 min.
Rainfall intensity =     2.061(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       10.348     19.60            2.082
2        5.330     20.00            2.061
Qmax(1) =
        1.000 *    1.000 *    10.348) +
        1.000 *    0.980 *     5.330) + =      15.572
Qmax(2) =
        0.990 *    1.000 *    10.348) +
        1.000 *    1.000 *     5.330) + =      15.577

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.348       5.330
Maximum flow rates at confluence using above data:
       15.572       15.577
Area of streams before confluence:
        6.040        3.190
Results of confluence:
Total flow rate =     15.577(CFS)
Time of concentration =    20.003 min.
Effective stream area after confluence =      9.230(Ac.)


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Process from Point/Station       42.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.577(CFS)
```

```
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    15.577(CFS)
Normal flow depth in pipe =   20.16(In.)
Flow top width inside pipe =   23.49(In.)
Critical Depth =   16.52(In.)
Pipe flow velocity =      4.89(Ft/s)
Travel time through pipe =    1.11 min.
Time of concentration (TC) =    21.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.230(Ac.)
Runoff from this stream =     15.577(CFS)
Time of concentration =   21.11 min.
Rainfall intensity =     2.007(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       70.000 to Point/Station       72.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  264.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  490.700(Ft.)
Elevation difference =    2.300(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    11.02 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 264.000^.5)/( 0.871^(1/3)]=  11.02
Rainfall intensity (I) =      2.696(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.594(CFS)
Total initial stream area =        1.300(Ac.)


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Process from Point/Station       72.000 to Point/Station       74.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   488.300(Ft.)
Downstream point elevation =   487.300(Ft.)
Channel length thru subarea  =   180.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
```

```
Estimated mean flow rate at midpoint of channel =      3.102(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.102(CFS)
Depth of flow =   0.202(Ft.), Average velocity =   0.746(Ft/s)
Channel flow top width =   21.211(Ft.)
Flow Velocity =    0.75(Ft/s)
Travel time  =    4.02 min.
Time of concentration =   15.05 min.
Critical depth =      0.090(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.353(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.888(CFS) for    0.510(Ac.)
Total runoff =      3.482(CFS)   Total area =        1.81(Ac.)


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Process from Point/Station       74.000 to Point/Station       76.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   483.300(Ft.)
Downstream point/station elevation =   482.400(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.482(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.482(CFS)
Normal flow depth in pipe =    9.79(In.)
Flow top width inside pipe =   14.29(In.)
Critical Depth =    9.04(In.)
Pipe flow velocity =      4.11(Ft/s)
Travel time through pipe =    0.73 min.
Time of concentration (TC) =    15.77 min.


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Process from Point/Station       77.000 to Point/Station       76.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    15.77 min.
Rainfall intensity =      2.304(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.085(CFS) for    0.050(Ac.)
Total runoff =      3.567(CFS)   Total area =        1.86(Ac.)


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Process from Point/Station       76.000 to Point/Station       78.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
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Upstream point/station elevation =   482.400(Ft.)
Downstream point/station elevation =   481.300(Ft.)
Pipe length  =   241.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.567(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.567(CFS)
Normal flow depth in pipe =   10.31(In.)
Flow top width inside pipe =   13.91(In.)
Critical Depth =    9.15(In.)
Pipe flow velocity =      3.97(Ft/s)
Travel time through pipe =    1.01 min.
Time of concentration (TC) =    16.78 min.


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Process from Point/Station       79.000 to Point/Station       78.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.78 min.
Rainfall intensity =      2.240(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.050(CFS) for    0.030(Ac.)
Total runoff =      3.617(CFS)   Total area =        1.89(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       80.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   481.300(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.617(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.617(CFS)
Normal flow depth in pipe =    9.80(In.)
Flow top width inside pipe =   14.28(In.)
Critical Depth =    9.22(In.)
Pipe flow velocity =      4.26(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =    17.51 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.890(Ac.)
Runoff from this stream =      3.617(CFS)
Time of concentration =   17.51 min.
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Rainfall intensity =     2.196(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       82.000 to Point/Station       84.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  814.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  487.800(Ft.)
Elevation difference =    5.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    21.47 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 814.000^.5)/( 0.639^(1/3)]=  21.47
Rainfall intensity (I) =      1.991(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      4.021(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       84.000 to Point/Station       86.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.500(Ft.)
Downstream point elevation =   484.500(Ft.)
Channel length thru subarea  =   216.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      4.390(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      4.390(CFS)
Depth of flow =   0.262(Ft.), Average velocity =   0.806(Ft/s)
Channel flow top width =   21.572(Ft.)
Flow Velocity =    0.81(Ft/s)
Travel time  =    4.47 min.
Time of concentration =   25.93 min.
Critical depth =      0.113(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      1.802(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.667(CFS) for    0.500(Ac.)
Total runoff =      4.688(CFS)   Total area =        3.23(Ac.)


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Process from Point/Station       86.000 to Point/Station       80.000
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =    32.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.688(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.688(CFS)
Normal flow depth in pipe =   11.32(In.)
Flow top width inside pipe =   12.91(In.)
Critical Depth =   10.54(In.)
Pipe flow velocity =      4.72(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    26.05 min.


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Process from Point/Station       86.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.230(Ac.)
Runoff from this stream =      4.688(CFS)
Time of concentration =   26.05 min.
Rainfall intensity =     1.798(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.617     17.51            2.196
2        4.688     26.05            1.798
Qmax(1) =
        1.000 *    1.000 *     3.617) +
        1.000 *    0.672 *     4.688) + =       6.768
Qmax(2) =
        0.819 *    1.000 *     3.617) +
        1.000 *    1.000 *     4.688) + =       7.649

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.617       4.688
Maximum flow rates at confluence using above data:
        6.768        7.649
Area of streams before confluence:
        1.890        3.230
Results of confluence:
Total flow rate =      7.649(CFS)
Time of concentration =    26.047 min.
Effective stream area after confluence =      5.120(Ac.)
```

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Process from Point/Station       80.000 to Point/Station       88.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.300(Ft.)
Downstream point/station elevation =   478.300(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.649(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.649(CFS)
Normal flow depth in pipe =   12.71(In.)
Flow top width inside pipe =   20.53(In.)
Critical Depth =   12.29(In.)
Pipe flow velocity =      5.02(Ft/s)
Travel time through pipe =    1.32 min.
Time of concentration (TC) =    27.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       89.000 to Point/Station       88.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    27.37 min.
Rainfall intensity =      1.749(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.039(CFS) for    0.030(Ac.)
Total runoff =      7.687(CFS)   Total area =        5.15(Ac.)


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Process from Point/Station       88.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.300(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   264.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.687(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.687(CFS)
Normal flow depth in pipe =   12.84(In.)
Flow top width inside pipe =   20.47(In.)
Critical Depth =   12.32(In.)
Pipe flow velocity =      4.99(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    28.25 min.


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Process from Point/Station       88.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.150(Ac.)
Runoff from this stream =      7.687(CFS)
Time of concentration =   28.25 min.
Rainfall intensity =     1.717(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       90.000 to Point/Station       92.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  389.000(Ft.)
Highest elevation =  488.500(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    3.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    12.77 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 389.000^.5)/( 1.003^(1/3)]=  12.77
Rainfall intensity (I) =      2.530(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.752(CFS)
Total initial stream area =        1.470(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       92.000 to Point/Station       94.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   482.700(Ft.)
Downstream point elevation =   482.000(Ft.)
Channel length thru subarea  =   133.000(Ft.)
Channel base width    =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      2.976(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.976(CFS)
Depth of flow =   0.116(Ft.), Average velocity =   0.637(Ft/s)
Channel flow top width =   40.695(Ft.)
Flow Velocity =    0.64(Ft/s)
Travel time  =    3.48 min.
Time of concentration =   16.25 min.
Critical depth =      0.056(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.273(In/Hr) for a    25.0 year storm
```

```
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.404(CFS) for    0.240(Ac.)
Total runoff =      3.155(CFS)   Total area =        1.71(Ac.)


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Process from Point/Station       94.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =    88.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.155(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.155(CFS)
Normal flow depth in pipe =    8.36(In.)
Flow top width inside pipe =   11.04(In.)
Critical Depth =    9.13(In.)
Pipe flow velocity =      5.41(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    16.52 min.


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Process from Point/Station       94.000 to Point/Station       66.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.710(Ac.)
Runoff from this stream =      3.155(CFS)
Time of concentration =   16.52 min.
Rainfall intensity =     2.256(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       15.577     21.11            2.007
2        7.687     28.25            1.717
3        3.155     16.52            2.256
Qmax(1) =
        1.000 *    1.000 *    15.577) +
        1.000 *    0.747 *     7.687) +
        0.890 *    1.000 *     3.155) + =      24.130
Qmax(2) =
        0.856 *    1.000 *    15.577) +
        1.000 *    1.000 *     7.687) +
        0.761 *    1.000 *     3.155) + =      23.416
Qmax(3) =
        1.000 *    0.783 *    15.577) +
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```
        1.000 *    0.585 *     7.687) +
        1.000 *    1.000 *     3.155) + =      19.844

Total of 3 main streams to confluence:
Flow rates before confluence point:
      15.577       7.687       3.155
Maximum flow rates at confluence using above data:
       24.130       23.416       19.844
Area of streams before confluence:
        9.230        5.150        1.710


Results of confluence:
Total flow rate =     24.130(CFS)
Time of concentration =    21.110 min.
Effective stream area after confluence  =     16.090(Ac.)


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Process from Point/Station       60.000 to Point/Station       96.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   477.000(Ft.)
Downstream point/station elevation =   476.680(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.130(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    24.130(CFS)
Normal flow depth in pipe =   23.04(In.)
Flow top width inside pipe =   30.30(In.)
Critical Depth =   19.52(In.)
Pipe flow velocity =      5.45(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =    21.44 min.


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Process from Point/Station       60.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     16.090(Ac.)
Runoff from this stream =     24.130(CFS)
Time of concentration =   21.44 min.
Rainfall intensity =     1.992(In/Hr)


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Process from Point/Station       98.000 to Point/Station       96.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
```

```
Initial subarea flow distance  =  539.000(Ft.)
Highest elevation =  489.300(Ft.)
Lowest elevation =  482.700(Ft.)
Elevation difference =    6.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    14.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 539.000^.5)/( 1.224^(1/3)]=  14.06
Rainfall intensity (I) =      2.425(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      1.669(CFS)
Total initial stream area =        0.930(Ac.)


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Process from Point/Station       98.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.669(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     2.425(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       24.130     21.44            1.992
2        1.669     14.06            2.425
Qmax(1) =
        1.000 *    1.000 *    24.130) +
        0.821 *    1.000 *     1.669) + =      25.501
Qmax(2) =
        1.000 *    0.656 *    24.130) +
        1.000 *    1.000 *     1.669) + =      17.497

Total of 2 streams to confluence:
Flow rates before confluence point:
      24.130       1.669
Maximum flow rates at confluence using above data:
       25.501       17.497
Area of streams before confluence:
       16.090        0.930
Results of confluence:
Total flow rate =     25.501(CFS)
Time of concentration =    21.437 min.
Effective stream area after confluence =     17.020(Ac.)


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```

```
Process from Point/Station      100.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  191.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.19 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 191.000^.5)/( 1.309^(1/3)]=   8.19
Rainfall intensity (I) =      3.069(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.681(CFS)
Total initial stream area =        0.300(Ac.)


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Process from Point/Station      110.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  147.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.58 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 147.000^.5)/( 1.701^(1/3)]=   6.58
Rainfall intensity (I) =      3.383(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.601(CFS)
Total initial stream area =        0.240(Ac.)


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Process from Point/Station      120.000 to Point/Station      122.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  229.000(Ft.)
Highest elevation =  487.100(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.97 min.
```

```
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 229.000^.5)/(   1.092^(1/3)]=   3.97
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      3.845(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.338(CFS)
Total initial stream area =        0.640(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   481.000(Ft.)
Downstream point/station elevation =   479.800(Ft.)
Pipe length  =   254.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.338(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.338(CFS)
Normal flow depth in pipe =    9.38(In.)
Flow top width inside pipe =    9.92(In.)
Critical Depth =    7.85(In.)
Pipe flow velocity =      3.55(Ft/s)
Travel time through pipe =    1.19 min.
Time of concentration (TC) =     6.19 min.


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Process from Point/Station      126.000 to Point/Station      124.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Time of concentration =     6.19 min.
Rainfall intensity =      3.479(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.280(CFS) for    0.690(Ac.)
Total runoff =      4.618(CFS)   Total area =        1.33(Ac.)


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Process from Point/Station      124.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   479.800(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.618(CFS)
Nearest computed pipe diameter  =     18.00(In.)
```

```
Calculated individual pipe flow  =     4.618(CFS)
Normal flow depth in pipe =   11.72(In.)
Flow top width inside pipe =   17.16(In.)
Critical Depth =    9.90(In.)
Pipe flow velocity =      3.79(Ft/s)
Travel time through pipe =    0.91 min.
Time of concentration (TC) =     7.11 min.


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Process from Point/Station      130.000 to Point/Station      128.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Time of concentration =     7.11 min.
Rainfall intensity =      3.268(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.863(CFS) for    0.600(Ac.)
Total runoff =      6.481(CFS)   Total area =        1.93(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      132.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.400(Ft.)
Pipe length  =   191.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.481(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     6.481(CFS)
Normal flow depth in pipe =   12.64(In.)
Flow top width inside pipe =   20.56(In.)
Critical Depth =   11.27(In.)
Pipe flow velocity =      4.28(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =     7.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      132.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
```

```
Time of concentration =     7.85 min.
Rainfall intensity =      3.126(In/Hr) for a    25.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      3.000(CFS) for    1.010(Ac.)
Total runoff =      9.480(CFS)   Total area =        2.94(Ac.)


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Process from Point/Station      132.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.400(Ft.)
Downstream point/station elevation =   476.700(Ft.)
Pipe length  =   455.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.480(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.480(CFS)
Normal flow depth in pipe =   16.83(In.)
Flow top width inside pipe =   16.76(In.)
Critical Depth =   13.75(In.)
Pipe flow velocity =      4.59(Ft/s)
Travel time through pipe =    1.65 min.
Time of concentration (TC) =     9.50 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.940(Ac.)
Runoff from this stream =      9.480(CFS)
Time of concentration =    9.50 min.
Rainfall intensity =     2.875(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      200.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  489.000(Ft.)
Lowest elevation =  457.000(Ft.)
Elevation difference =   32.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.32 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 179.000^.5)/(  17.877^(1/3)]=   3.32
Setting time of concentration to 5 minutes
```

```
Rainfall intensity (I) =      3.845(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.740(CFS)
Total initial stream area =        0.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      212.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  215.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.000(Ft.)
Elevation difference =    2.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.43 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 215.000^.5)/( 1.023^(1/3)]=   9.43
Rainfall intensity (I) =      2.885(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.384(CFS)
Total initial stream area =        0.180(Ac.)
End of computations, total study area =          20.940 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Proposed Conditions
50-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   50.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance = 222.000(Ft.)
Highest elevation = 491.400(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   2.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   9.41 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*(222.000^.5)/(1.081^(1/3)]=   9.41
Rainfall intensity (I) =   3.269(In/Hr) for a   50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =   2.105(CFS)
Total initial stream area =   0.870(Ac.)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =     9.41 min.
Rainfall intensity =      3.269(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.210(CFS) for    0.500(Ac.)
Total runoff =      3.315(CFS)   Total area =        1.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.300(Ft.)
Downstream point elevation =   484.900(Ft.)
Channel length thru subarea  =    80.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.581(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.581(CFS)
Depth of flow =   0.227(Ft.), Average velocity =   0.763(Ft/s)
Channel flow top width =   21.361(Ft.)
Flow Velocity =    0.76(Ft/s)
Travel time  =    1.75 min.
Time of concentration =   11.15 min.
Critical depth =      0.100(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      3.054(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.497(CFS) for    0.220(Ac.)
Total runoff =      3.812(CFS)   Total area =        1.59(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   311.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.812(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     3.812(CFS)
Normal flow depth in pipe =   10.83(In.)
Flow top width inside pipe =   17.62(In.)
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```
Critical Depth =    8.96(In.)
Pipe flow velocity =      3.43(Ft/s)
Travel time through pipe =    1.51 min.
Time of concentration (TC) =    12.66 min.


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Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.590(Ac.)
Runoff from this stream =      3.812(CFS)
Time of concentration =   12.66 min.
Rainfall intensity =     2.902(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  522.000(Ft.)
Highest elevation =  491.400(Ft.)
Lowest elevation =  487.000(Ft.)
Elevation difference =    4.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    15.67 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 522.000^.5)/( 0.843^(1/3)]=  15.67
Rainfall intensity (I) =      2.657(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      5.368(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   484.300(Ft.)
Downstream point elevation =   484.000(Ft.)
Channel length thru subarea  =    62.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      5.368(CFS)
Depth of flow =   0.310(Ft.), Average velocity =   0.914(Ft/s)
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```
Channel flow top width =   19.861(Ft.)
Flow Velocity =    0.91(Ft/s)
Travel time  =    1.13 min.
Time of concentration =   16.80 min.
Critical depth =      0.139(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.730(Ac.)
Runoff from this stream =      5.368(CFS)
Time of concentration =   16.80 min.
Rainfall intensity =     2.579(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       32.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  187.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.500(Ft.)
Elevation difference =    1.700(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 187.000^.5)/( 0.909^(1/3)]=   9.15
Rainfall intensity (I) =      3.307(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.807(CFS)
Total initial stream area =        0.330(Ac.)


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Process from Point/Station       32.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   486.500(Ft.)
Downstream point elevation =   484.100(Ft.)
Channel length thru subarea  =   367.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      0.807(CFS)
Depth of flow =   0.092(Ft.), Average velocity =   0.483(Ft/s)
Channel flow top width =   18.549(Ft.)
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Flow Velocity =    0.48(Ft/s)
Travel time  =   12.67 min.
Time of concentration =   21.82 min.
Critical depth =      0.040(Ft.)


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Process from Point/Station       32.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.330(Ac.)
Runoff from this stream =      0.807(CFS)
Time of concentration =   21.82 min.
Rainfall intensity =     2.288(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        5.368     16.80            2.579
2        0.807     21.82            2.288
Qmax(1) =
        1.000 *    1.000 *     5.368) +
        1.000 *    0.770 *     0.807) + =       5.990
Qmax(2) =
        0.887 *    1.000 *     5.368) +
        1.000 *    1.000 *     0.807) + =       5.569

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.368       0.807
Maximum flow rates at confluence using above data:
        5.990        5.569
Area of streams before confluence:
        2.730        0.330
Results of confluence:
Total flow rate =      5.990(CFS)
Time of concentration =    16.803 min.
Effective stream area after confluence =      3.060(Ac.)


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Process from Point/Station       24.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.80 min.
Rainfall intensity =      2.579(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.821(CFS) for    0.430(Ac.)
```

```
Total runoff =      6.811(CFS)   Total area =        3.49(Ac.)


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Process from Point/Station       24.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   480.100(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.811(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     6.811(CFS)
Normal flow depth in pipe =   14.55(In.)
Flow top width inside pipe =   19.37(In.)
Critical Depth =   11.57(In.)
Pipe flow velocity =      3.83(Ft/s)
Travel time through pipe =    0.81 min.
Time of concentration (TC) =    17.61 min.


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Process from Point/Station       24.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
Runoff from this stream =      6.811(CFS)
Time of concentration =   17.61 min.
Rainfall intensity =     2.527(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.812     12.66            2.902
2        6.811     17.61            2.527
Qmax(1) =
        1.000 *    1.000 *     3.812) +
        1.000 *    0.719 *     6.811) + =       8.710
Qmax(2) =
        0.871 *    1.000 *     3.812) +
        1.000 *    1.000 *     6.811) + =      10.130

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.812       6.811
Maximum flow rates at confluence using above data:
        8.710       10.130
Area of streams before confluence:
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```
        1.590        3.490


Results of confluence:
Total flow rate =     10.130(CFS)
Time of concentration =    17.609 min.
Effective stream area after confluence  =      5.080(Ac.)


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Process from Point/Station       16.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.600(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   161.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.130(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.130(CFS)
Normal flow depth in pipe =   16.29(In.)
Flow top width inside pipe =   22.41(In.)
Critical Depth =   13.67(In.)
Pipe flow velocity =      4.46(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =    18.21 min.


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Process from Point/Station       36.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.21 min.
Rainfall intensity =      2.489(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.290(CFS) for    0.700(Ac.)
Total runoff =     11.420(CFS)   Total area =        5.78(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       38.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.500(Ft.)
Pipe length  =   190.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.420(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    11.420(CFS)
Normal flow depth in pipe =   17.77(In.)
Flow top width inside pipe =   21.05(In.)
Critical Depth =   14.55(In.)
```

```
Pipe flow velocity =      4.58(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =    18.90 min.


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Process from Point/Station       40.000 to Point/Station       38.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.90 min.
Rainfall intensity =      2.448(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.471(CFS) for    0.260(Ac.)
Total runoff =     11.891(CFS)   Total area =        6.04(Ac.)


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Process from Point/Station       38.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.500(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.891(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    11.891(CFS)
Normal flow depth in pipe =   18.19(In.)
Flow top width inside pipe =   20.56(In.)
Critical Depth =   14.87(In.)
Pipe flow velocity =      4.66(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =    19.45 min.


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Process from Point/Station       38.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.040(Ac.)
Runoff from this stream =     11.891(CFS)
Time of concentration =   19.45 min.
Rainfall intensity =     2.416(In/Hr)


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Process from Point/Station       50.000 to Point/Station       52.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  455.000(Ft.)
```

```
Highest elevation =  488.400(Ft.)
Lowest elevation =  485.500(Ft.)
Elevation difference =    2.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    16.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 455.000^.5)/( 0.637^(1/3)]=  16.06
Rainfall intensity (I) =      2.630(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      5.293(CFS)
Total initial stream area =        2.720(Ac.)


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Process from Point/Station       52.000 to Point/Station       54.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   483.800(Ft.)
Downstream point elevation =   483.000(Ft.)
Channel length thru subarea  =   164.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      5.750(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      5.750(CFS)
Depth of flow =   0.303(Ft.), Average velocity =   0.908(Ft/s)
Channel flow top width =   21.818(Ft.)
Flow Velocity =    0.91(Ft/s)
Travel time  =    3.01 min.
Time of concentration =   19.07 min.
Critical depth =      0.137(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.438(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.848(CFS) for    0.470(Ac.)
Total runoff =      6.141(CFS)   Total area =        3.19(Ac.)


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Process from Point/Station       54.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.000(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   207.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.141(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.141(CFS)
Normal flow depth in pipe =   12.64(In.)
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Flow top width inside pipe =   16.46(In.)
Critical Depth =   11.49(In.)
Pipe flow velocity =      4.63(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =    19.82 min.


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Process from Point/Station       54.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      6.141(CFS)
Time of concentration =   19.82 min.
Rainfall intensity =     2.395(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       11.891     19.45            2.416
2        6.141     19.82            2.395
Qmax(1) =
        1.000 *    1.000 *    11.891) +
        1.000 *    0.982 *     6.141) + =      17.918
Qmax(2) =
        0.991 *    1.000 *    11.891) +
        1.000 *    1.000 *     6.141) + =      17.930

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.891       6.141
Maximum flow rates at confluence using above data:
       17.918       17.930
Area of streams before confluence:
        6.040        3.190
Results of confluence:
Total flow rate =     17.930(CFS)
Time of concentration =    19.818 min.
Effective stream area after confluence =      9.230(Ac.)


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Process from Point/Station       42.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.930(CFS)
```

```
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    17.930(CFS)
Normal flow depth in pipe =   23.34(In.)
Flow top width inside pipe =   18.48(In.)
Critical Depth =   17.76(In.)
Pipe flow velocity =      4.90(Ft/s)
Travel time through pipe =    1.10 min.
Time of concentration (TC) =    20.92 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.230(Ac.)
Runoff from this stream =     17.930(CFS)
Time of concentration =   20.92 min.
Rainfall intensity =     2.335(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       70.000 to Point/Station       72.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  264.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  490.700(Ft.)
Elevation difference =    2.300(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    11.02 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 264.000^.5)/( 0.871^(1/3)]=  11.02
Rainfall intensity (I) =      3.068(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.952(CFS)
Total initial stream area =        1.300(Ac.)


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Process from Point/Station       72.000 to Point/Station       74.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   488.300(Ft.)
Downstream point elevation =   487.300(Ft.)
Channel length thru subarea  =   180.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
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```
Estimated mean flow rate at midpoint of channel =      3.531(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.531(CFS)
Depth of flow =   0.218(Ft.), Average velocity =   0.784(Ft/s)
Channel flow top width =   21.308(Ft.)
Flow Velocity =    0.78(Ft/s)
Travel time  =    3.83 min.
Time of concentration =   14.85 min.
Critical depth =      0.099(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.718(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.026(CFS) for    0.510(Ac.)
Total runoff =      3.978(CFS)   Total area =        1.81(Ac.)


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Process from Point/Station       74.000 to Point/Station       76.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =   483.300(Ft.)
Downstream point/station elevation =   482.400(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.978(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.978(CFS)
Normal flow depth in pipe =   10.80(In.)
Flow top width inside pipe =   13.47(In.)
Critical Depth =    9.68(In.)
Pipe flow velocity =      4.20(Ft/s)
Travel time through pipe =    0.71 min.
Time of concentration (TC) =    15.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       77.000 to Point/Station       76.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    15.56 min.
Rainfall intensity =      2.665(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.099(CFS) for    0.050(Ac.)
Total runoff =      4.076(CFS)   Total area =        1.86(Ac.)


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Process from Point/Station       76.000 to Point/Station       78.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
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Upstream point/station elevation =   482.400(Ft.)
Downstream point/station elevation =   481.300(Ft.)
Pipe length  =   241.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.076(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.076(CFS)
Normal flow depth in pipe =   11.48(In.)
Flow top width inside pipe =   12.71(In.)
Critical Depth =    9.81(In.)
Pipe flow velocity =      4.04(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    16.55 min.


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Process from Point/Station       79.000 to Point/Station       78.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.55 min.
Rainfall intensity =      2.596(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.058(CFS) for    0.030(Ac.)
Total runoff =      4.134(CFS)   Total area =        1.89(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       80.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   481.300(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.134(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.134(CFS)
Normal flow depth in pipe =   10.83(In.)
Flow top width inside pipe =   13.44(In.)
Critical Depth =    9.88(In.)
Pipe flow velocity =      4.36(Ft/s)
Travel time through pipe =    0.71 min.
Time of concentration (TC) =    17.26 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.890(Ac.)
Runoff from this stream =      4.134(CFS)
Time of concentration =   17.26 min.
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Rainfall intensity =     2.549(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       82.000 to Point/Station       84.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  814.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  487.800(Ft.)
Elevation difference =    5.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    21.47 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 814.000^.5)/( 0.639^(1/3)]=  21.47
Rainfall intensity (I) =      2.306(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      4.659(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       84.000 to Point/Station       86.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.500(Ft.)
Downstream point elevation =   484.500(Ft.)
Channel length thru subarea  =   216.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      5.085(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      5.085(CFS)
Depth of flow =   0.286(Ft.), Average velocity =   0.852(Ft/s)
Channel flow top width =   21.716(Ft.)
Flow Velocity =    0.85(Ft/s)
Travel time  =    4.22 min.
Time of concentration =   25.69 min.
Critical depth =      0.125(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.104(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.779(CFS) for    0.500(Ac.)
Total runoff =      5.437(CFS)   Total area =        3.23(Ac.)


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Process from Point/Station       86.000 to Point/Station       80.000
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =    32.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.437(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.437(CFS)
Normal flow depth in pipe =   10.62(In.)
Flow top width inside pipe =   17.71(In.)
Critical Depth =   10.79(In.)
Pipe flow velocity =      5.01(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    25.80 min.


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Process from Point/Station       86.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.230(Ac.)
Runoff from this stream =      5.437(CFS)
Time of concentration =   25.80 min.
Rainfall intensity =     2.100(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.134     17.26            2.549
2        5.437     25.80            2.100
Qmax(1) =
        1.000 *    1.000 *     4.134) +
        1.000 *    0.669 *     5.437) + =       7.772
Qmax(2) =
        0.824 *    1.000 *     4.134) +
        1.000 *    1.000 *     5.437) + =       8.842

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.134       5.437
Maximum flow rates at confluence using above data:
        7.772        8.842
Area of streams before confluence:
        1.890        3.230
Results of confluence:
Total flow rate =      8.842(CFS)
Time of concentration =    25.797 min.
Effective stream area after confluence =      5.120(Ac.)
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Process from Point/Station       80.000 to Point/Station       88.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.300(Ft.)
Downstream point/station elevation =   478.300(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.842(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.842(CFS)
Normal flow depth in pipe =   14.04(In.)
Flow top width inside pipe =   19.77(In.)
Critical Depth =   13.27(In.)
Pipe flow velocity =      5.17(Ft/s)
Travel time through pipe =    1.28 min.
Time of concentration (TC) =    27.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       89.000 to Point/Station       88.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    27.08 min.
Rainfall intensity =      2.045(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.045(CFS) for    0.030(Ac.)
Total runoff =      8.888(CFS)   Total area =        5.15(Ac.)


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Process from Point/Station       88.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.300(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   264.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.888(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.888(CFS)
Normal flow depth in pipe =   14.20(In.)
Flow top width inside pipe =   19.65(In.)
Critical Depth =   13.31(In.)
Pipe flow velocity =      5.14(Ft/s)
Travel time through pipe =    0.86 min.
Time of concentration (TC) =    27.94 min.


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Process from Point/Station       88.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
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The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.150(Ac.)
Runoff from this stream =      8.888(CFS)
Time of concentration =   27.94 min.
Rainfall intensity =     2.010(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station       90.000 to Point/Station       92.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  389.000(Ft.)
Highest elevation =  488.500(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    3.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    12.77 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 389.000^.5)/( 1.003^(1/3)]=  12.77
Rainfall intensity (I) =      2.892(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.146(CFS)
Total initial stream area =        1.470(Ac.)


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Process from Point/Station       92.000 to Point/Station       94.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   482.700(Ft.)
Downstream point elevation =   482.000(Ft.)
Channel length thru subarea  =   133.000(Ft.)
Channel base width    =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.403(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.403(CFS)
Depth of flow =   0.126(Ft.), Average velocity =   0.671(Ft/s)
Channel flow top width =   40.753(Ft.)
Flow Velocity =    0.67(Ft/s)
Travel time  =    3.30 min.
Time of concentration =   16.07 min.
Critical depth =      0.061(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.629(In/Hr) for a    50.0 year storm
```

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Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.467(CFS) for    0.240(Ac.)
Total runoff =      3.613(CFS)   Total area =        1.71(Ac.)


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Process from Point/Station       94.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =    88.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.613(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.613(CFS)
Normal flow depth in pipe =    9.35(In.)
Flow top width inside pipe =    9.95(In.)
Critical Depth =    9.73(In.)
Pipe flow velocity =      5.50(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    16.34 min.


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Process from Point/Station       94.000 to Point/Station       66.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.710(Ac.)
Runoff from this stream =      3.613(CFS)
Time of concentration =   16.34 min.
Rainfall intensity =     2.611(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       17.930     20.92            2.335
2        8.888     27.94            2.010
3        3.613     16.34            2.611
Qmax(1) =
        1.000 *    1.000 *    17.930) +
        1.000 *    0.749 *     8.888) +
        0.894 *    1.000 *     3.613) + =      27.817
Qmax(2) =
        0.861 *    1.000 *    17.930) +
        1.000 *    1.000 *     8.888) +
        0.770 *    1.000 *     3.613) + =      27.102
Qmax(3) =
        1.000 *    0.781 *    17.930) +
```

```
        1.000 *    0.585 *     8.888) +
        1.000 *    1.000 *     3.613) + =      22.812

Total of 3 main streams to confluence:
Flow rates before confluence point:
      17.930       8.888       3.613
Maximum flow rates at confluence using above data:
       27.817       27.102       22.812
Area of streams before confluence:
        9.230        5.150        1.710


Results of confluence:
Total flow rate =     27.817(CFS)
Time of concentration =    20.923 min.
Effective stream area after confluence  =     16.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       96.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   477.000(Ft.)
Downstream point/station elevation =   476.680(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.817(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    27.817(CFS)
Normal flow depth in pipe =   25.97(In.)
Flow top width inside pipe =   27.03(In.)
Critical Depth =   21.01(In.)
Pipe flow velocity =      5.55(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =    21.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     16.090(Ac.)
Runoff from this stream =     27.817(CFS)
Time of concentration =   21.24 min.
Rainfall intensity =     2.318(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       98.000 to Point/Station       96.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
```

```
Initial subarea flow distance  =  539.000(Ft.)
Highest elevation =  489.300(Ft.)
Lowest elevation =  482.700(Ft.)
Elevation difference =    6.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    14.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 539.000^.5)/( 1.224^(1/3)]=  14.06
Rainfall intensity (I) =      2.780(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      1.913(CFS)
Total initial stream area =        0.930(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       98.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.913(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     2.780(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       27.817     21.24            2.318
2        1.913     14.06            2.780
Qmax(1) =
        1.000 *    1.000 *    27.817) +
        0.834 *    1.000 *     1.913) + =      29.412
Qmax(2) =
        1.000 *    0.662 *    27.817) +
        1.000 *    1.000 *     1.913) + =      20.326

Total of 2 streams to confluence:
Flow rates before confluence point:
      27.817       1.913
Maximum flow rates at confluence using above data:
       29.412       20.326
Area of streams before confluence:
       16.090        0.930
Results of confluence:
Total flow rate =     29.412(CFS)
Time of concentration =    21.245 min.
Effective stream area after confluence =     17.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      100.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  191.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.19 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 191.000^.5)/( 1.309^(1/3)]=   8.19
Rainfall intensity (I) =      3.458(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.768(CFS)
Total initial stream area =        0.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  147.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.58 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 147.000^.5)/( 1.701^(1/3)]=   6.58
Rainfall intensity (I) =      3.785(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.672(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      122.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  229.000(Ft.)
Highest elevation =  487.100(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.97 min.
```

```
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 229.000^.5)/(   1.092^(1/3)]=   3.97
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.265(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.593(CFS)
Total initial stream area =        0.640(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   481.000(Ft.)
Downstream point/station elevation =   479.800(Ft.)
Pipe length  =   254.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.593(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.593(CFS)
Normal flow depth in pipe =    8.24(In.)
Flow top width inside pipe =   14.93(In.)
Critical Depth =    7.75(In.)
Pipe flow velocity =      3.76(Ft/s)
Travel time through pipe =    1.13 min.
Time of concentration (TC) =     6.13 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      126.000 to Point/Station      124.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Time of concentration =     6.13 min.
Rainfall intensity =      3.903(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.558(CFS) for    0.690(Ac.)
Total runoff =      5.151(CFS)   Total area =        1.33(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.800(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.151(CFS)
Nearest computed pipe diameter  =     18.00(In.)
```

```
Calculated individual pipe flow  =     5.151(CFS)
Normal flow depth in pipe =   12.70(In.)
Flow top width inside pipe =   16.41(In.)
Critical Depth =   10.48(In.)
Pipe flow velocity =      3.87(Ft/s)
Travel time through pipe =    0.90 min.
Time of concentration (TC) =     7.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      128.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Time of concentration =     7.02 min.
Rainfall intensity =      3.684(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.100(CFS) for    0.600(Ac.)
Total runoff =      7.251(CFS)   Total area =        1.93(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      132.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.400(Ft.)
Pipe length  =   191.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.251(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.251(CFS)
Normal flow depth in pipe =   13.64(In.)
Flow top width inside pipe =   20.04(In.)
Critical Depth =   11.96(In.)
Pipe flow velocity =      4.38(Ft/s)
Travel time through pipe =    0.73 min.
Time of concentration (TC) =     7.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      132.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
```

```
Time of concentration =     7.75 min.
Rainfall intensity =      3.537(In/Hr) for a    50.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      3.394(CFS) for    1.010(Ac.)
Total runoff =     10.645(CFS)   Total area =        2.94(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.400(Ft.)
Downstream point/station elevation =   476.700(Ft.)
Pipe length  =   455.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.645(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.645(CFS)
Normal flow depth in pipe =   15.80(In.)
Flow top width inside pipe =   22.77(In.)
Critical Depth =   14.03(In.)
Pipe flow velocity =      4.86(Ft/s)
Travel time through pipe =    1.56 min.
Time of concentration (TC) =     9.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.940(Ac.)
Runoff from this stream =     10.645(CFS)
Time of concentration =    9.31 min.
Rainfall intensity =     3.283(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  489.000(Ft.)
Lowest elevation =  457.000(Ft.)
Elevation difference =   32.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.32 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 179.000^.5)/(  17.877^(1/3)]=   3.32
Setting time of concentration to 5 minutes
```

```
Rainfall intensity (I) =      4.265(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.821(CFS)
Total initial stream area =        0.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      212.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  215.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.000(Ft.)
Elevation difference =    2.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.43 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 215.000^.5)/( 1.023^(1/3)]=   9.43
Rainfall intensity (I) =      3.266(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.435(CFS)
Total initial stream area =        0.180(Ac.)
End of computations, total study area =          20.940 (Ac.)
```

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
     Rational Hydrology Study   Date: 07/26/18

Plaza La Media - North
Preliminary Hydrology
Proposed Conditions
100-Year Flow Rate

 *********   Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station   10.000 to Point/Station   12.000
**** INITIAL AREA EVALUATION ****

User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance = 222.000(Ft.)
Highest elevation = 491.400(Ft.)
Lowest elevation = 489.000(Ft.)
Elevation difference =   2.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =   9.41 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*(222.000^.5)/(1.081^(1/3)]=   9.41
Rainfall intensity (I) =   3.450(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =   2.221(CFS)
Total initial stream area =   0.870(Ac.)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =     9.41 min.
Rainfall intensity =      3.450(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.276(CFS) for    0.500(Ac.)
Total runoff =      3.497(CFS)   Total area =        1.37(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.300(Ft.)
Downstream point elevation =   484.900(Ft.)
Channel length thru subarea  =    80.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.778(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.778(CFS)
Depth of flow =   0.234(Ft.), Average velocity =   0.779(Ft/s)
Channel flow top width =   21.405(Ft.)
Flow Velocity =    0.78(Ft/s)
Travel time  =    1.71 min.
Time of concentration =   11.12 min.
Critical depth =      0.104(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      3.247(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.529(CFS) for    0.220(Ac.)
Total runoff =      4.026(CFS)   Total area =        1.59(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   311.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.026(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.026(CFS)
Normal flow depth in pipe =   11.23(In.)
Flow top width inside pipe =   17.44(In.)
```

```
Critical Depth =    9.21(In.)
Pipe flow velocity =      3.47(Ft/s)
Travel time through pipe =    1.49 min.
Time of concentration (TC) =    12.61 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.590(Ac.)
Runoff from this stream =      4.026(CFS)
Time of concentration =   12.61 min.
Rainfall intensity =     3.101(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       22.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  522.000(Ft.)
Highest elevation =  491.400(Ft.)
Lowest elevation =  487.000(Ft.)
Elevation difference =    4.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    15.67 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 522.000^.5)/( 0.843^(1/3)]=  15.67
Rainfall intensity (I) =      2.856(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      5.769(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   484.300(Ft.)
Downstream point elevation =   484.000(Ft.)
Channel length thru subarea  =    62.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      5.769(CFS)
Depth of flow =   0.324(Ft.), Average velocity =   0.939(Ft/s)
```

```
Channel flow top width =   19.942(Ft.)
Flow Velocity =    0.94(Ft/s)
Travel time  =    1.10 min.
Time of concentration =   16.77 min.
Critical depth =      0.146(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.730(Ac.)
Runoff from this stream =      5.769(CFS)
Time of concentration =   16.77 min.
Rainfall intensity =     2.780(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       32.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  187.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.500(Ft.)
Elevation difference =    1.700(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 187.000^.5)/( 0.909^(1/3)]=   9.15
Rainfall intensity (I) =      3.485(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.851(CFS)
Total initial stream area =        0.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       24.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   486.500(Ft.)
Downstream point elevation =   484.100(Ft.)
Channel length thru subarea  =   367.000(Ft.)
Channel base width    =   18.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      0.851(CFS)
Depth of flow =   0.094(Ft.), Average velocity =   0.493(Ft/s)
Channel flow top width =   18.567(Ft.)
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```
Flow Velocity =    0.49(Ft/s)
Travel time  =   12.41 min.
Time of concentration =   21.56 min.
Critical depth =      0.041(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       24.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.330(Ac.)
Runoff from this stream =      0.851(CFS)
Time of concentration =   21.56 min.
Rainfall intensity =     2.494(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        5.769     16.77            2.780
2        0.851     21.56            2.494
Qmax(1) =
        1.000 *    1.000 *     5.769) +
        1.000 *    0.778 *     0.851) + =       6.431
Qmax(2) =
        0.897 *    1.000 *     5.769) +
        1.000 *    1.000 *     0.851) + =       6.027

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.769       0.851
Maximum flow rates at confluence using above data:
        6.431        6.027
Area of streams before confluence:
        2.730        0.330
Results of confluence:
Total flow rate =      6.431(CFS)
Time of concentration =    16.773 min.
Effective stream area after confluence =      3.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       24.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.77 min.
Rainfall intensity =      2.780(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.884(CFS) for    0.430(Ac.)
```

```
Total runoff =      7.316(CFS)   Total area =        3.49(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   480.100(Ft.)
Downstream point/station elevation =   479.600(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.316(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.316(CFS)
Normal flow depth in pipe =   15.40(In.)
Flow top width inside pipe =   18.57(In.)
Critical Depth =   12.03(In.)
Pipe flow velocity =      3.87(Ft/s)
Travel time through pipe =    0.80 min.
Time of concentration (TC) =    17.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       24.000 to Point/Station       16.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.490(Ac.)
Runoff from this stream =      7.316(CFS)
Time of concentration =   17.57 min.
Rainfall intensity =     2.727(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.026     12.61            3.101
2        7.316     17.57            2.727
Qmax(1) =
        1.000 *    1.000 *     4.026) +
        1.000 *    0.718 *     7.316) + =       9.277
Qmax(2) =
        0.880 *    1.000 *     4.026) +
        1.000 *    1.000 *     7.316) + =      10.857

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.026       7.316
Maximum flow rates at confluence using above data:
        9.277       10.857
Area of streams before confluence:
```

```
        1.590        3.490


Results of confluence:
Total flow rate =     10.857(CFS)
Time of concentration =    17.570 min.
Effective stream area after confluence  =      5.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.600(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   161.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.857(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.857(CFS)
Normal flow depth in pipe =   17.18(In.)
Flow top width inside pipe =   21.65(In.)
Critical Depth =   14.18(In.)
Pipe flow velocity =      4.51(Ft/s)
Travel time through pipe =    0.59 min.
Time of concentration (TC) =    18.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.16 min.
Rainfall intensity =      2.690(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.393(CFS) for    0.700(Ac.)
Total runoff =     12.250(CFS)   Total area =        5.78(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       38.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.500(Ft.)
Pipe length  =   190.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.250(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.250(CFS)
Normal flow depth in pipe =   18.94(In.)
Flow top width inside pipe =   19.58(In.)
Critical Depth =   15.09(In.)
```

```
Pipe flow velocity =      4.61(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =    18.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       38.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Time of concentration =    18.85 min.
Rainfall intensity =      2.648(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.509(CFS) for    0.260(Ac.)
Total runoff =     12.759(CFS)   Total area =        6.04(Ac.)


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Process from Point/Station       38.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.500(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   154.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.759(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.759(CFS)
Normal flow depth in pipe =   19.45(In.)
Flow top width inside pipe =   18.81(In.)
Critical Depth =   15.41(In.)
Pipe flow velocity =      4.68(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =    19.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.040(Ac.)
Runoff from this stream =     12.759(CFS)
Time of concentration =   19.40 min.
Rainfall intensity =     2.615(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       52.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  455.000(Ft.)
```

```
Highest elevation =  488.400(Ft.)
Lowest elevation =  485.500(Ft.)
Elevation difference =    2.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    16.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 455.000^.5)/( 0.637^(1/3)]=  16.06
Rainfall intensity (I) =      2.828(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      5.693(CFS)
Total initial stream area =        2.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       54.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   483.800(Ft.)
Downstream point elevation =   483.000(Ft.)
Channel length thru subarea  =   164.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      6.185(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      6.185(CFS)
Depth of flow =   0.316(Ft.), Average velocity =   0.933(Ft/s)
Channel flow top width =   21.899(Ft.)
Flow Velocity =    0.93(Ft/s)
Travel time  =    2.93 min.
Time of concentration =   18.99 min.
Critical depth =      0.143(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.639(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.918(CFS) for    0.470(Ac.)
Total runoff =      6.611(CFS)   Total area =        3.19(Ac.)


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Process from Point/Station       54.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.000(Ft.)
Downstream point/station elevation =   478.000(Ft.)
Pipe length  =   207.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.611(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.611(CFS)
Normal flow depth in pipe =   13.43(In.)
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Flow top width inside pipe =   15.67(In.)
Critical Depth =   11.94(In.)
Pipe flow velocity =      4.68(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =    19.73 min.


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Process from Point/Station       54.000 to Point/Station       42.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.190(Ac.)
Runoff from this stream =      6.611(CFS)
Time of concentration =   19.73 min.
Rainfall intensity =     2.596(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       12.759     19.40            2.615
2        6.611     19.73            2.596
Qmax(1) =
        1.000 *    1.000 *    12.759) +
        1.000 *    0.983 *     6.611) + =      19.260
Qmax(2) =
        0.993 *    1.000 *    12.759) +
        1.000 *    1.000 *     6.611) + =      19.277

Total of 2 streams to confluence:
Flow rates before confluence point:
      12.759       6.611
Maximum flow rates at confluence using above data:
       19.260       19.277
Area of streams before confluence:
        6.040        3.190
Results of confluence:
Total flow rate =     19.277(CFS)
Time of concentration =    19.729 min.
Effective stream area after confluence =      9.230(Ac.)


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Process from Point/Station       42.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.277(CFS)
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Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    19.277(CFS)
Normal flow depth in pipe =   21.19(In.)
Flow top width inside pipe =   27.33(In.)
Critical Depth =   17.88(In.)
Pipe flow velocity =      5.20(Ft/s)
Travel time through pipe =    1.04 min.
Time of concentration (TC) =    20.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.230(Ac.)
Runoff from this stream =     19.277(CFS)
Time of concentration =   20.77 min.
Rainfall intensity =     2.537(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       70.000 to Point/Station       72.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  264.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  490.700(Ft.)
Elevation difference =    2.300(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    11.02 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 264.000^.5)/( 0.871^(1/3)]=  11.02
Rainfall intensity (I) =      3.257(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.133(CFS)
Total initial stream area =        1.300(Ac.)


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Process from Point/Station       72.000 to Point/Station       74.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   488.300(Ft.)
Downstream point elevation =   487.300(Ft.)
Channel length thru subarea  =   180.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
```

```
Estimated mean flow rate at midpoint of channel =      3.748(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.748(CFS)
Depth of flow =   0.226(Ft.), Average velocity =   0.802(Ft/s)
Channel flow top width =   21.355(Ft.)
Flow Velocity =    0.80(Ft/s)
Travel time  =    3.74 min.
Time of concentration =   14.76 min.
Critical depth =      0.103(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.923(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      1.103(CFS) for    0.510(Ac.)
Total runoff =      4.236(CFS)   Total area =        1.81(Ac.)


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Process from Point/Station       74.000 to Point/Station       76.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =   483.300(Ft.)
Downstream point/station elevation =   482.400(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.236(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.236(CFS)
Normal flow depth in pipe =   11.39(In.)
Flow top width inside pipe =   12.82(In.)
Critical Depth =   10.00(In.)
Pipe flow velocity =      4.24(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    15.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       77.000 to Point/Station       76.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    15.47 min.
Rainfall intensity =      2.871(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.106(CFS) for    0.050(Ac.)
Total runoff =      4.343(CFS)   Total area =        1.86(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       76.000 to Point/Station       78.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
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```
Upstream point/station elevation =   482.400(Ft.)
Downstream point/station elevation =   481.300(Ft.)
Pipe length  =   241.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.343(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.343(CFS)
Normal flow depth in pipe =   12.23(In.)
Flow top width inside pipe =   11.63(In.)
Critical Depth =   10.14(In.)
Pipe flow velocity =      4.05(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    16.46 min.


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Process from Point/Station       79.000 to Point/Station       78.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    16.46 min.
Rainfall intensity =      2.801(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.062(CFS) for    0.030(Ac.)
Total runoff =      4.405(CFS)   Total area =        1.89(Ac.)


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Process from Point/Station       78.000 to Point/Station       80.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   481.300(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.405(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.405(CFS)
Normal flow depth in pipe =   11.41(In.)
Flow top width inside pipe =   12.80(In.)
Critical Depth =   10.21(In.)
Pipe flow velocity =      4.39(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    17.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.890(Ac.)
Runoff from this stream =      4.405(CFS)
Time of concentration =   17.16 min.
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Rainfall intensity =     2.754(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       82.000 to Point/Station       84.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  814.000(Ft.)
Highest elevation =  493.000(Ft.)
Lowest elevation =  487.800(Ft.)
Elevation difference =    5.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    21.47 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 814.000^.5)/( 0.639^(1/3)]=  21.47
Rainfall intensity (I) =      2.499(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      5.048(CFS)
Total initial stream area =        2.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       84.000 to Point/Station       86.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   485.500(Ft.)
Downstream point elevation =   484.500(Ft.)
Channel length thru subarea  =   216.000(Ft.)
Channel base width    =   20.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      5.511(CFS)
Manning's 'N'    = 0.050
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      5.511(CFS)
Depth of flow =   0.300(Ft.), Average velocity =   0.879(Ft/s)
Channel flow top width =   21.801(Ft.)
Flow Velocity =    0.88(Ft/s)
Travel time  =    4.10 min.
Time of concentration =   25.56 min.
Critical depth =      0.133(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.294(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.849(CFS) for    0.500(Ac.)
Total runoff =      5.897(CFS)   Total area =        3.23(Ac.)


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Process from Point/Station       86.000 to Point/Station       80.000
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   480.500(Ft.)
Downstream point/station elevation =   480.300(Ft.)
Pipe length  =    32.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.897(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.897(CFS)
Normal flow depth in pipe =   11.20(In.)
Flow top width inside pipe =   17.45(In.)
Critical Depth =   11.25(In.)
Pipe flow velocity =      5.10(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    25.67 min.


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Process from Point/Station       86.000 to Point/Station       80.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.230(Ac.)
Runoff from this stream =      5.897(CFS)
Time of concentration =   25.67 min.
Rainfall intensity =     2.289(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.405     17.16            2.754
2        5.897     25.67            2.289
Qmax(1) =
        1.000 *    1.000 *     4.405) +
        1.000 *    0.669 *     5.897) + =       8.347
Qmax(2) =
        0.831 *    1.000 *     4.405) +
        1.000 *    1.000 *     5.897) + =       9.558

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.405       5.897
Maximum flow rates at confluence using above data:
        8.347        9.558
Area of streams before confluence:
        1.890        3.230
Results of confluence:
Total flow rate =      9.558(CFS)
Time of concentration =    25.668 min.
Effective stream area after confluence =      5.120(Ac.)
```

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Process from Point/Station       80.000 to Point/Station       88.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   480.300(Ft.)
Downstream point/station elevation =   478.300(Ft.)
Pipe length  =   398.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.558(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.558(CFS)
Normal flow depth in pipe =   14.88(In.)
Flow top width inside pipe =   19.08(In.)
Critical Depth =   13.80(In.)
Pipe flow velocity =      5.24(Ft/s)
Travel time through pipe =    1.27 min.
Time of concentration (TC) =    26.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       89.000 to Point/Station       88.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Time of concentration =    26.93 min.
Rainfall intensity =      2.231(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.050(CFS) for    0.030(Ac.)
Total runoff =      9.607(CFS)   Total area =        5.15(Ac.)


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Process from Point/Station       88.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.300(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =   264.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.607(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.607(CFS)
Normal flow depth in pipe =   15.07(In.)
Flow top width inside pipe =   18.91(In.)
Critical Depth =   13.83(In.)
Pipe flow velocity =      5.20(Ft/s)
Travel time through pipe =    0.85 min.
Time of concentration (TC) =    27.78 min.


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Process from Point/Station       88.000 to Point/Station       60.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.150(Ac.)
Runoff from this stream =      9.607(CFS)
Time of concentration =   27.78 min.
Rainfall intensity =     2.194(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       90.000 to Point/Station       92.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  389.000(Ft.)
Highest elevation =  488.500(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    3.900(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    12.77 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 389.000^.5)/( 1.003^(1/3)]=  12.77
Rainfall intensity (I) =      3.087(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      3.358(CFS)
Total initial stream area =        1.470(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       92.000 to Point/Station       94.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   482.700(Ft.)
Downstream point elevation =   482.000(Ft.)
Channel length thru subarea  =   133.000(Ft.)
Channel base width    =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =      3.632(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.632(CFS)
Depth of flow =   0.131(Ft.), Average velocity =   0.689(Ft/s)
Channel flow top width =   40.783(Ft.)
Flow Velocity =    0.69(Ft/s)
Travel time  =    3.22 min.
Time of concentration =   15.99 min.
Critical depth =      0.063(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.740 given for subarea
Rainfall intensity =      2.833(In/Hr) for a   100.0 year storm
```

```
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.740
Subarea runoff =      0.503(CFS) for    0.240(Ac.)
Total runoff =      3.861(CFS)   Total area =        1.71(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       94.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   477.000(Ft.)
Pipe length  =    88.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.861(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.861(CFS)
Normal flow depth in pipe =    8.03(In.)
Flow top width inside pipe =   14.96(In.)
Critical Depth =    9.53(In.)
Pipe flow velocity =      5.77(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    16.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       94.000 to Point/Station       66.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.710(Ac.)
Runoff from this stream =      3.861(CFS)
Time of concentration =   16.24 min.
Rainfall intensity =     2.816(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       19.277     20.77            2.537
2        9.607     27.78            2.194
3        3.861     16.24            2.816
Qmax(1) =
        1.000 *    1.000 *    19.277) +
        1.000 *    0.748 *     9.607) +
        0.901 *    1.000 *     3.861) + =      29.939
Qmax(2) =
        0.865 *    1.000 *    19.277) +
        1.000 *    1.000 *     9.607) +
        0.779 *    1.000 *     3.861) + =      29.283
Qmax(3) =
        1.000 *    0.782 *    19.277) +
```

```
        1.000 *    0.585 *     9.607) +
        1.000 *    1.000 *     3.861) + =      24.553

Total of 3 main streams to confluence:
Flow rates before confluence point:
      19.277       9.607       3.861
Maximum flow rates at confluence using above data:
       29.939       29.283       24.553
Area of streams before confluence:
        9.230        5.150        1.710


Results of confluence:
Total flow rate =     29.939(CFS)
Time of concentration =    20.770 min.
Effective stream area after confluence  =     16.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       96.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   477.000(Ft.)
Downstream point/station elevation =   476.680(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.939(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    29.939(CFS)
Normal flow depth in pipe =   28.22(In.)
Flow top width inside pipe =   23.23(In.)
Critical Depth =   21.84(In.)
Pipe flow velocity =      5.53(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =    21.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     16.090(Ac.)
Runoff from this stream =     29.939(CFS)
Time of concentration =   21.09 min.
Rainfall intensity =     2.519(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       98.000 to Point/Station       96.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
```

```
Initial subarea flow distance  =  539.000(Ft.)
Highest elevation =  489.300(Ft.)
Lowest elevation =  482.700(Ft.)
Elevation difference =    6.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    14.06 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 539.000^.5)/( 1.224^(1/3)]=  14.06
Rainfall intensity (I) =      2.978(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      2.049(CFS)
Total initial stream area =        0.930(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       98.000 to Point/Station       96.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      2.049(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     2.978(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       29.939     21.09            2.519
2        2.049     14.06            2.978
Qmax(1) =
        1.000 *    1.000 *    29.939) +
        0.846 *    1.000 *     2.049) + =      31.672
Qmax(2) =
        1.000 *    0.667 *    29.939) +
        1.000 *    1.000 *     2.049) + =      22.009

Total of 2 streams to confluence:
Flow rates before confluence point:
      29.939       2.049
Maximum flow rates at confluence using above data:
       31.672       22.009
Area of streams before confluence:
       16.090        0.930
Results of confluence:
Total flow rate =     31.672(CFS)
Time of concentration =    21.092 min.
Effective stream area after confluence =     17.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      100.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  191.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.19 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 191.000^.5)/( 1.309^(1/3)]=   8.19
Rainfall intensity (I) =      3.629(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.806(CFS)
Total initial stream area =        0.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  147.000(Ft.)
Highest elevation =  486.000(Ft.)
Lowest elevation =  483.500(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.58 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 147.000^.5)/( 1.701^(1/3)]=   6.58
Rainfall intensity (I) =      3.937(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.699(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      122.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Initial subarea flow distance  =  229.000(Ft.)
Highest elevation =  487.100(Ft.)
Lowest elevation =  484.600(Ft.)
Elevation difference =    2.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.97 min.
```

```
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9500)*( 229.000^.5)/(   1.092^(1/3)]=   3.97
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.950
Subarea runoff =      2.669(CFS)
Total initial stream area =        0.640(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   481.000(Ft.)
Downstream point/station elevation =   479.800(Ft.)
Pipe length  =   254.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.669(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.669(CFS)
Normal flow depth in pipe =    8.38(In.)
Flow top width inside pipe =   14.90(In.)
Critical Depth =    7.86(In.)
Pipe flow velocity =      3.78(Ft/s)
Travel time through pipe =    1.12 min.
Time of concentration (TC) =     6.12 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      126.000 to Point/Station      124.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
Time of concentration =     6.12 min.
Rainfall intensity =      4.049(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.654(CFS) for    0.690(Ac.)
Total runoff =      5.323(CFS)   Total area =        1.33(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.800(Ft.)
Downstream point/station elevation =   479.100(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.323(CFS)
Nearest computed pipe diameter  =     18.00(In.)
```

```
Calculated individual pipe flow  =     5.323(CFS)
Normal flow depth in pipe =   13.03(In.)
Flow top width inside pipe =   16.09(In.)
Critical Depth =   10.67(In.)
Pipe flow velocity =      3.89(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =     7.01 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      128.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
Time of concentration =     7.01 min.
Rainfall intensity =      3.844(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      2.191(CFS) for    0.600(Ac.)
Total runoff =      7.514(CFS)   Total area =        1.93(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      132.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   479.100(Ft.)
Downstream point/station elevation =   478.400(Ft.)
Pipe length  =   191.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.514(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     7.514(CFS)
Normal flow depth in pipe =   13.99(In.)
Flow top width inside pipe =   19.80(In.)
Critical Depth =   12.19(In.)
Pipe flow velocity =      4.41(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =     7.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      132.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
```

```
Time of concentration =     7.73 min.
Rainfall intensity =      3.706(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      3.556(CFS) for    1.010(Ac.)
Total runoff =     11.070(CFS)   Total area =        2.94(Ac.)

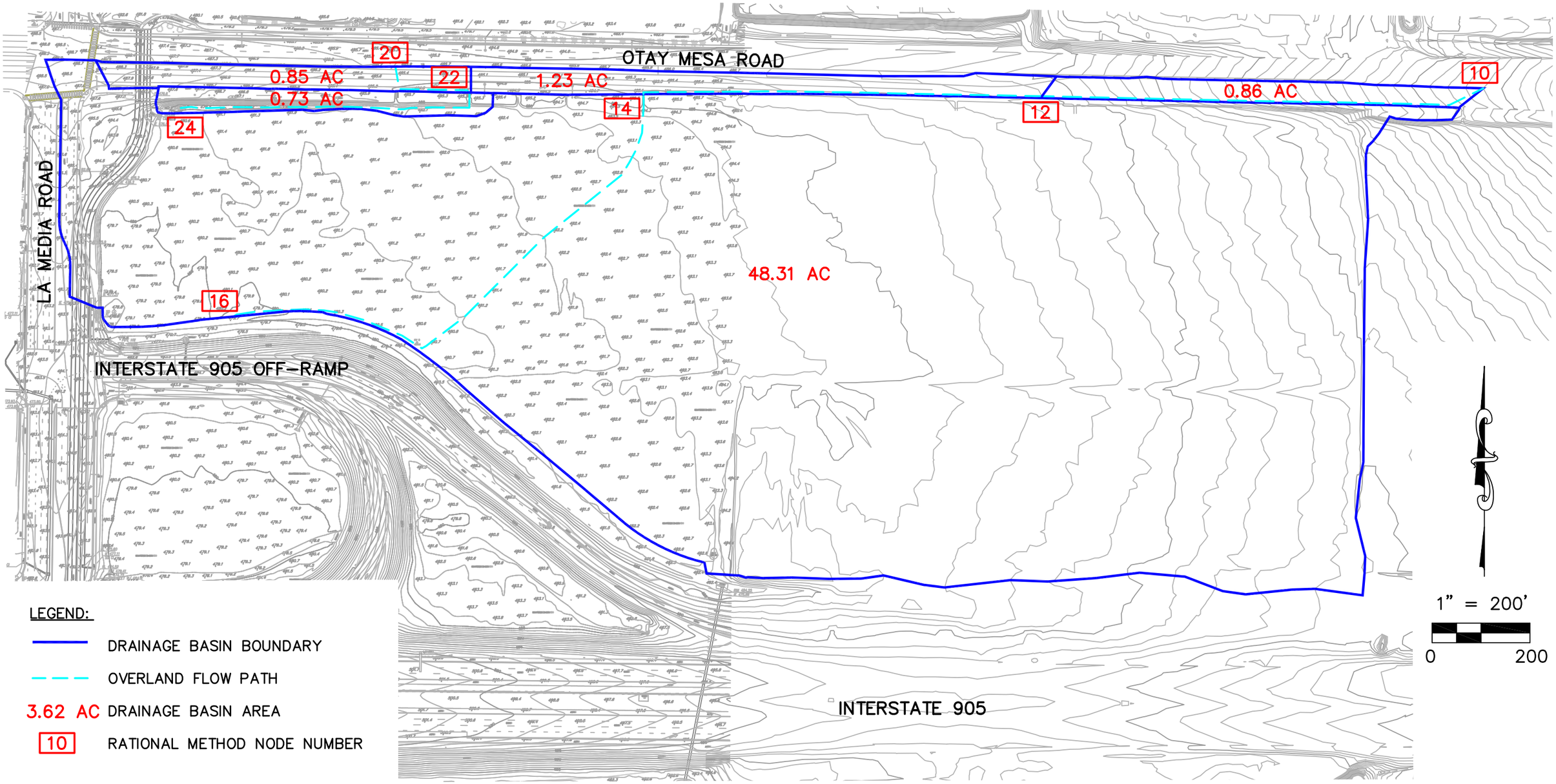

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   478.400(Ft.)
Downstream point/station elevation =   476.700(Ft.)
Pipe length  =   455.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.070(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    11.070(CFS)
Normal flow depth in pipe =   16.24(In.)
Flow top width inside pipe =   22.45(In.)
Critical Depth =   14.31(In.)
Pipe flow velocity =      4.89(Ft/s)
Travel time through pipe =    1.55 min.
Time of concentration (TC) =     9.28 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      136.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.940(Ac.)
Runoff from this stream =     11.070(CFS)
Time of concentration =    9.28 min.
Rainfall intensity =     3.466(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  179.000(Ft.)
Highest elevation =  489.000(Ft.)
Lowest elevation =  457.000(Ft.)
Elevation difference =   32.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.32 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 179.000^.5)/(  17.877^(1/3)]=   3.32
Setting time of concentration to 5 minutes
```

```
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.844(CFS)
Total initial stream area =        0.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      212.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.740 given for subarea
Initial subarea flow distance  =  215.000(Ft.)
Highest elevation =  488.200(Ft.)
Lowest elevation =  486.000(Ft.)
Elevation difference =    2.200(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.43 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7400)*( 215.000^.5)/( 1.023^(1/3)]=   9.43
Rainfall intensity (I) =      3.447(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff =      0.459(CFS)
Total initial stream area =        0.180(Ac.)
End of computations, total study area =          20.940 (Ac.)
```



EXISTING CONDITION
RATIONAL METHOD WORK MAP

OTAY MESA ROAD

LA MEDIA ROAD

INTERSTATE 905 OFF-RAMP

SEE DETAIL BELOW LEFT FOR OFF-SITE CONTINUATION

MATCHLINE SEE ABOVE RIGHT

OTAY MESA ROAD

31.05 AC

OFF-SITE CONTINUATION TO EAST (1=200')

G PHARMACY 13,500 SF F.F.E. 486.5

H DRIVE-THRU REST. 2,500 SF F.F.E. 488.0

J DRIVE-THRU REST. 3,500 SF F.F.E. 488.5

K GAS / C-STORE 3,500 SF F.F.E. 489.5

E SHOPS (RETAIL) 9,600 SF F.F.E. 488.0

F MAJOR (RETAIL) 12,800 SF F.F.E. 488.0

D SHOPS (RETAIL) 6,300 SF F.F.E. 488.0

C MAJOR (RETAIL) 10,000 SF F.F.E. 489.0

B MAJOR (RETAIL) 20,000 SF F.F.E. 490.5

A GROCERY 45,000 SF F.F.E. 491.5

PLAZA T.B.D.

PLAZA T.B.D.

1.01 AC
0.60 AC
0.69 AC
0.64 AC
0.30 AC
0.47 AC
0.43 AC
2.72 AC
0.27 AC
0.93 AC
0.24 AC
2.73 AC
0.26 AC
0.70 AC
0.33 AC
0.18 AC
0.22 AC
1.47 AC
0.24 AC
0.03 AC
0.50 AC
0.87 AC
0.26 AC
2.73 AC
0.03 AC
0.50 AC
1.30 AC
0.05 AC
0.51 AC

98 136 132 128 124 134 130 126 122 54 52 24 22 212 102 100 120 32 40 38 36 34 16 120 42 50 90 30 210 94 14 60 12 89 88 64 92 96 80 20 10 86 82 79 70 78 200 76 72 74

GRAPHIC SCALE
50 0 25 50 100
1 INCH = 50 FEET

LEGEND:
- DRAINAGE BASIN BOUNDARY
- OVERLAND FLOW PATH
- PROPOSED DRAINAGE FACILITY
- 3.62 AC DRAINAGE BASIN AREA
- 10 RATIONAL METHOD NODE NUMBER

PROPOSED CONDITION
RATIONAL METHOD WORK MAP

PLAZA LA MEDIA NORTH - INDUSTRIAL ALTERNATIVE

PTS 334235

Drainage Addendum for Preliminary Drainage Report for Plaza La Media North by Chang Consultants dated 2/28/2019

OTAY MESA ROAD AT LA MEDIA ROAD
SAN DIEGO, CA 92154
APN: 646-121-34-00

MARCH 20, 2020

Applicant:

LAS VEGAS SUNSET PROPERTIES
2700 W. SAHARA AVE
LAS VEGAS NV 89102

Prepared By:

KIMLEY-HORN AND ASSOCIATES, INC.
401 B STREET, SUITE 600
SAN DIEGO, CA 92101
(619)234-9411

This Drainage Addendum has been prepared by Kimley-Horn and Associates, Inc. under the direct supervision of the following Registered Civil engineer. The undersigned attests to the technical data contained in this study, and to the qualifications of technical specialists providing engineering computations upon which the recommendations and conclusions are based.

Registered Civil Engineer

Date

Contents

1 INTRODUCTION

1.1 SUMMARY

This addendum is prepared to study the Industrial land use alternative for the La Media North project, in conjunction with that study prepared by Chang Consultants, dated 2/28/2019 for the Retail land use of the project. The Industrial Alternative is a proposed 2-building development for industrial distribution centers along with parking areas, loading docks, driveways, and other supporting infrastructure. The substantial difference between the Industrial and Retail land uses is in the amount of impervious area for infiltration. Through the use of biofiltration areas and detention basins, the resulting flow from the Industrial alternative is compliant with the Otay Mesa drainage directive which is that the post-developed flow not exceed the pre-developed flow in the 5, 10, 25 and 50-year storm event. The 100-year storm event will pass the emergency spillway of the detention basins, however the peak 100-year flow rate will be less than the existing condition so as not to increase runoff to the Caltrans culvert system.

The methodology used for hydrology peak flow rates is the Modified Rational Method (MRM), utilizing the AES Software package pre-loaded with County of San Diego time of concertation parameters. Hydrographs of the proposed storm events are then derived using the RickRat Hydro program adopted by the County of San Diego which the inputs are taken from the MRM time of concentration, 6-hour runoff rates per the County Hydrology Isopluvial Maps, and MRM peak flow rates. These hydrographs were then routed through the basin geometry using the Hydraflow Hydrographs analysis package with outlet works sized and located to attenuate storm peaks to the City criteria for Otay Mesa.

Proposed Discharge Summary

Storm Event	Existing Runoff[1]	Site Existing Runoff[2]	Un-detained Runoff	Mitigated Runoff	Watershed Area
(yr)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Acres
5	39.0	15.6	39.0	13.2	20.8
10	47.0	18.8	45.5	15.1	20.8
25	52.0	20.8	52.1	16.9	20.8
50	61.0	24.4	62.0	19.6	20.8
100	66.0	26.4	67.8	21.3	20.8

1 - From Plaza La Media North Commercial Report
2 - Existing Runoff from note 1 factored as a portion of the existing tributary area (20.80 / 51.98 = 40%)

2 PROPOSED RATIONAL METHOD CALCULATIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* PLAZA LA MEDIA NORTH                                                    *
* PROPOSED 5YR RATIONAL METHOD                                            *
* MARCH 2020 - MJS                                                        *
 **************************************************************************

  FILE NAME: PR5LMR.DAT
  TIME/DATE OF STUDY: 14:20 03/26/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    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 = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.62
  DOWNSTREAM ELEVATION(FEET) =    490.10
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    490.10  DOWNSTREAM(FEET) =    488.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   431.00   CHANNEL SLOPE =  0.0035
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.321
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.96
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   7.51
  Tc(MIN.) =   10.25
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    2.63
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       2.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     506.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.10  DOWNSTREAM(FEET) =   484.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.242
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       3.51
  TC(MIN.) =   10.82

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.40  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.45
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.51
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     719.00 FEET.

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

```
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.206
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.19
 TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       3.65
 TC(MIN.) =   11.10

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.30
 FLOW LENGTH(FEET) =   149.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.21
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.65
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   11.69
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =     868.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.133
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.56
 TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       4.08
 TC(MIN.) =   11.69

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.30  DOWNSTREAM(FEET) =   482.10
 FLOW LENGTH(FEET) =   229.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.08
 PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   12.54
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    1097.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.039
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.48
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       6.39
 TC(MIN.) =   12.54
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.10  DOWNSTREAM(FEET) =   481.70
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.39
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   12.83
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    1182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.009
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.45
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =       8.74
  TC(MIN.) =   12.83

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.83
  RAINFALL INTENSITY(INCH/HR) =   2.01
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.74

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   989.00   CHANNEL SLOPE =  0.0058
```

```
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.955
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.55
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =  10.64
  Tc(MIN.) =   13.38
  SUBAREA AREA(ACRES) =     5.90       SUBAREA RUNOFF(CFS) =   10.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.0         PEAK FLOW RATE(CFS) =      10.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.955
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      10.88
  TC(MIN.) =   13.38

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    307.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.90  DOWNSTREAM(FEET) =    481.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0093
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.892
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.66
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =   14.08
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.16
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      10.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   5.62
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =   14.08
  RAINFALL INTENSITY(INCH/HR) =   1.89
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.88
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.74    12.83        2.009          5.00
      2       10.88    14.08        1.892          6.50

  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       18.66    12.83       2.009
      2       19.11    14.08       1.892

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.11   Tc(MIN.) =   14.08
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   751.00   CHANNEL SLOPE =  0.0077
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.068
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.31
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   9.52
  Tc(MIN.) =   12.27
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    2.88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       3.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.068
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    4.32
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =       7.38
  TC(MIN.) =   12.27

****************************************************************************
  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) =    483.80  DOWNSTREAM(FEET) =    477.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    32.00   CHANNEL SLOPE =  0.1969
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.052
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   12.41
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =       7.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   3.75
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.052
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    1.61
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =       9.11
  TC(MIN.) =   12.41

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    485.70
  DOWNSTREAM ELEVATION(FEET) =    485.40
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.89
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.21
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.40  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.21
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =    4.77
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    3.85
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.06
  TC(MIN.) =    4.77

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.06
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    6.31
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.175
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.93
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =       8.01
  TC(MIN.) =    6.31

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   476.70
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.01
  PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.90
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.468
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    603.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  486.60  DOWNSTREAM ELEVATION(FEET) =  482.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   4.65   Tc(MIN.) =    7.11
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.938
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.30
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.84
  FLOW VELOCITY(FEET/SEC.) =  1.72   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.11
  RAINFALL INTENSITY(INCH/HR) =   2.94
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.30

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.30
  DOWNSTREAM ELEVATION(FEET) =    486.10
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.505
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    483.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0084
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.106
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.59
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   9.42
  Tc(MIN.) =   11.92
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   0.62
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     409.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.53
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   12.07
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =     466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 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.) =   12.07
  RAINFALL INTENSITY(INCH/HR) =   2.09
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.73

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.30     7.11        2.938          0.90
      2        0.73    12.07        2.090          0.40

  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        2.73     7.11       2.938
      2        2.37    12.07       2.090

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.73   Tc(MIN.) =    7.11
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      7.11
  PEAK FLOW RATE(CFS)   =       2.73
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PLAZA LA MEDIA NORTH                                                    *
* PROPOSED 10YR RATIONAL METHOD                                           *
* MARCH 2020 - MJS                                                        *
 ************************************************************************

  FILE NAME: PR10LMR.DAT
  TIME/DATE OF STUDY: 14:18 03/26/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    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 = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.62
  DOWNSTREAM ELEVATION(FEET) =    490.10
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    490.10  DOWNSTREAM(FEET) =    488.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   431.00   CHANNEL SLOPE =  0.0035
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.698
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.99
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   7.25
  Tc(MIN.) =    9.99
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    3.05
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     506.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.10  DOWNSTREAM(FEET) =   484.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.23
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.54
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.606
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.08
  TC(MIN.) =   10.54

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.40  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.08
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     719.00 FEET.

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

```
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.565
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.22
 TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       4.24
 TC(MIN.) =   10.80

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.30
 FLOW LENGTH(FEET) =   149.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.31
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.24
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   11.38
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =     868.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.480
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.65
 TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       4.75
 TC(MIN.) =   11.38

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.30  DOWNSTREAM(FEET) =   482.10
 FLOW LENGTH(FEET) =   229.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.75
 PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   12.21
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    1097.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.370
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.89
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       7.42
 TC(MIN.) =   12.21
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.10  DOWNSTREAM(FEET) =   481.70
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   12.50
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    1182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.334
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.84
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =      10.15
  TC(MIN.) =   12.50

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.50
  RAINFALL INTENSITY(INCH/HR) =   2.33
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.15

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   989.00   CHANNEL SLOPE =  0.0058
```

```
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.289
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =  10.14
  Tc(MIN.) =   12.88
  SUBAREA AREA(ACRES) =     5.90       SUBAREA RUNOFF(CFS) =   11.75
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.0         PEAK FLOW RATE(CFS) =      11.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.289
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      12.75
  TC(MIN.) =   12.88

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    307.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.90  DOWNSTREAM(FEET) =    481.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0093
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.216
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.93
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   0.66
  Tc(MIN.) =   13.55
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      12.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   5.90
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =   13.55
  RAINFALL INTENSITY(INCH/HR) =   2.22
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.75
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.15    12.50        2.334          5.00
      2       12.75    13.55        2.216          6.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.92    12.50       2.334
      2       22.39    13.55       2.216

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.39   Tc(MIN.) =   13.55
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   751.00   CHANNEL SLOPE =  0.0077
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.424
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.38
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   9.05
  Tc(MIN.) =   11.79
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    3.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       3.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   1.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.424
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    5.06
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =       8.65
  TC(MIN.) =   11.79

****************************************************************************
  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) =    483.80  DOWNSTREAM(FEET) =    477.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    32.00   CHANNEL SLOPE =  0.1969
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.406
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.94
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.14
  Tc(MIN.) =   11.93
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =       8.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   3.96
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.406
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    1.88
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      10.68
  TC(MIN.) =   11.93

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    485.70
  DOWNSTREAM ELEVATION(FEET) =    485.40
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    3.30
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.67
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.40  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.68
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.67
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    4.75
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    4.40
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       8.07
  TC(MIN.) =    4.75

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.55
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.07
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.652
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.22
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =       9.21
  TC(MIN.) =    6.25

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   476.70
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.21
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =    7.93
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.90
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.468
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    603.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  486.60  DOWNSTREAM ELEVATION(FEET) =  482.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
  STREET FLOW TRAVEL TIME(MIN.) =   4.58   Tc(MIN.) =    7.04
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.380
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.35
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.65
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.37
  FLOW VELOCITY(FEET/SEC.) =  1.77   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.04
  RAINFALL INTENSITY(INCH/HR) =   3.38
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.65

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.30
  DOWNSTREAM ELEVATION(FEET) =    486.10
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.505
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    483.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0084
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.537
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.66
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   8.48
  Tc(MIN.) =   10.99
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.66
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   0.65
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     409.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.91
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.88
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   11.12
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =     466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 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.) =   11.12
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.88

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.65     7.04        3.380          0.90
      2        0.88    11.12        2.517          0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.21     7.04       3.380
      2        2.85    11.12       2.517

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.21   Tc(MIN.) =    7.04
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      7.04
  PEAK FLOW RATE(CFS)   =       3.21
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PLAZA LA MEDIA NORTH                                                    *
* PROPOSED 25YR RATIONAL METHOD                                           *
* MARCH 2020 - MJS                                                        *
 ************************************************************************

  FILE NAME: PR25LMR.DAT
  TIME/DATE OF STUDY: 14:17 03/26/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    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 = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.62
  DOWNSTREAM ELEVATION(FEET) =    490.10
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    490.10  DOWNSTREAM(FEET) =    488.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   431.00   CHANNEL SLOPE =  0.0035
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.103
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.04
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   6.91
  Tc(MIN.) =    9.65
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    3.51
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     506.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.10  DOWNSTREAM(FEET) =   484.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.69
  TC(MIN.) =   10.19

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.40  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.69
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     719.00 FEET.

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

```
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.948
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.26
 TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       4.87
 TC(MIN.) =   10.45

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.30
 FLOW LENGTH(FEET) =   149.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.87
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   10.99
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =     868.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.853
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.74
 TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       5.46
 TC(MIN.) =   10.99

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.30  DOWNSTREAM(FEET) =   482.10
 FLOW LENGTH(FEET) =   229.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.46
 PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   11.78
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    1097.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.729
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    3.32
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       8.55
 TC(MIN.) =   11.78
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.10  DOWNSTREAM(FEET) =   481.70
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.55
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   12.05
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    1182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.690
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    3.28
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =      11.70
  TC(MIN.) =   12.05

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.05
  RAINFALL INTENSITY(INCH/HR) =   2.69
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.70

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   989.00   CHANNEL SLOPE =  0.0058
```

```
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.659
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.73
  AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   9.52
  Tc(MIN.) =   12.26
  SUBAREA AREA(ACRES) =     5.90       SUBAREA RUNOFF(CFS) =   13.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.0         PEAK FLOW RATE(CFS) =      13.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.659
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.93
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      14.81
  TC(MIN.) =   12.26

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    307.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.90  DOWNSTREAM(FEET) =    481.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0093
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.574
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   0.64
  Tc(MIN.) =   12.90
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.22
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      14.81

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   6.18
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =   12.90
  RAINFALL INTENSITY(INCH/HR) =   2.57
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.81
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.70    12.05        2.690          5.00
      2       14.81    12.90        2.574          6.50

  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       25.53    12.05       2.690
      2       26.00    12.90       2.574

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.00   Tc(MIN.) =   12.90
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   751.00   CHANNEL SLOPE =  0.0077
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.735
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.39
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   9.00
  Tc(MIN.) =   11.74
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    3.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       4.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.65
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.735
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    5.71
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =       9.76
  TC(MIN.) =   11.74

****************************************************************************
  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) =    483.80  DOWNSTREAM(FEET) =    477.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    32.00   CHANNEL SLOPE =  0.1969
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.715
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.03
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   0.13
  Tc(MIN.) =   11.87
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.24
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =       9.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   4.05
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.715
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.13
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      12.05
  TC(MIN.) =   11.87

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    485.70
  DOWNSTREAM ELEVATION(FEET) =    485.40
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
```

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

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    3.71
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       4.13
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.40  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.13
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    4.70
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    4.95
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       9.08
  TC(MIN.) =    4.70

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.08
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    6.17
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.142
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.52
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      10.45
  TC(MIN.) =    6.17

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   476.70
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.80
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.45
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =    7.76
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.90
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.468
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    603.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  486.60  DOWNSTREAM ELEVATION(FEET) =  482.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
  STREET FLOW TRAVEL TIME(MIN.) =   4.44   Tc(MIN.) =    6.90
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.851
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.68
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.02
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.90
  FLOW VELOCITY(FEET/SEC.) =  1.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.52
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.90
  RAINFALL INTENSITY(INCH/HR) =   3.85
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.02

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.30
  DOWNSTREAM ELEVATION(FEET) =    486.10
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.505
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    483.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0084
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.849
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.65
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   8.51
  Tc(MIN.) =   11.02
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     409.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.12
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.99
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =     466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 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.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.83
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.02     6.90        3.851          0.90
      2        0.99    11.15        2.827          0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.63     6.90       3.851
      2        3.20    11.15       2.827

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.63   Tc(MIN.) =    6.90
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      6.90
  PEAK FLOW RATE(CFS)   =       3.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
_____
*****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PLAZA LA MEDIA NORTH                                                    *
* PROPOSED 50YR RATIONAL METHOD                                           *
* MARCH 2020 - MJS                                                        *
 *************************************************************************

  FILE NAME: PR50LMR.DAT
  TIME/DATE OF STUDY: 14:13 03/26/2020
-----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    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 = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.62
  DOWNSTREAM ELEVATION(FEET) =    490.10
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    490.10  DOWNSTREAM(FEET) =    488.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   431.00   CHANNEL SLOPE =  0.0035
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.668
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.07
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   6.72
  Tc(MIN.) =    9.46
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    4.15
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       4.47

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     506.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.10  DOWNSTREAM(FEET) =   484.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.47
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.98
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.543
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.23
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.55
  TC(MIN.) =    9.98

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.40  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.55
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     719.00 FEET.

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

```
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.488
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.30
 TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       5.77
 TC(MIN.) =   10.23

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.30
 FLOW LENGTH(FEET) =   149.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.77
 PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.75
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =     868.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.88
 TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       6.46
 TC(MIN.) =   10.75

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.30  DOWNSTREAM(FEET) =   482.10
 FLOW LENGTH(FEET) =   229.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.46
 PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   11.51
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    1097.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.232
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    3.94
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      10.12
 TC(MIN.) =   11.51
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.10  DOWNSTREAM(FEET) =   481.70
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.12
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.77
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    1182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.186
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    3.88
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =      13.86
  TC(MIN.) =   11.77

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.77
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.86

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   989.00   CHANNEL SLOPE =  0.0058
```

```
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.153
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   9.22
  Tc(MIN.) =   11.96
  SUBAREA AREA(ACRES) =     5.90       SUBAREA RUNOFF(CFS) =   16.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.0         PEAK FLOW RATE(CFS) =      16.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   2.04
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.153
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      17.55
  TC(MIN.) =   11.96

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    307.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.90  DOWNSTREAM(FEET) =    481.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0093
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.054
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.53
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   0.60
  Tc(MIN.) =   12.56
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.27
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      17.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   6.52
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =   12.56
  RAINFALL INTENSITY(INCH/HR) =   3.05
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.55
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.86    11.77        3.186          5.00
      2       17.55    12.56        3.054          6.50

  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       30.30    11.77       3.186
      2       30.84    12.56       3.054

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.84   Tc(MIN.) =   12.56
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   751.00   CHANNEL SLOPE =  0.0077
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.295
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.49
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   8.43
  Tc(MIN.) =   11.17
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    4.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       4.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.295
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    6.88
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =      11.75
  TC(MIN.) =   11.17

****************************************************************************
  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) =    483.80  DOWNSTREAM(FEET) =    477.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    32.00   CHANNEL SLOPE =  0.1969
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.270
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.12
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.13
  Tc(MIN.) =   11.30
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =      11.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   4.14
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.270
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.56
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      14.51
  TC(MIN.) =   11.30

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    485.70
  DOWNSTREAM ELEVATION(FEET) =    485.40
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    4.33
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       4.81
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.40  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.01
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.81
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =    4.66
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    5.78
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      10.59
  TC(MIN.) =    4.66

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.59
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =    6.05
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.891
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.98
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      12.34
  TC(MIN.) =    6.05

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   476.70
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.34
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.90
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.468
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    603.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  486.60  DOWNSTREAM ELEVATION(FEET) =  482.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.28   Tc(MIN.) =    6.75
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.558
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.17
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.57
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.57
  FLOW VELOCITY(FEET/SEC.) =  1.90   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.75
  RAINFALL INTENSITY(INCH/HR) =   4.56
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.57

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.30
  DOWNSTREAM ELEVATION(FEET) =    486.10
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.505
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    483.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0084
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.426
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.70
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   8.01
  Tc(MIN.) =   10.51
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     409.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =     466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 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.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   3.40
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.19

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.57     6.75        4.558          0.90
      2        1.19    10.64        3.400          0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.33     6.75       4.558
      2        3.85    10.64       3.400

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.33   Tc(MIN.) =    6.75
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      6.75
  PEAK FLOW RATE(CFS)   =       4.33
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PLAZA LA MEDIA NORTH                                                    *
* PROPOSED 100YR RATIONAL METHOD                                          *
* MARCH 2020 - MJS                                                        *
 ************************************************************************

  FILE NAME: PR100LMR.DAT
  TIME/DATE OF STUDY: 13:54 03/26/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.50    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 = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.62
  DOWNSTREAM ELEVATION(FEET) =    490.10
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    490.10  DOWNSTREAM(FEET) =    488.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   431.00   CHANNEL SLOPE =  0.0035
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.058
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.09
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   6.57
  Tc(MIN.) =    9.31
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    4.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       4.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     506.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.10  DOWNSTREAM(FEET) =   484.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.94
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.924
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.37
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       6.14
  TC(MIN.) =    9.81

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.40  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.14
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =     719.00 FEET.

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

```
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.864
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.34
 TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       6.39
 TC(MIN.) =   10.05

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.30
 FLOW LENGTH(FEET) =   149.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.39
 PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.56
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =     868.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.741
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.98
 TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.16
 TC(MIN.) =   10.56

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.30  DOWNSTREAM(FEET) =   482.10
 FLOW LENGTH(FEET) =   229.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.16
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   11.31
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    1097.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.580
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    4.36
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      11.21
 TC(MIN.) =   11.31
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.10  DOWNSTREAM(FEET) =   481.70
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.21
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    1182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.528
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    4.30
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =      15.35
  TC(MIN.) =   11.57

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   3.53
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.35

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   989.00   CHANNEL SLOPE =  0.0058
```

```
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.440
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.77
  AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   9.29
  Tc(MIN.) =   12.03
  SUBAREA AREA(ACRES) =     5.90       SUBAREA RUNOFF(CFS) =   17.66
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.0         PEAK FLOW RATE(CFS) =      17.96

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   2.09
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.440
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.20
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      19.15
  TC(MIN.) =   12.03

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    307.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.90  DOWNSTREAM(FEET) =    481.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0093
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.336
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.71
  AVERAGE FLOW DEPTH(FEET) =   0.96   TRAVEL TIME(MIN.) =   0.59
  Tc(MIN.) =   12.62
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.29
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      19.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 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.) =   12.62
  RAINFALL INTENSITY(INCH/HR) =   3.34
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.15
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.35    11.57        3.528          5.00
      2       19.15    12.62        3.336          6.50

  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       32.91    11.57       3.528
      2       33.66    12.62       3.336

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      33.66   Tc(MIN.) =   12.62
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    307.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    491.12
  DOWNSTREAM ELEVATION(FEET) =    489.60
  ELEVATION DIFFERENCE(FEET) =      1.52
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.742
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.27
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    489.60  DOWNSTREAM(FEET) =    483.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   751.00   CHANNEL SLOPE =  0.0077
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.582
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.46
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   8.56
  Tc(MIN.) =   11.30
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    4.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       5.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.582
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    7.48
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =      12.78
  TC(MIN.) =   11.30

****************************************************************************
  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) =    483.80  DOWNSTREAM(FEET) =    477.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    32.00   CHANNEL SLOPE =  0.1969
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.557
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.38
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.12
  Tc(MIN.) =   11.42
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.31
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =      13.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   4.41
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.557
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.79
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      15.78
  TC(MIN.) =   11.42

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    485.70
  DOWNSTREAM ELEVATION(FEET) =    485.40
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    4.74
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       5.27
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.40  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.27
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    4.65
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    6.33
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      11.60
  TC(MIN.) =    4.65

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.60
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =    6.01
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.380
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    3.28
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      13.57
  TC(MIN.) =    6.01

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   476.70
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.57
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    7.55
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.90
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.468
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    603.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  486.60  DOWNSTREAM ELEVATION(FEET) =  482.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
  STREET FLOW TRAVEL TIME(MIN.) =   4.24   Tc(MIN.) =    6.71
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.49
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.92
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.97
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.71
  RAINFALL INTENSITY(INCH/HR) =   5.01
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.92

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    488.30
  DOWNSTREAM ELEVATION(FEET) =    486.10
  ELEVATION DIFFERENCE(FEET) =      2.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.505
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    483.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0084
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.850
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.73
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   7.60
  Tc(MIN.) =   10.10
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    1.00
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     409.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.80
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.34
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.22
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =     466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 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.) =   10.22
  RAINFALL INTENSITY(INCH/HR) =   3.82
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.34

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.92     6.71        5.011          0.90
      2        1.34    10.22        3.820          0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.80     6.71       5.011
      2        4.33    10.22       3.820

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.80   Tc(MIN.) =    6.71
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    603.00 =     511.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      6.71
  PEAK FLOW RATE(CFS)   =       4.80
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

3 DETENTION CALCULATIONS

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 1 - 5 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 5.1 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 9.1 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.4
TIME (MIN) = 10	DISCHARGE (CFS) = 0.4
TIME (MIN) = 15	DISCHARGE (CFS) = 0.4
TIME (MIN) = 20	DISCHARGE (CFS) = 0.4
TIME (MIN) = 25	DISCHARGE (CFS) = 0.4
TIME (MIN) = 30	DISCHARGE (CFS) = 0.4
TIME (MIN) = 35	DISCHARGE (CFS) = 0.4
TIME (MIN) = 40	DISCHARGE (CFS) = 0.4
TIME (MIN) = 45	DISCHARGE (CFS) = 0.4
TIME (MIN) = 50	DISCHARGE (CFS) = 0.4
TIME (MIN) = 55	DISCHARGE (CFS) = 0.4
TIME (MIN) = 60	DISCHARGE (CFS) = 0.4
TIME (MIN) = 65	DISCHARGE (CFS) = 0.4
TIME (MIN) = 70	DISCHARGE (CFS) = 0.5
TIME (MIN) = 75	DISCHARGE (CFS) = 0.5
TIME (MIN) = 80	DISCHARGE (CFS) = 0.5
TIME (MIN) = 85	DISCHARGE (CFS) = 0.5
TIME (MIN) = 90	DISCHARGE (CFS) = 0.5
TIME (MIN) = 95	DISCHARGE (CFS) = 0.5
TIME (MIN) = 100	DISCHARGE (CFS) = 0.5
TIME (MIN) = 105	DISCHARGE (CFS) = 0.5
TIME (MIN) = 110	DISCHARGE (CFS) = 0.5
TIME (MIN) = 115	DISCHARGE (CFS) = 0.6
TIME (MIN) = 120	DISCHARGE (CFS) = 0.6
TIME (MIN) = 125	DISCHARGE (CFS) = 0.6
TIME (MIN) = 130	DISCHARGE (CFS) = 0.6
TIME (MIN) = 135	DISCHARGE (CFS) = 0.6
TIME (MIN) = 140	DISCHARGE (CFS) = 0.6
TIME (MIN) = 145	DISCHARGE (CFS) = 0.7
TIME (MIN) = 150	DISCHARGE (CFS) = 0.7
TIME (MIN) = 155	DISCHARGE (CFS) = 0.7
TIME (MIN) = 160	DISCHARGE (CFS) = 0.7
TIME (MIN) = 165	DISCHARGE (CFS) = 0.8
TIME (MIN) = 170	DISCHARGE (CFS) = 0.8
TIME (MIN) = 175	DISCHARGE (CFS) = 0.8
TIME (MIN) = 180	DISCHARGE (CFS) = 0.9
TIME (MIN) = 185	DISCHARGE (CFS) = 0.9
TIME (MIN) = 190	DISCHARGE (CFS) = 1
TIME (MIN) = 195	DISCHARGE (CFS) = 1
TIME (MIN) = 200	DISCHARGE (CFS) = 1.1
TIME (MIN) = 205	DISCHARGE (CFS) = 1.2
TIME (MIN) = 210	DISCHARGE (CFS) = 1.3
TIME (MIN) = 215	DISCHARGE (CFS) = 1.5
TIME (MIN) = 220	DISCHARGE (CFS) = 1.6
TIME (MIN) = 225	DISCHARGE (CFS) = 1.9
TIME (MIN) = 230	DISCHARGE (CFS) = 2.2
TIME (MIN) = 235	DISCHARGE (CFS) = 3.2
TIME (MIN) = 240	DISCHARGE (CFS) = 11.8
TIME (MIN) = 245	DISCHARGE (CFS) = 9.1
TIME (MIN) = 250	DISCHARGE (CFS) = 2.6
TIME (MIN) = 255	DISCHARGE (CFS) = 1.7
TIME (MIN) = 260	DISCHARGE (CFS) = 1.4
TIME (MIN) = 265	DISCHARGE (CFS) = 1.1
TIME (MIN) = 270	DISCHARGE (CFS) = 1
TIME (MIN) = 275	DISCHARGE (CFS) = 0.9
TIME (MIN) = 280	DISCHARGE (CFS) = 0.8
TIME (MIN) = 285	DISCHARGE (CFS) = 0.7
TIME (MIN) = 290	DISCHARGE (CFS) = 0.7
TIME (MIN) = 295	DISCHARGE (CFS) = 0.6
TIME (MIN) = 300	DISCHARGE (CFS) = 0.6
TIME (MIN) = 305	DISCHARGE (CFS) = 0.6
TIME (MIN) = 310	DISCHARGE (CFS) = 0.5
TIME (MIN) = 315	DISCHARGE (CFS) = 0.5
TIME (MIN) = 320	DISCHARGE (CFS) = 0.5
TIME (MIN) = 325	DISCHARGE (CFS) = 0.5
TIME (MIN) = 330	DISCHARGE (CFS) = 0.5
TIME (MIN) = 335	DISCHARGE (CFS) = 0.4
TIME (MIN) = 340	DISCHARGE (CFS) = 0.4
TIME (MIN) = 345	DISCHARGE (CFS) = 0.4
TIME (MIN) = 350	DISCHARGE (CFS) = 0.4
TIME (MIN) = 355	DISCHARGE (CFS) = 0.4
TIME (MIN) = 360	DISCHARGE (CFS) = 0.4

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 1 - 10 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 5.1 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 10.7 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.4
TIME (MIN) = 10	DISCHARGE (CFS) = 0.4
TIME (MIN) = 15	DISCHARGE (CFS) = 0.4
TIME (MIN) = 20	DISCHARGE (CFS) = 0.4
TIME (MIN) = 25	DISCHARGE (CFS) = 0.4
TIME (MIN) = 30	DISCHARGE (CFS) = 0.5
TIME (MIN) = 35	DISCHARGE (CFS) = 0.5
TIME (MIN) = 40	DISCHARGE (CFS) = 0.5
TIME (MIN) = 45	DISCHARGE (CFS) = 0.5
TIME (MIN) = 50	DISCHARGE (CFS) = 0.5
TIME (MIN) = 55	DISCHARGE (CFS) = 0.5
TIME (MIN) = 60	DISCHARGE (CFS) = 0.5
TIME (MIN) = 65	DISCHARGE (CFS) = 0.5
TIME (MIN) = 70	DISCHARGE (CFS) = 0.5
TIME (MIN) = 75	DISCHARGE (CFS) = 0.5
TIME (MIN) = 80	DISCHARGE (CFS) = 0.5
TIME (MIN) = 85	DISCHARGE (CFS) = 0.6
TIME (MIN) = 90	DISCHARGE (CFS) = 0.6
TIME (MIN) = 95	DISCHARGE (CFS) = 0.6
TIME (MIN) = 100	DISCHARGE (CFS) = 0.6
TIME (MIN) = 105	DISCHARGE (CFS) = 0.6
TIME (MIN) = 110	DISCHARGE (CFS) = 0.6
TIME (MIN) = 115	DISCHARGE (CFS) = 0.6
TIME (MIN) = 120	DISCHARGE (CFS) = 0.6
TIME (MIN) = 125	DISCHARGE (CFS) = 0.7
TIME (MIN) = 130	DISCHARGE (CFS) = 0.7
TIME (MIN) = 135	DISCHARGE (CFS) = 0.7
TIME (MIN) = 140	DISCHARGE (CFS) = 0.7
TIME (MIN) = 145	DISCHARGE (CFS) = 0.7
TIME (MIN) = 150	DISCHARGE (CFS) = 0.8
TIME (MIN) = 155	DISCHARGE (CFS) = 0.8
TIME (MIN) = 160	DISCHARGE (CFS) = 0.8
TIME (MIN) = 165	DISCHARGE (CFS) = 0.9
TIME (MIN) = 170	DISCHARGE (CFS) = 0.9
TIME (MIN) = 175	DISCHARGE (CFS) = 0.9
TIME (MIN) = 180	DISCHARGE (CFS) = 1
TIME (MIN) = 185	DISCHARGE (CFS) = 1
TIME (MIN) = 190	DISCHARGE (CFS) = 1.1
TIME (MIN) = 195	DISCHARGE (CFS) = 1.2
TIME (MIN) = 200	DISCHARGE (CFS) = 1.2
TIME (MIN) = 205	DISCHARGE (CFS) = 1.4
TIME (MIN) = 210	DISCHARGE (CFS) = 1.5
TIME (MIN) = 215	DISCHARGE (CFS) = 1.7
TIME (MIN) = 220	DISCHARGE (CFS) = 1.8
TIME (MIN) = 225	DISCHARGE (CFS) = 2.2
TIME (MIN) = 230	DISCHARGE (CFS) = 2.5
TIME (MIN) = 235	DISCHARGE (CFS) = 3.7
TIME (MIN) = 240	DISCHARGE (CFS) = 13.2
TIME (MIN) = 245	DISCHARGE (CFS) = 10.7
TIME (MIN) = 250	DISCHARGE (CFS) = 3
TIME (MIN) = 255	DISCHARGE (CFS) = 2
TIME (MIN) = 260	DISCHARGE (CFS) = 1.6
TIME (MIN) = 265	DISCHARGE (CFS) = 1.3
TIME (MIN) = 270	DISCHARGE (CFS) = 1.1
TIME (MIN) = 275	DISCHARGE (CFS) = 1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.9
TIME (MIN) = 285	DISCHARGE (CFS) = 0.8
TIME (MIN) = 290	DISCHARGE (CFS) = 0.8
TIME (MIN) = 295	DISCHARGE (CFS) = 0.7
TIME (MIN) = 300	DISCHARGE (CFS) = 0.7
TIME (MIN) = 305	DISCHARGE (CFS) = 0.7
TIME (MIN) = 310	DISCHARGE (CFS) = 0.6
TIME (MIN) = 315	DISCHARGE (CFS) = 0.6
TIME (MIN) = 320	DISCHARGE (CFS) = 0.6
TIME (MIN) = 325	DISCHARGE (CFS) = 0.5
TIME (MIN) = 330	DISCHARGE (CFS) = 0.5
TIME (MIN) = 335	DISCHARGE (CFS) = 0.5
TIME (MIN) = 340	DISCHARGE (CFS) = 0.5
TIME (MIN) = 345	DISCHARGE (CFS) = 0.5
TIME (MIN) = 350	DISCHARGE (CFS) = 0.5
TIME (MIN) = 355	DISCHARGE (CFS) = 0.4
TIME (MIN) = 360	DISCHARGE (CFS) = 0.4

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 1 - 25 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 5.1 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 12.1 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.5
TIME (MIN) = 10	DISCHARGE (CFS) = 0.5
TIME (MIN) = 15	DISCHARGE (CFS) = 0.5
TIME (MIN) = 20	DISCHARGE (CFS) = 0.5
TIME (MIN) = 25	DISCHARGE (CFS) = 0.5
TIME (MIN) = 30	DISCHARGE (CFS) = 0.5
TIME (MIN) = 35	DISCHARGE (CFS) = 0.5
TIME (MIN) = 40	DISCHARGE (CFS) = 0.5
TIME (MIN) = 45	DISCHARGE (CFS) = 0.5
TIME (MIN) = 50	DISCHARGE (CFS) = 0.5
TIME (MIN) = 55	DISCHARGE (CFS) = 0.6
TIME (MIN) = 60	DISCHARGE (CFS) = 0.6
TIME (MIN) = 65	DISCHARGE (CFS) = 0.6
TIME (MIN) = 70	DISCHARGE (CFS) = 0.6
TIME (MIN) = 75	DISCHARGE (CFS) = 0.6
TIME (MIN) = 80	DISCHARGE (CFS) = 0.6
TIME (MIN) = 85	DISCHARGE (CFS) = 0.6
TIME (MIN) = 90	DISCHARGE (CFS) = 0.6
TIME (MIN) = 95	DISCHARGE (CFS) = 0.6
TIME (MIN) = 100	DISCHARGE (CFS) = 0.7
TIME (MIN) = 105	DISCHARGE (CFS) = 0.7
TIME (MIN) = 110	DISCHARGE (CFS) = 0.7
TIME (MIN) = 115	DISCHARGE (CFS) = 0.7
TIME (MIN) = 120	DISCHARGE (CFS) = 0.7
TIME (MIN) = 125	DISCHARGE (CFS) = 0.7
TIME (MIN) = 130	DISCHARGE (CFS) = 0.8
TIME (MIN) = 135	DISCHARGE (CFS) = 0.8
TIME (MIN) = 140	DISCHARGE (CFS) = 0.8
TIME (MIN) = 145	DISCHARGE (CFS) = 0.8
TIME (MIN) = 150	DISCHARGE (CFS) = 0.9
TIME (MIN) = 155	DISCHARGE (CFS) = 0.9
TIME (MIN) = 160	DISCHARGE (CFS) = 0.9
TIME (MIN) = 165	DISCHARGE (CFS) = 1
TIME (MIN) = 170	DISCHARGE (CFS) = 1
TIME (MIN) = 175	DISCHARGE (CFS) = 1.1
TIME (MIN) = 180	DISCHARGE (CFS) = 1.1
TIME (MIN) = 185	DISCHARGE (CFS) = 1.2
TIME (MIN) = 190	DISCHARGE (CFS) = 1.2
TIME (MIN) = 195	DISCHARGE (CFS) = 1.3
TIME (MIN) = 200	DISCHARGE (CFS) = 1.4
TIME (MIN) = 205	DISCHARGE (CFS) = 1.5
TIME (MIN) = 210	DISCHARGE (CFS) = 1.6
TIME (MIN) = 215	DISCHARGE (CFS) = 1.9
TIME (MIN) = 220	DISCHARGE (CFS) = 2
TIME (MIN) = 225	DISCHARGE (CFS) = 2.5
TIME (MIN) = 230	DISCHARGE (CFS) = 2.8
TIME (MIN) = 235	DISCHARGE (CFS) = 4.2
TIME (MIN) = 240	DISCHARGE (CFS) = 14.8
TIME (MIN) = 245	DISCHARGE (CFS) = 12.1
TIME (MIN) = 250	DISCHARGE (CFS) = 3.3
TIME (MIN) = 255	DISCHARGE (CFS) = 2.2
TIME (MIN) = 260	DISCHARGE (CFS) = 1.7
TIME (MIN) = 265	DISCHARGE (CFS) = 1.5
TIME (MIN) = 270	DISCHARGE (CFS) = 1.3
TIME (MIN) = 275	DISCHARGE (CFS) = 1.1
TIME (MIN) = 280	DISCHARGE (CFS) = 1
TIME (MIN) = 285	DISCHARGE (CFS) = 0.9
TIME (MIN) = 290	DISCHARGE (CFS) = 0.9
TIME (MIN) = 295	DISCHARGE (CFS) = 0.8
TIME (MIN) = 300	DISCHARGE (CFS) = 0.8
TIME (MIN) = 305	DISCHARGE (CFS) = 0.7
TIME (MIN) = 310	DISCHARGE (CFS) = 0.7
TIME (MIN) = 315	DISCHARGE (CFS) = 0.7
TIME (MIN) = 320	DISCHARGE (CFS) = 0.6
TIME (MIN) = 325	DISCHARGE (CFS) = 0.6
TIME (MIN) = 330	DISCHARGE (CFS) = 0.6
TIME (MIN) = 335	DISCHARGE (CFS) = 0.6
TIME (MIN) = 340	DISCHARGE (CFS) = 0.5
TIME (MIN) = 345	DISCHARGE (CFS) = 0.5
TIME (MIN) = 350	DISCHARGE (CFS) = 0.5
TIME (MIN) = 355	DISCHARGE (CFS) = 0.5
TIME (MIN) = 360	DISCHARGE (CFS) = 0.5

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 1 - 50 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 5.1 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 14.5 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.6
TIME (MIN) = 10	DISCHARGE (CFS) = 0.6
TIME (MIN) = 15	DISCHARGE (CFS) = 0.6
TIME (MIN) = 20	DISCHARGE (CFS) = 0.6
TIME (MIN) = 25	DISCHARGE (CFS) = 0.6
TIME (MIN) = 30	DISCHARGE (CFS) = 0.6
TIME (MIN) = 35	DISCHARGE (CFS) = 0.6
TIME (MIN) = 40	DISCHARGE (CFS) = 0.6
TIME (MIN) = 45	DISCHARGE (CFS) = 0.6
TIME (MIN) = 50	DISCHARGE (CFS) = 0.6
TIME (MIN) = 55	DISCHARGE (CFS) = 0.6
TIME (MIN) = 60	DISCHARGE (CFS) = 0.7
TIME (MIN) = 65	DISCHARGE (CFS) = 0.7
TIME (MIN) = 70	DISCHARGE (CFS) = 0.7
TIME (MIN) = 75	DISCHARGE (CFS) = 0.7
TIME (MIN) = 80	DISCHARGE (CFS) = 0.7
TIME (MIN) = 85	DISCHARGE (CFS) = 0.7
TIME (MIN) = 90	DISCHARGE (CFS) = 0.7
TIME (MIN) = 95	DISCHARGE (CFS) = 0.8
TIME (MIN) = 100	DISCHARGE (CFS) = 0.8
TIME (MIN) = 105	DISCHARGE (CFS) = 0.8
TIME (MIN) = 110	DISCHARGE (CFS) = 0.8
TIME (MIN) = 115	DISCHARGE (CFS) = 0.8
TIME (MIN) = 120	DISCHARGE (CFS) = 0.8
TIME (MIN) = 125	DISCHARGE (CFS) = 0.9
TIME (MIN) = 130	DISCHARGE (CFS) = 0.9
TIME (MIN) = 135	DISCHARGE (CFS) = 0.9
TIME (MIN) = 140	DISCHARGE (CFS) = 0.9
TIME (MIN) = 145	DISCHARGE (CFS) = 1
TIME (MIN) = 150	DISCHARGE (CFS) = 1
TIME (MIN) = 155	DISCHARGE (CFS) = 1.1
TIME (MIN) = 160	DISCHARGE (CFS) = 1.1
TIME (MIN) = 165	DISCHARGE (CFS) = 1.1
TIME (MIN) = 170	DISCHARGE (CFS) = 1.2
TIME (MIN) = 175	DISCHARGE (CFS) = 1.2
TIME (MIN) = 180	DISCHARGE (CFS) = 1.3
TIME (MIN) = 185	DISCHARGE (CFS) = 1.4
TIME (MIN) = 190	DISCHARGE (CFS) = 1.4
TIME (MIN) = 195	DISCHARGE (CFS) = 1.6
TIME (MIN) = 200	DISCHARGE (CFS) = 1.6
TIME (MIN) = 205	DISCHARGE (CFS) = 1.8
TIME (MIN) = 210	DISCHARGE (CFS) = 1.9
TIME (MIN) = 215	DISCHARGE (CFS) = 2.2
TIME (MIN) = 220	DISCHARGE (CFS) = 2.4
TIME (MIN) = 225	DISCHARGE (CFS) = 2.9
TIME (MIN) = 230	DISCHARGE (CFS) = 3.3
TIME (MIN) = 235	DISCHARGE (CFS) = 4.9
TIME (MIN) = 240	DISCHARGE (CFS) = 16.9
TIME (MIN) = 245	DISCHARGE (CFS) = 14.5
TIME (MIN) = 250	DISCHARGE (CFS) = 3.9
TIME (MIN) = 255	DISCHARGE (CFS) = 2.6
TIME (MIN) = 260	DISCHARGE (CFS) = 2
TIME (MIN) = 265	DISCHARGE (CFS) = 1.7
TIME (MIN) = 270	DISCHARGE (CFS) = 1.5
TIME (MIN) = 275	DISCHARGE (CFS) = 1.3
TIME (MIN) = 280	DISCHARGE (CFS) = 1.2
TIME (MIN) = 285	DISCHARGE (CFS) = 1.1
TIME (MIN) = 290	DISCHARGE (CFS) = 1
TIME (MIN) = 295	DISCHARGE (CFS) = 1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.9
TIME (MIN) = 305	DISCHARGE (CFS) = 0.9
TIME (MIN) = 310	DISCHARGE (CFS) = 0.8
TIME (MIN) = 315	DISCHARGE (CFS) = 0.8
TIME (MIN) = 320	DISCHARGE (CFS) = 0.7
TIME (MIN) = 325	DISCHARGE (CFS) = 0.7
TIME (MIN) = 330	DISCHARGE (CFS) = 0.7
TIME (MIN) = 335	DISCHARGE (CFS) = 0.7
TIME (MIN) = 340	DISCHARGE (CFS) = 0.6
TIME (MIN) = 345	DISCHARGE (CFS) = 0.6
TIME (MIN) = 350	DISCHARGE (CFS) = 0.6
TIME (MIN) = 355	DISCHARGE (CFS) = 0.6
TIME (MIN) = 360	DISCHARGE (CFS) = 0.6

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 1 - 100 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 5.1 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 15.8 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.6
TIME (MIN) = 10	DISCHARGE (CFS) = 0.6
TIME (MIN) = 15	DISCHARGE (CFS) = 0.6
TIME (MIN) = 20	DISCHARGE (CFS) = 0.6
TIME (MIN) = 25	DISCHARGE (CFS) = 0.6
TIME (MIN) = 30	DISCHARGE (CFS) = 0.6
TIME (MIN) = 35	DISCHARGE (CFS) = 0.7
TIME (MIN) = 40	DISCHARGE (CFS) = 0.7
TIME (MIN) = 45	DISCHARGE (CFS) = 0.7
TIME (MIN) = 50	DISCHARGE (CFS) = 0.7
TIME (MIN) = 55	DISCHARGE (CFS) = 0.7
TIME (MIN) = 60	DISCHARGE (CFS) = 0.7
TIME (MIN) = 65	DISCHARGE (CFS) = 0.7
TIME (MIN) = 70	DISCHARGE (CFS) = 0.7
TIME (MIN) = 75	DISCHARGE (CFS) = 0.8
TIME (MIN) = 80	DISCHARGE (CFS) = 0.8
TIME (MIN) = 85	DISCHARGE (CFS) = 0.8
TIME (MIN) = 90	DISCHARGE (CFS) = 0.8
TIME (MIN) = 95	DISCHARGE (CFS) = 0.8
TIME (MIN) = 100	DISCHARGE (CFS) = 0.8
TIME (MIN) = 105	DISCHARGE (CFS) = 0.9
TIME (MIN) = 110	DISCHARGE (CFS) = 0.9
TIME (MIN) = 115	DISCHARGE (CFS) = 0.9
TIME (MIN) = 120	DISCHARGE (CFS) = 0.9
TIME (MIN) = 125	DISCHARGE (CFS) = 1
TIME (MIN) = 130	DISCHARGE (CFS) = 1
TIME (MIN) = 135	DISCHARGE (CFS) = 1
TIME (MIN) = 140	DISCHARGE (CFS) = 1
TIME (MIN) = 145	DISCHARGE (CFS) = 1.1
TIME (MIN) = 150	DISCHARGE (CFS) = 1.1
TIME (MIN) = 155	DISCHARGE (CFS) = 1.2
TIME (MIN) = 160	DISCHARGE (CFS) = 1.2
TIME (MIN) = 165	DISCHARGE (CFS) = 1.2
TIME (MIN) = 170	DISCHARGE (CFS) = 1.3
TIME (MIN) = 175	DISCHARGE (CFS) = 1.4
TIME (MIN) = 180	DISCHARGE (CFS) = 1.4
TIME (MIN) = 185	DISCHARGE (CFS) = 1.5
TIME (MIN) = 190	DISCHARGE (CFS) = 1.6
TIME (MIN) = 195	DISCHARGE (CFS) = 1.7
TIME (MIN) = 200	DISCHARGE (CFS) = 1.8
TIME (MIN) = 205	DISCHARGE (CFS) = 2
TIME (MIN) = 210	DISCHARGE (CFS) = 2.1
TIME (MIN) = 215	DISCHARGE (CFS) = 2.4
TIME (MIN) = 220	DISCHARGE (CFS) = 2.6
TIME (MIN) = 225	DISCHARGE (CFS) = 3.2
TIME (MIN) = 230	DISCHARGE (CFS) = 3.6
TIME (MIN) = 235	DISCHARGE (CFS) = 5.3
TIME (MIN) = 240	DISCHARGE (CFS) = 18.6
TIME (MIN) = 245	DISCHARGE (CFS) = 15.8
TIME (MIN) = 250	DISCHARGE (CFS) = 4.3
TIME (MIN) = 255	DISCHARGE (CFS) = 2.9
TIME (MIN) = 260	DISCHARGE (CFS) = 2.2
TIME (MIN) = 265	DISCHARGE (CFS) = 1.9
TIME (MIN) = 270	DISCHARGE (CFS) = 1.6
TIME (MIN) = 275	DISCHARGE (CFS) = 1.5
TIME (MIN) = 280	DISCHARGE (CFS) = 1.3
TIME (MIN) = 285	DISCHARGE (CFS) = 1.2
TIME (MIN) = 290	DISCHARGE (CFS) = 1.1
TIME (MIN) = 295	DISCHARGE (CFS) = 1.1
TIME (MIN) = 300	DISCHARGE (CFS) = 1
TIME (MIN) = 305	DISCHARGE (CFS) = 0.9
TIME (MIN) = 310	DISCHARGE (CFS) = 0.9
TIME (MIN) = 315	DISCHARGE (CFS) = 0.9
TIME (MIN) = 320	DISCHARGE (CFS) = 0.8
TIME (MIN) = 325	DISCHARGE (CFS) = 0.8
TIME (MIN) = 330	DISCHARGE (CFS) = 0.8
TIME (MIN) = 335	DISCHARGE (CFS) = 0.7
TIME (MIN) = 340	DISCHARGE (CFS) = 0.7
TIME (MIN) = 345	DISCHARGE (CFS) = 0.7
TIME (MIN) = 350	DISCHARGE (CFS) = 0.7
TIME (MIN) = 355	DISCHARGE (CFS) = 0.6
TIME (MIN) = 360	DISCHARGE (CFS) = 0.6

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 2 - 5 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 11.5 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 19.1 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.8
TIME (MIN) = 10	DISCHARGE (CFS) = 0.8
TIME (MIN) = 15	DISCHARGE (CFS) = 0.9
TIME (MIN) = 20	DISCHARGE (CFS) = 0.9
TIME (MIN) = 25	DISCHARGE (CFS) = 0.9
TIME (MIN) = 30	DISCHARGE (CFS) = 0.9
TIME (MIN) = 35	DISCHARGE (CFS) = 0.9
TIME (MIN) = 40	DISCHARGE (CFS) = 0.9
TIME (MIN) = 45	DISCHARGE (CFS) = 0.9
TIME (MIN) = 50	DISCHARGE (CFS) = 0.9
TIME (MIN) = 55	DISCHARGE (CFS) = 1
TIME (MIN) = 60	DISCHARGE (CFS) = 1
TIME (MIN) = 65	DISCHARGE (CFS) = 1
TIME (MIN) = 70	DISCHARGE (CFS) = 1
TIME (MIN) = 75	DISCHARGE (CFS) = 1
TIME (MIN) = 80	DISCHARGE (CFS) = 1.1
TIME (MIN) = 85	DISCHARGE (CFS) = 1.1
TIME (MIN) = 90	DISCHARGE (CFS) = 1.1
TIME (MIN) = 95	DISCHARGE (CFS) = 1.1
TIME (MIN) = 100	DISCHARGE (CFS) = 1.1
TIME (MIN) = 105	DISCHARGE (CFS) = 1.2
TIME (MIN) = 110	DISCHARGE (CFS) = 1.2
TIME (MIN) = 115	DISCHARGE (CFS) = 1.2
TIME (MIN) = 120	DISCHARGE (CFS) = 1.3
TIME (MIN) = 125	DISCHARGE (CFS) = 1.3
TIME (MIN) = 130	DISCHARGE (CFS) = 1.3
TIME (MIN) = 135	DISCHARGE (CFS) = 1.4
TIME (MIN) = 140	DISCHARGE (CFS) = 1.4
TIME (MIN) = 145	DISCHARGE (CFS) = 1.5
TIME (MIN) = 150	DISCHARGE (CFS) = 1.5
TIME (MIN) = 155	DISCHARGE (CFS) = 1.6
TIME (MIN) = 160	DISCHARGE (CFS) = 1.6
TIME (MIN) = 165	DISCHARGE (CFS) = 1.7
TIME (MIN) = 170	DISCHARGE (CFS) = 1.8
TIME (MIN) = 175	DISCHARGE (CFS) = 1.9
TIME (MIN) = 180	DISCHARGE (CFS) = 1.9
TIME (MIN) = 185	DISCHARGE (CFS) = 2.1
TIME (MIN) = 190	DISCHARGE (CFS) = 2.1
TIME (MIN) = 195	DISCHARGE (CFS) = 2.3
TIME (MIN) = 200	DISCHARGE (CFS) = 2.4
TIME (MIN) = 205	DISCHARGE (CFS) = 2.7
TIME (MIN) = 210	DISCHARGE (CFS) = 2.9
TIME (MIN) = 215	DISCHARGE (CFS) = 3.3
TIME (MIN) = 220	DISCHARGE (CFS) = 3.6
TIME (MIN) = 225	DISCHARGE (CFS) = 4.4
TIME (MIN) = 230	DISCHARGE (CFS) = 5
TIME (MIN) = 235	DISCHARGE (CFS) = 7.3
TIME (MIN) = 240	DISCHARGE (CFS) = 28.1
TIME (MIN) = 245	DISCHARGE (CFS) = 19.1
TIME (MIN) = 250	DISCHARGE (CFS) = 5.9
TIME (MIN) = 255	DISCHARGE (CFS) = 3.9
TIME (MIN) = 260	DISCHARGE (CFS) = 3.1
TIME (MIN) = 265	DISCHARGE (CFS) = 2.6
TIME (MIN) = 270	DISCHARGE (CFS) = 2.2
TIME (MIN) = 275	DISCHARGE (CFS) = 2
TIME (MIN) = 280	DISCHARGE (CFS) = 1.8
TIME (MIN) = 285	DISCHARGE (CFS) = 1.7
TIME (MIN) = 290	DISCHARGE (CFS) = 1.5
TIME (MIN) = 295	DISCHARGE (CFS) = 1.4
TIME (MIN) = 300	DISCHARGE (CFS) = 1.4
TIME (MIN) = 305	DISCHARGE (CFS) = 1.3
TIME (MIN) = 310	DISCHARGE (CFS) = 1.2
TIME (MIN) = 315	DISCHARGE (CFS) = 1.2
TIME (MIN) = 320	DISCHARGE (CFS) = 1.1
TIME (MIN) = 325	DISCHARGE (CFS) = 1.1
TIME (MIN) = 330	DISCHARGE (CFS) = 1
TIME (MIN) = 335	DISCHARGE (CFS) = 1
TIME (MIN) = 340	DISCHARGE (CFS) = 1
TIME (MIN) = 345	DISCHARGE (CFS) = 0.9
TIME (MIN) = 350	DISCHARGE (CFS) = 0.9
TIME (MIN) = 355	DISCHARGE (CFS) = 0.9
TIME (MIN) = 360	DISCHARGE (CFS) = 0.8

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 2 - 10 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 11.5 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 22.4 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 1
TIME (MIN) = 10	DISCHARGE (CFS) = 1
TIME (MIN) = 15	DISCHARGE (CFS) = 1
TIME (MIN) = 20	DISCHARGE (CFS) = 1
TIME (MIN) = 25	DISCHARGE (CFS) = 1
TIME (MIN) = 30	DISCHARGE (CFS) = 1
TIME (MIN) = 35	DISCHARGE (CFS) = 1
TIME (MIN) = 40	DISCHARGE (CFS) = 1.1
TIME (MIN) = 45	DISCHARGE (CFS) = 1.1
TIME (MIN) = 50	DISCHARGE (CFS) = 1.1
TIME (MIN) = 55	DISCHARGE (CFS) = 1.1
TIME (MIN) = 60	DISCHARGE (CFS) = 1.1
TIME (MIN) = 65	DISCHARGE (CFS) = 1.1
TIME (MIN) = 70	DISCHARGE (CFS) = 1.2
TIME (MIN) = 75	DISCHARGE (CFS) = 1.2
TIME (MIN) = 80	DISCHARGE (CFS) = 1.2
TIME (MIN) = 85	DISCHARGE (CFS) = 1.2
TIME (MIN) = 90	DISCHARGE (CFS) = 1.3
TIME (MIN) = 95	DISCHARGE (CFS) = 1.3
TIME (MIN) = 100	DISCHARGE (CFS) = 1.3
TIME (MIN) = 105	DISCHARGE (CFS) = 1.4
TIME (MIN) = 110	DISCHARGE (CFS) = 1.4
TIME (MIN) = 115	DISCHARGE (CFS) = 1.4
TIME (MIN) = 120	DISCHARGE (CFS) = 1.4
TIME (MIN) = 125	DISCHARGE (CFS) = 1.5
TIME (MIN) = 130	DISCHARGE (CFS) = 1.5
TIME (MIN) = 135	DISCHARGE (CFS) = 1.6
TIME (MIN) = 140	DISCHARGE (CFS) = 1.6
TIME (MIN) = 145	DISCHARGE (CFS) = 1.7
TIME (MIN) = 150	DISCHARGE (CFS) = 1.7
TIME (MIN) = 155	DISCHARGE (CFS) = 1.8
TIME (MIN) = 160	DISCHARGE (CFS) = 1.9
TIME (MIN) = 165	DISCHARGE (CFS) = 2
TIME (MIN) = 170	DISCHARGE (CFS) = 2
TIME (MIN) = 175	DISCHARGE (CFS) = 2.1
TIME (MIN) = 180	DISCHARGE (CFS) = 2.2
TIME (MIN) = 185	DISCHARGE (CFS) = 2.4
TIME (MIN) = 190	DISCHARGE (CFS) = 2.5
TIME (MIN) = 195	DISCHARGE (CFS) = 2.7
TIME (MIN) = 200	DISCHARGE (CFS) = 2.8
TIME (MIN) = 205	DISCHARGE (CFS) = 3.1
TIME (MIN) = 210	DISCHARGE (CFS) = 3.3
TIME (MIN) = 215	DISCHARGE (CFS) = 3.8
TIME (MIN) = 220	DISCHARGE (CFS) = 4.1
TIME (MIN) = 225	DISCHARGE (CFS) = 5
TIME (MIN) = 230	DISCHARGE (CFS) = 5.7
TIME (MIN) = 235	DISCHARGE (CFS) = 8.4
TIME (MIN) = 240	DISCHARGE (CFS) = 31.5
TIME (MIN) = 245	DISCHARGE (CFS) = 22.4
TIME (MIN) = 250	DISCHARGE (CFS) = 6.7
TIME (MIN) = 255	DISCHARGE (CFS) = 4.5
TIME (MIN) = 260	DISCHARGE (CFS) = 3.5
TIME (MIN) = 265	DISCHARGE (CFS) = 2.9
TIME (MIN) = 270	DISCHARGE (CFS) = 2.6
TIME (MIN) = 275	DISCHARGE (CFS) = 2.3
TIME (MIN) = 280	DISCHARGE (CFS) = 2.1
TIME (MIN) = 285	DISCHARGE (CFS) = 1.9
TIME (MIN) = 290	DISCHARGE (CFS) = 1.8
TIME (MIN) = 295	DISCHARGE (CFS) = 1.7
TIME (MIN) = 300	DISCHARGE (CFS) = 1.6
TIME (MIN) = 305	DISCHARGE (CFS) = 1.5
TIME (MIN) = 310	DISCHARGE (CFS) = 1.4
TIME (MIN) = 315	DISCHARGE (CFS) = 1.3
TIME (MIN) = 320	DISCHARGE (CFS) = 1.3
TIME (MIN) = 325	DISCHARGE (CFS) = 1.2
TIME (MIN) = 330	DISCHARGE (CFS) = 1.2
TIME (MIN) = 335	DISCHARGE (CFS) = 1.1
TIME (MIN) = 340	DISCHARGE (CFS) = 1.1
TIME (MIN) = 345	DISCHARGE (CFS) = 1.1
TIME (MIN) = 350	DISCHARGE (CFS) = 1
TIME (MIN) = 355	DISCHARGE (CFS) = 1
TIME (MIN) = 360	DISCHARGE (CFS) = 1

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 2 - 25 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 11.5 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 26 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 1.1
TIME (MIN) = 10	DISCHARGE (CFS) = 1.1
TIME (MIN) = 15	DISCHARGE (CFS) = 1.1
TIME (MIN) = 20	DISCHARGE (CFS) = 1.1
TIME (MIN) = 25	DISCHARGE (CFS) = 1.1
TIME (MIN) = 30	DISCHARGE (CFS) = 1.1
TIME (MIN) = 35	DISCHARGE (CFS) = 1.2
TIME (MIN) = 40	DISCHARGE (CFS) = 1.2
TIME (MIN) = 45	DISCHARGE (CFS) = 1.2
TIME (MIN) = 50	DISCHARGE (CFS) = 1.2
TIME (MIN) = 55	DISCHARGE (CFS) = 1.2
TIME (MIN) = 60	DISCHARGE (CFS) = 1.3
TIME (MIN) = 65	DISCHARGE (CFS) = 1.3
TIME (MIN) = 70	DISCHARGE (CFS) = 1.3
TIME (MIN) = 75	DISCHARGE (CFS) = 1.3
TIME (MIN) = 80	DISCHARGE (CFS) = 1.4
TIME (MIN) = 85	DISCHARGE (CFS) = 1.4
TIME (MIN) = 90	DISCHARGE (CFS) = 1.4
TIME (MIN) = 95	DISCHARGE (CFS) = 1.5
TIME (MIN) = 100	DISCHARGE (CFS) = 1.5
TIME (MIN) = 105	DISCHARGE (CFS) = 1.5
TIME (MIN) = 110	DISCHARGE (CFS) = 1.5
TIME (MIN) = 115	DISCHARGE (CFS) = 1.6
TIME (MIN) = 120	DISCHARGE (CFS) = 1.6
TIME (MIN) = 125	DISCHARGE (CFS) = 1.7
TIME (MIN) = 130	DISCHARGE (CFS) = 1.7
TIME (MIN) = 135	DISCHARGE (CFS) = 1.8
TIME (MIN) = 140	DISCHARGE (CFS) = 1.8
TIME (MIN) = 145	DISCHARGE (CFS) = 1.9
TIME (MIN) = 150	DISCHARGE (CFS) = 1.9
TIME (MIN) = 155	DISCHARGE (CFS) = 2
TIME (MIN) = 160	DISCHARGE (CFS) = 2.1
TIME (MIN) = 165	DISCHARGE (CFS) = 2.2
TIME (MIN) = 170	DISCHARGE (CFS) = 2.3
TIME (MIN) = 175	DISCHARGE (CFS) = 2.4
TIME (MIN) = 180	DISCHARGE (CFS) = 2.5
TIME (MIN) = 185	DISCHARGE (CFS) = 2.7
TIME (MIN) = 190	DISCHARGE (CFS) = 2.8
TIME (MIN) = 195	DISCHARGE (CFS) = 3
TIME (MIN) = 200	DISCHARGE (CFS) = 3.1
TIME (MIN) = 205	DISCHARGE (CFS) = 3.5
TIME (MIN) = 210	DISCHARGE (CFS) = 3.7
TIME (MIN) = 215	DISCHARGE (CFS) = 4.2
TIME (MIN) = 220	DISCHARGE (CFS) = 4.6
TIME (MIN) = 225	DISCHARGE (CFS) = 5.6
TIME (MIN) = 230	DISCHARGE (CFS) = 6.4
TIME (MIN) = 235	DISCHARGE (CFS) = 9.4
TIME (MIN) = 240	DISCHARGE (CFS) = 34.7
TIME (MIN) = 245	DISCHARGE (CFS) = 26
TIME (MIN) = 250	DISCHARGE (CFS) = 7.5
TIME (MIN) = 255	DISCHARGE (CFS) = 5
TIME (MIN) = 260	DISCHARGE (CFS) = 3.9
TIME (MIN) = 265	DISCHARGE (CFS) = 3.3
TIME (MIN) = 270	DISCHARGE (CFS) = 2.9
TIME (MIN) = 275	DISCHARGE (CFS) = 2.6
TIME (MIN) = 280	DISCHARGE (CFS) = 2.3
TIME (MIN) = 285	DISCHARGE (CFS) = 2.1
TIME (MIN) = 290	DISCHARGE (CFS) = 2
TIME (MIN) = 295	DISCHARGE (CFS) = 1.9
TIME (MIN) = 300	DISCHARGE (CFS) = 1.7
TIME (MIN) = 305	DISCHARGE (CFS) = 1.7
TIME (MIN) = 310	DISCHARGE (CFS) = 1.6
TIME (MIN) = 315	DISCHARGE (CFS) = 1.5
TIME (MIN) = 320	DISCHARGE (CFS) = 1.4
TIME (MIN) = 325	DISCHARGE (CFS) = 1.4
TIME (MIN) = 330	DISCHARGE (CFS) = 1.3
TIME (MIN) = 335	DISCHARGE (CFS) = 1.3
TIME (MIN) = 340	DISCHARGE (CFS) = 1.2
TIME (MIN) = 345	DISCHARGE (CFS) = 1.2
TIME (MIN) = 350	DISCHARGE (CFS) = 1.2
TIME (MIN) = 355	DISCHARGE (CFS) = 1.1
TIME (MIN) = 360	DISCHARGE (CFS) = 1.1

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 2 - 50 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 11.5 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 30.8 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 1.3
TIME (MIN) = 10	DISCHARGE (CFS) = 1.3
TIME (MIN) = 15	DISCHARGE (CFS) = 1.3
TIME (MIN) = 20	DISCHARGE (CFS) = 1.3
TIME (MIN) = 25	DISCHARGE (CFS) = 1.3
TIME (MIN) = 30	DISCHARGE (CFS) = 1.3
TIME (MIN) = 35	DISCHARGE (CFS) = 1.4
TIME (MIN) = 40	DISCHARGE (CFS) = 1.4
TIME (MIN) = 45	DISCHARGE (CFS) = 1.4
TIME (MIN) = 50	DISCHARGE (CFS) = 1.4
TIME (MIN) = 55	DISCHARGE (CFS) = 1.5
TIME (MIN) = 60	DISCHARGE (CFS) = 1.5
TIME (MIN) = 65	DISCHARGE (CFS) = 1.5
TIME (MIN) = 70	DISCHARGE (CFS) = 1.5
TIME (MIN) = 75	DISCHARGE (CFS) = 1.6
TIME (MIN) = 80	DISCHARGE (CFS) = 1.6
TIME (MIN) = 85	DISCHARGE (CFS) = 1.6
TIME (MIN) = 90	DISCHARGE (CFS) = 1.7
TIME (MIN) = 95	DISCHARGE (CFS) = 1.7
TIME (MIN) = 100	DISCHARGE (CFS) = 1.7
TIME (MIN) = 105	DISCHARGE (CFS) = 1.8
TIME (MIN) = 110	DISCHARGE (CFS) = 1.8
TIME (MIN) = 115	DISCHARGE (CFS) = 1.9
TIME (MIN) = 120	DISCHARGE (CFS) = 1.9
TIME (MIN) = 125	DISCHARGE (CFS) = 2
TIME (MIN) = 130	DISCHARGE (CFS) = 2
TIME (MIN) = 135	DISCHARGE (CFS) = 2.1
TIME (MIN) = 140	DISCHARGE (CFS) = 2.1
TIME (MIN) = 145	DISCHARGE (CFS) = 2.2
TIME (MIN) = 150	DISCHARGE (CFS) = 2.3
TIME (MIN) = 155	DISCHARGE (CFS) = 2.4
TIME (MIN) = 160	DISCHARGE (CFS) = 2.4
TIME (MIN) = 165	DISCHARGE (CFS) = 2.6
TIME (MIN) = 170	DISCHARGE (CFS) = 2.6
TIME (MIN) = 175	DISCHARGE (CFS) = 2.8
TIME (MIN) = 180	DISCHARGE (CFS) = 2.9
TIME (MIN) = 185	DISCHARGE (CFS) = 3.1
TIME (MIN) = 190	DISCHARGE (CFS) = 3.2
TIME (MIN) = 195	DISCHARGE (CFS) = 3.5
TIME (MIN) = 200	DISCHARGE (CFS) = 3.7
TIME (MIN) = 205	DISCHARGE (CFS) = 4.1
TIME (MIN) = 210	DISCHARGE (CFS) = 4.3
TIME (MIN) = 215	DISCHARGE (CFS) = 4.9
TIME (MIN) = 220	DISCHARGE (CFS) = 5.4
TIME (MIN) = 225	DISCHARGE (CFS) = 6.6
TIME (MIN) = 230	DISCHARGE (CFS) = 7.5
TIME (MIN) = 235	DISCHARGE (CFS) = 11
TIME (MIN) = 240	DISCHARGE (CFS) = 40
TIME (MIN) = 245	DISCHARGE (CFS) = 30.8
TIME (MIN) = 250	DISCHARGE (CFS) = 8.8
TIME (MIN) = 255	DISCHARGE (CFS) = 5.9
TIME (MIN) = 260	DISCHARGE (CFS) = 4.6
TIME (MIN) = 265	DISCHARGE (CFS) = 3.9
TIME (MIN) = 270	DISCHARGE (CFS) = 3.4
TIME (MIN) = 275	DISCHARGE (CFS) = 3
TIME (MIN) = 280	DISCHARGE (CFS) = 2.7
TIME (MIN) = 285	DISCHARGE (CFS) = 2.5
TIME (MIN) = 290	DISCHARGE (CFS) = 2.3
TIME (MIN) = 295	DISCHARGE (CFS) = 2.2
TIME (MIN) = 300	DISCHARGE (CFS) = 2
TIME (MIN) = 305	DISCHARGE (CFS) = 1.9
TIME (MIN) = 310	DISCHARGE (CFS) = 1.8
TIME (MIN) = 315	DISCHARGE (CFS) = 1.8
TIME (MIN) = 320	DISCHARGE (CFS) = 1.7
TIME (MIN) = 325	DISCHARGE (CFS) = 1.6
TIME (MIN) = 330	DISCHARGE (CFS) = 1.5
TIME (MIN) = 335	DISCHARGE (CFS) = 1.5
TIME (MIN) = 340	DISCHARGE (CFS) = 1.4
TIME (MIN) = 345	DISCHARGE (CFS) = 1.4
TIME (MIN) = 350	DISCHARGE (CFS) = 1.4
TIME (MIN) = 355	DISCHARGE (CFS) = 1.3
TIME (MIN) = 360	DISCHARGE (CFS) = 1.3

RATIONAL METHOD HYDROGRAPH PROGRAM

Basin 2 - 100 Year Storm Event

RUN DATE 3/26/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 11.5 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 33.7 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 1.4
TIME (MIN) = 10	DISCHARGE (CFS) = 1.4
TIME (MIN) = 15	DISCHARGE (CFS) = 1.4
TIME (MIN) = 20	DISCHARGE (CFS) = 1.4
TIME (MIN) = 25	DISCHARGE (CFS) = 1.5
TIME (MIN) = 30	DISCHARGE (CFS) = 1.5
TIME (MIN) = 35	DISCHARGE (CFS) = 1.5
TIME (MIN) = 40	DISCHARGE (CFS) = 1.5
TIME (MIN) = 45	DISCHARGE (CFS) = 1.5
TIME (MIN) = 50	DISCHARGE (CFS) = 1.6
TIME (MIN) = 55	DISCHARGE (CFS) = 1.6
TIME (MIN) = 60	DISCHARGE (CFS) = 1.6
TIME (MIN) = 65	DISCHARGE (CFS) = 1.7
TIME (MIN) = 70	DISCHARGE (CFS) = 1.7
TIME (MIN) = 75	DISCHARGE (CFS) = 1.7
TIME (MIN) = 80	DISCHARGE (CFS) = 1.7
TIME (MIN) = 85	DISCHARGE (CFS) = 1.8
TIME (MIN) = 90	DISCHARGE (CFS) = 1.8
TIME (MIN) = 95	DISCHARGE (CFS) = 1.9
TIME (MIN) = 100	DISCHARGE (CFS) = 1.9
TIME (MIN) = 105	DISCHARGE (CFS) = 1.9
TIME (MIN) = 110	DISCHARGE (CFS) = 2
TIME (MIN) = 115	DISCHARGE (CFS) = 2
TIME (MIN) = 120	DISCHARGE (CFS) = 2.1
TIME (MIN) = 125	DISCHARGE (CFS) = 2.2
TIME (MIN) = 130	DISCHARGE (CFS) = 2.2
TIME (MIN) = 135	DISCHARGE (CFS) = 2.3
TIME (MIN) = 140	DISCHARGE (CFS) = 2.3
TIME (MIN) = 145	DISCHARGE (CFS) = 2.4
TIME (MIN) = 150	DISCHARGE (CFS) = 2.5
TIME (MIN) = 155	DISCHARGE (CFS) = 2.6
TIME (MIN) = 160	DISCHARGE (CFS) = 2.7
TIME (MIN) = 165	DISCHARGE (CFS) = 2.8
TIME (MIN) = 170	DISCHARGE (CFS) = 2.9
TIME (MIN) = 175	DISCHARGE (CFS) = 3.1
TIME (MIN) = 180	DISCHARGE (CFS) = 3.2
TIME (MIN) = 185	DISCHARGE (CFS) = 3.4
TIME (MIN) = 190	DISCHARGE (CFS) = 3.5
TIME (MIN) = 195	DISCHARGE (CFS) = 3.8
TIME (MIN) = 200	DISCHARGE (CFS) = 4
TIME (MIN) = 205	DISCHARGE (CFS) = 4.5
TIME (MIN) = 210	DISCHARGE (CFS) = 4.7
TIME (MIN) = 215	DISCHARGE (CFS) = 5.4
TIME (MIN) = 220	DISCHARGE (CFS) = 5.9
TIME (MIN) = 225	DISCHARGE (CFS) = 7.2
TIME (MIN) = 230	DISCHARGE (CFS) = 8.2
TIME (MIN) = 235	DISCHARGE (CFS) = 12
TIME (MIN) = 240	DISCHARGE (CFS) = 43.8
TIME (MIN) = 245	DISCHARGE (CFS) = 33.7
TIME (MIN) = 250	DISCHARGE (CFS) = 9.6
TIME (MIN) = 255	DISCHARGE (CFS) = 6.4
TIME (MIN) = 260	DISCHARGE (CFS) = 5
TIME (MIN) = 265	DISCHARGE (CFS) = 4.2
TIME (MIN) = 270	DISCHARGE (CFS) = 3.7
TIME (MIN) = 275	DISCHARGE (CFS) = 3.3
TIME (MIN) = 280	DISCHARGE (CFS) = 3
TIME (MIN) = 285	DISCHARGE (CFS) = 2.7
TIME (MIN) = 290	DISCHARGE (CFS) = 2.5
TIME (MIN) = 295	DISCHARGE (CFS) = 2.4
TIME (MIN) = 300	DISCHARGE (CFS) = 2.2
TIME (MIN) = 305	DISCHARGE (CFS) = 2.1
TIME (MIN) = 310	DISCHARGE (CFS) = 2
TIME (MIN) = 315	DISCHARGE (CFS) = 1.9
TIME (MIN) = 320	DISCHARGE (CFS) = 1.8
TIME (MIN) = 325	DISCHARGE (CFS) = 1.8
TIME (MIN) = 330	DISCHARGE (CFS) = 1.7
TIME (MIN) = 335	DISCHARGE (CFS) = 1.6
TIME (MIN) = 340	DISCHARGE (CFS) = 1.6
TIME (MIN) = 345	DISCHARGE (CFS) = 1.5
TIME (MIN) = 350	DISCHARGE (CFS) = 1.5
TIME (MIN) = 355	DISCHARGE (CFS) = 1.4
TIME (MIN) = 360	DISCHARGE (CFS) = 1.4

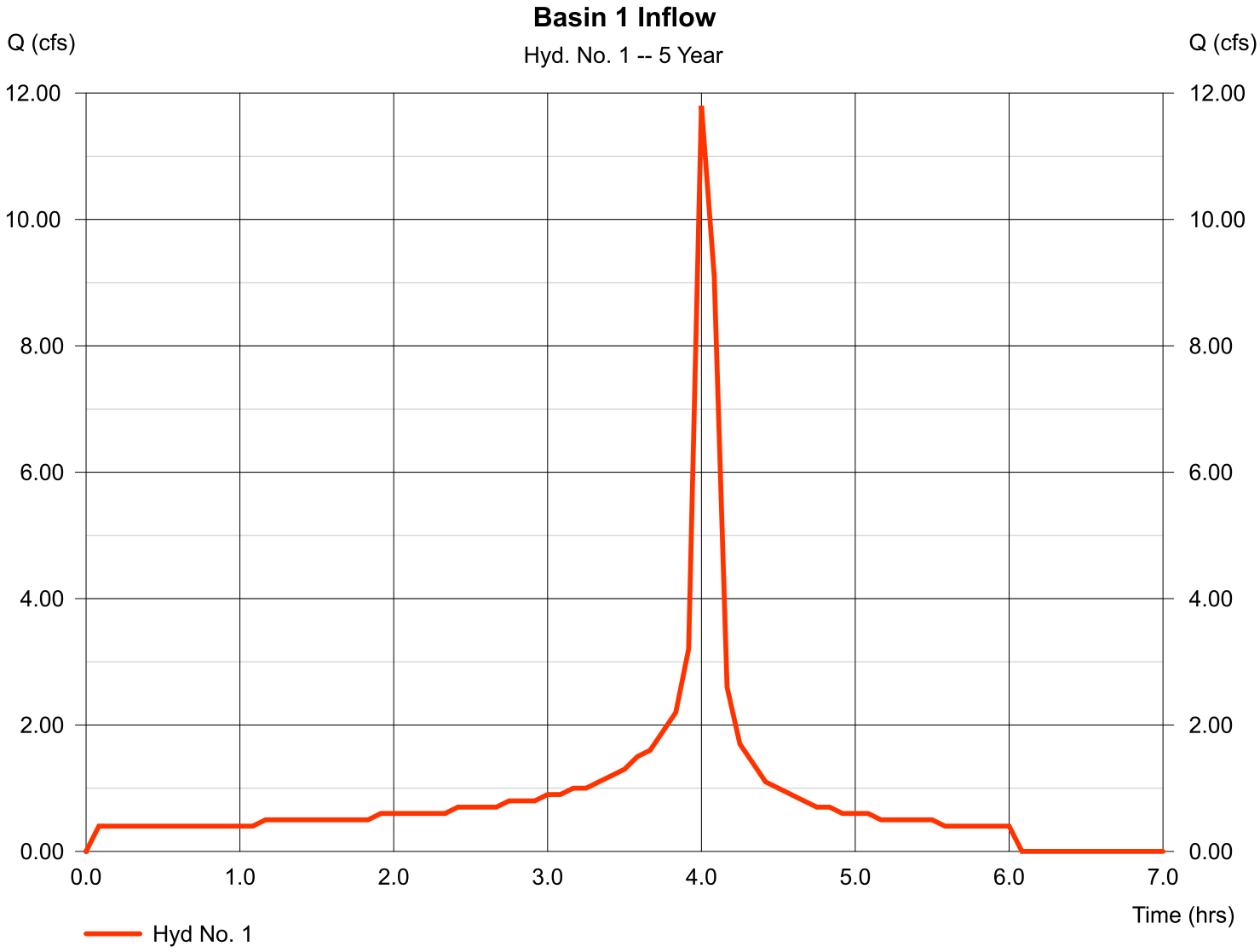
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Thursday, 03 / 26 / 2020

Hyd. No. 1

Basin 1 Inflow

Hydrograph type	= Manual	Peak discharge	= 11.80 cfs
Storm frequency	= 5 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 22,440 cuft

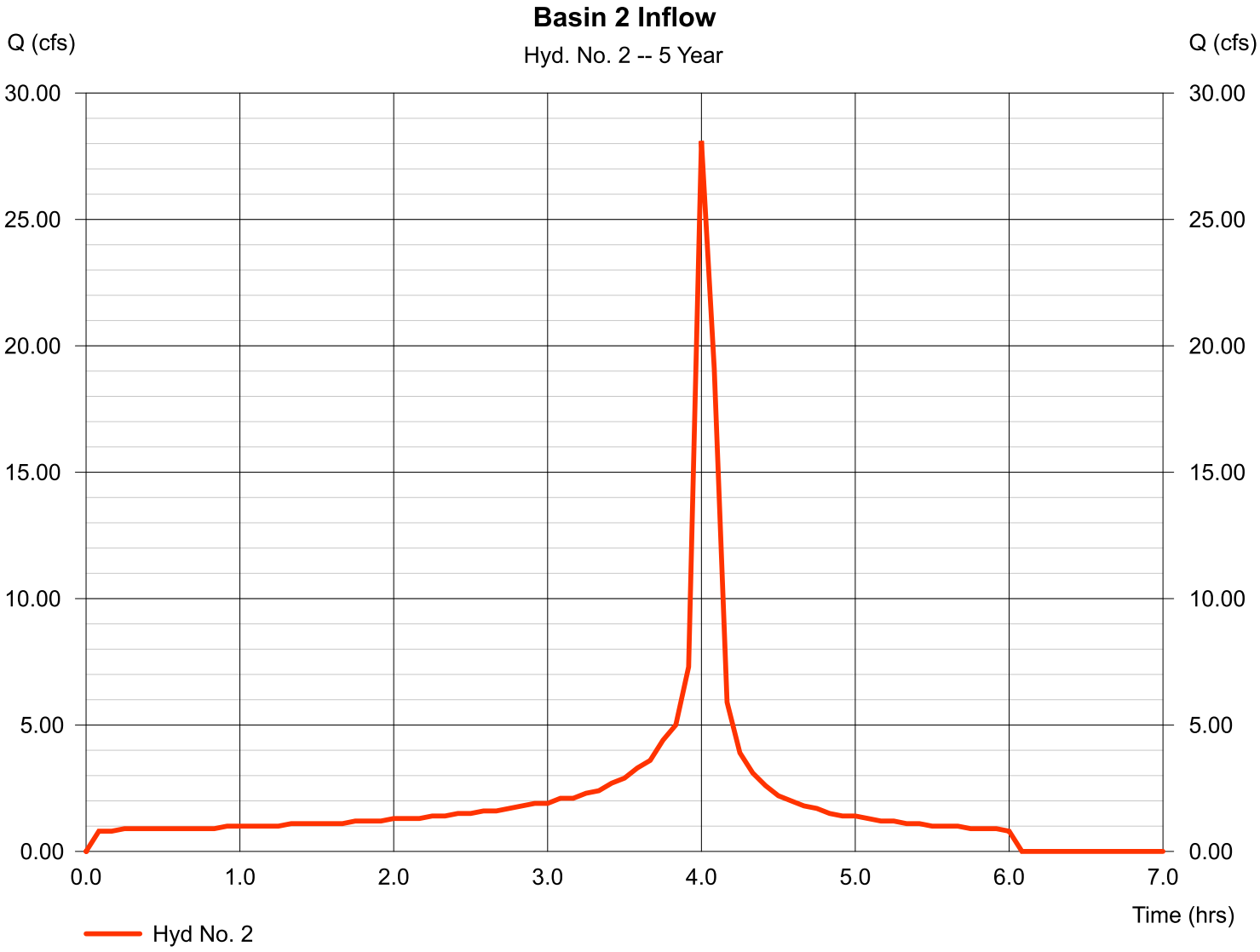


Hydrograph Report

Hyd. No. 2

Basin 2 Inflow

Hydrograph type	= Manual	Peak discharge	= 28.10 cfs
Storm frequency	= 5 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 50,490 cuft



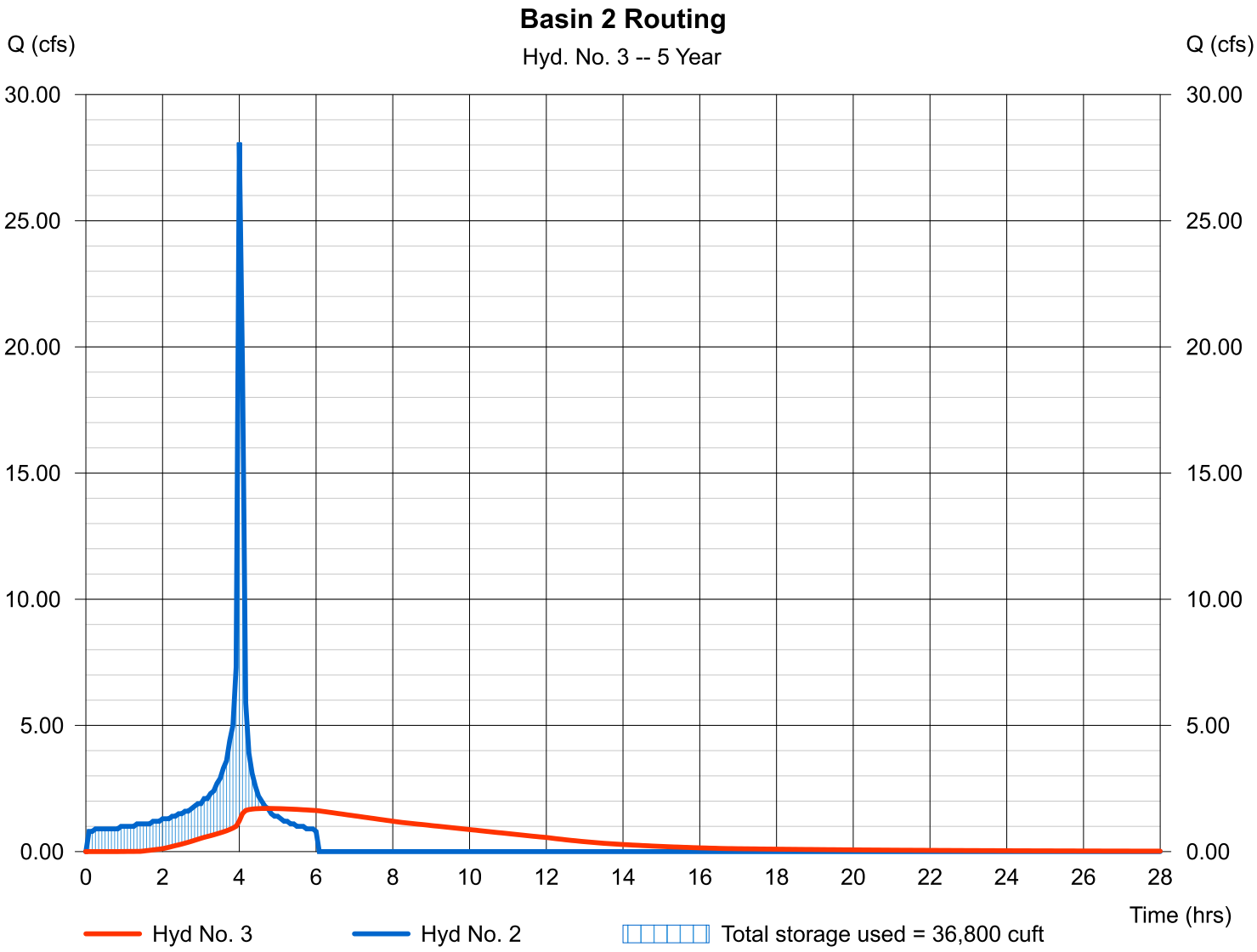
Hydrograph Report

Hyd. No. 3

Basin 2 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	1.709 cfs
Storm frequency	=	5 yrs	Time to peak	=	4.75 hrs
Time interval	=	5 min	Hyd. volume	=	47,867 cuft
Inflow hyd. No.	=	2 - Basin 2 Inflow	Max. Elevation	=	482.04 ft
Reservoir name	=	Basin 2	Max. Storage	=	36,800 cuft

Storage Indication method used.



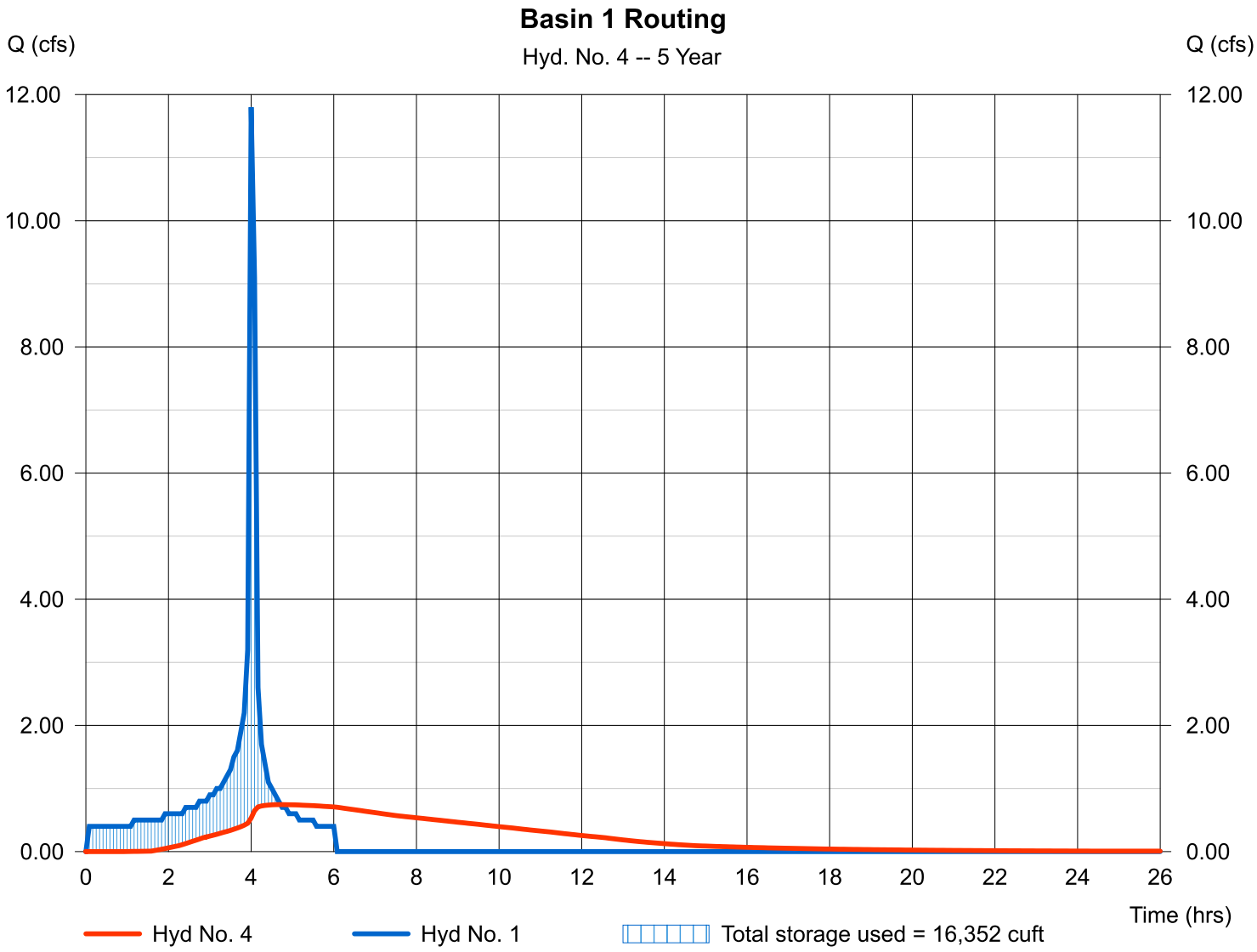
Hydrograph Report

Hyd. No. 4

Basin 1 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.744 cfs
Storm frequency	=	5 yrs	Time to peak	=	4.75 hrs
Time interval	=	5 min	Hyd. volume	=	21,077 cuft
Inflow hyd. No.	=	1 - Basin 1 Inflow	Max. Elevation	=	478.44 ft
Reservoir name	=	Basin 1	Max. Storage	=	16,352 cuft

Storage Indication method used.

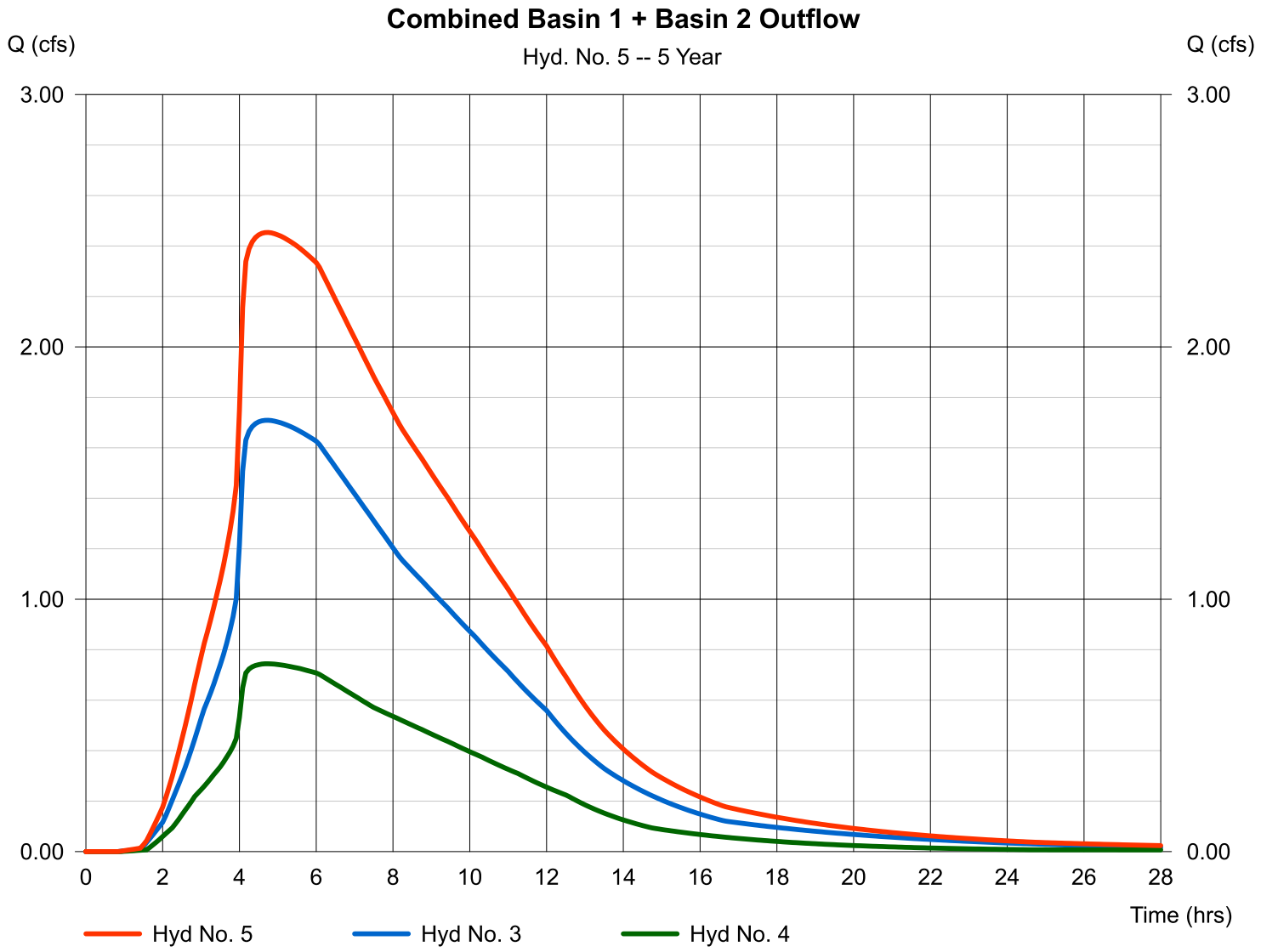


Hydrograph Report

Hyd. No. 5

Combined Basin 1 + Basin 2 Outflow

Hydrograph type	= Combine	Peak discharge	= 2.454 cfs
Storm frequency	= 5 yrs	Time to peak	= 4.75 hrs
Time interval	= 5 min	Hyd. volume	= 68,944 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 0.000 ac

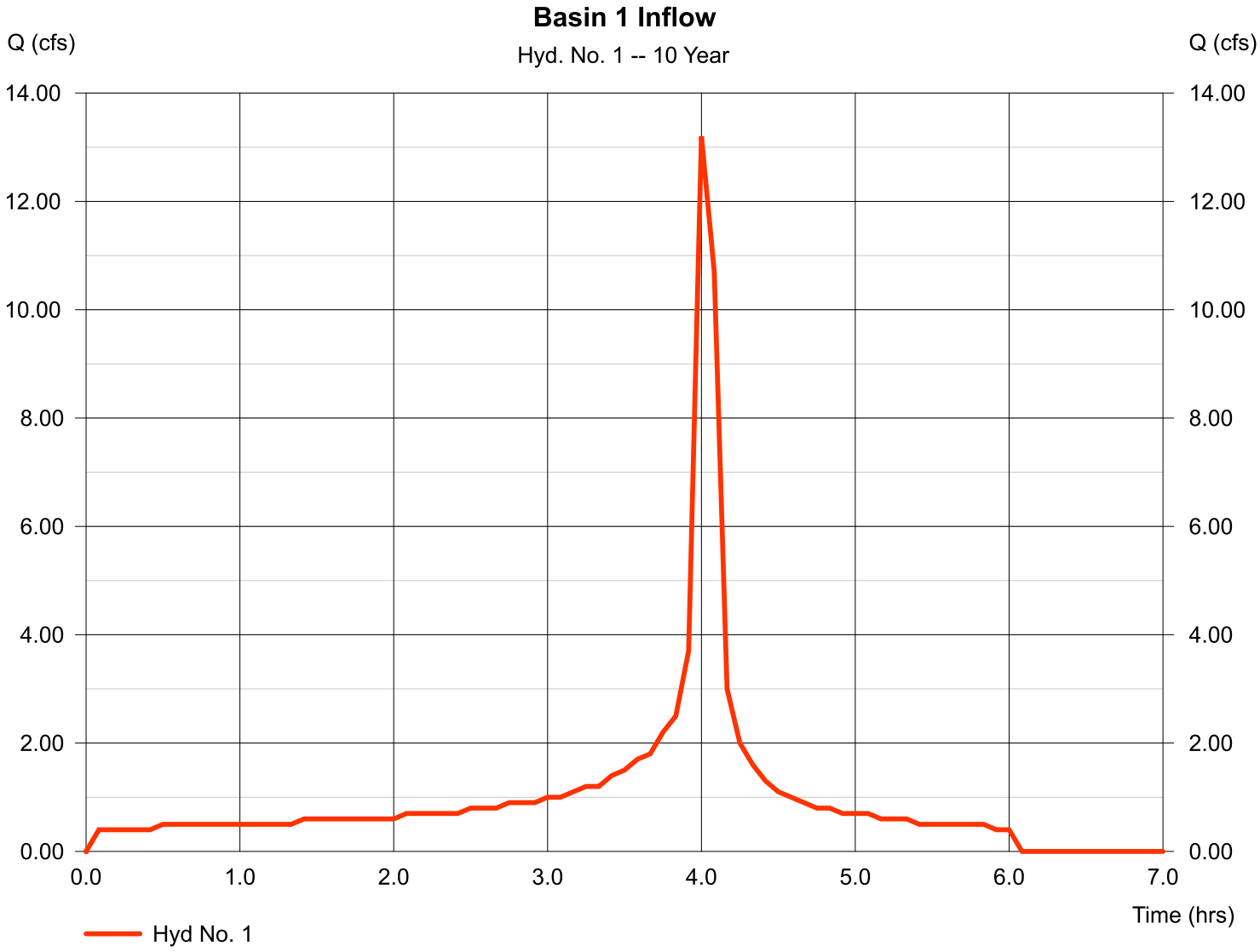


Hydrograph Report

Hyd. No. 1

Basin 1 Inflow

Hydrograph type	= Manual	Peak discharge	= 13.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 25,590 cuft

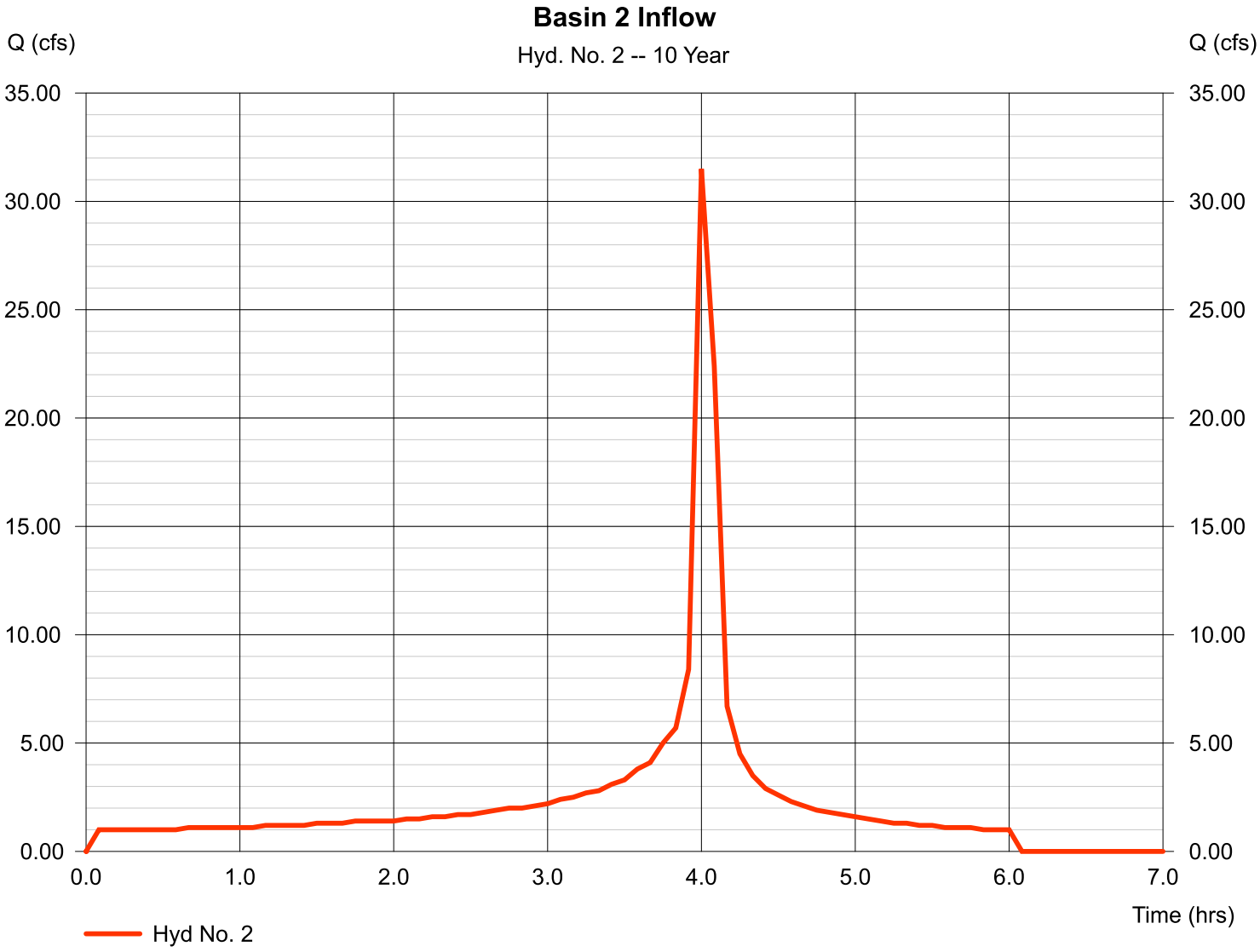


Hydrograph Report

Hyd. No. 2

Basin 2 Inflow

Hydrograph type	= Manual	Peak discharge	= 31.50 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 57,900 cuft



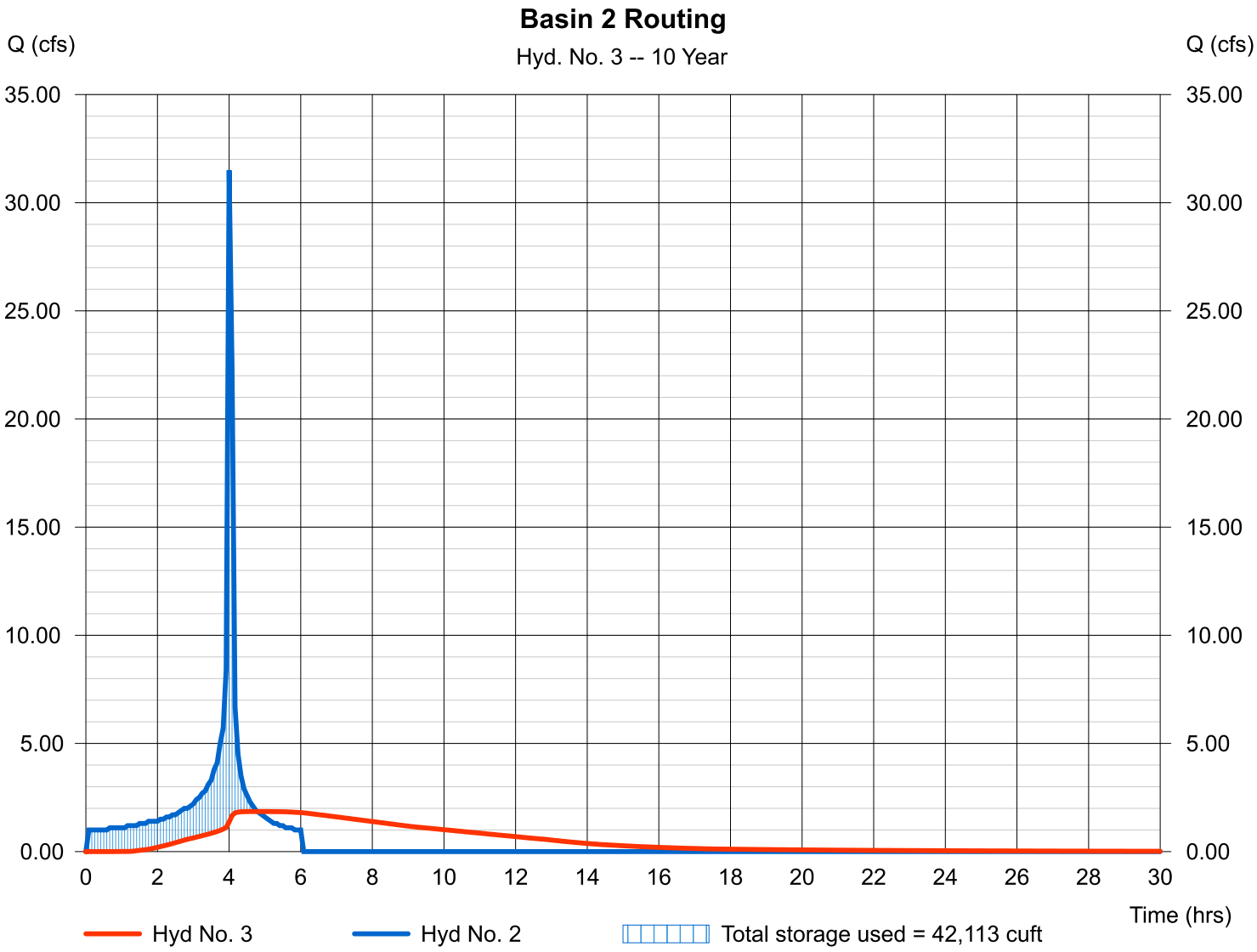
Hydrograph Report

Hyd. No. 3

Basin 2 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	1.851 cfs
Storm frequency	=	10 yrs	Time to peak	=	4.75 hrs
Time interval	=	5 min	Hyd. volume	=	55,277 cuft
Inflow hyd. No.	=	2 - Basin 2 Inflow	Max. Elevation	=	482.43 ft
Reservoir name	=	Basin 2	Max. Storage	=	42,113 cuft

Storage Indication method used.



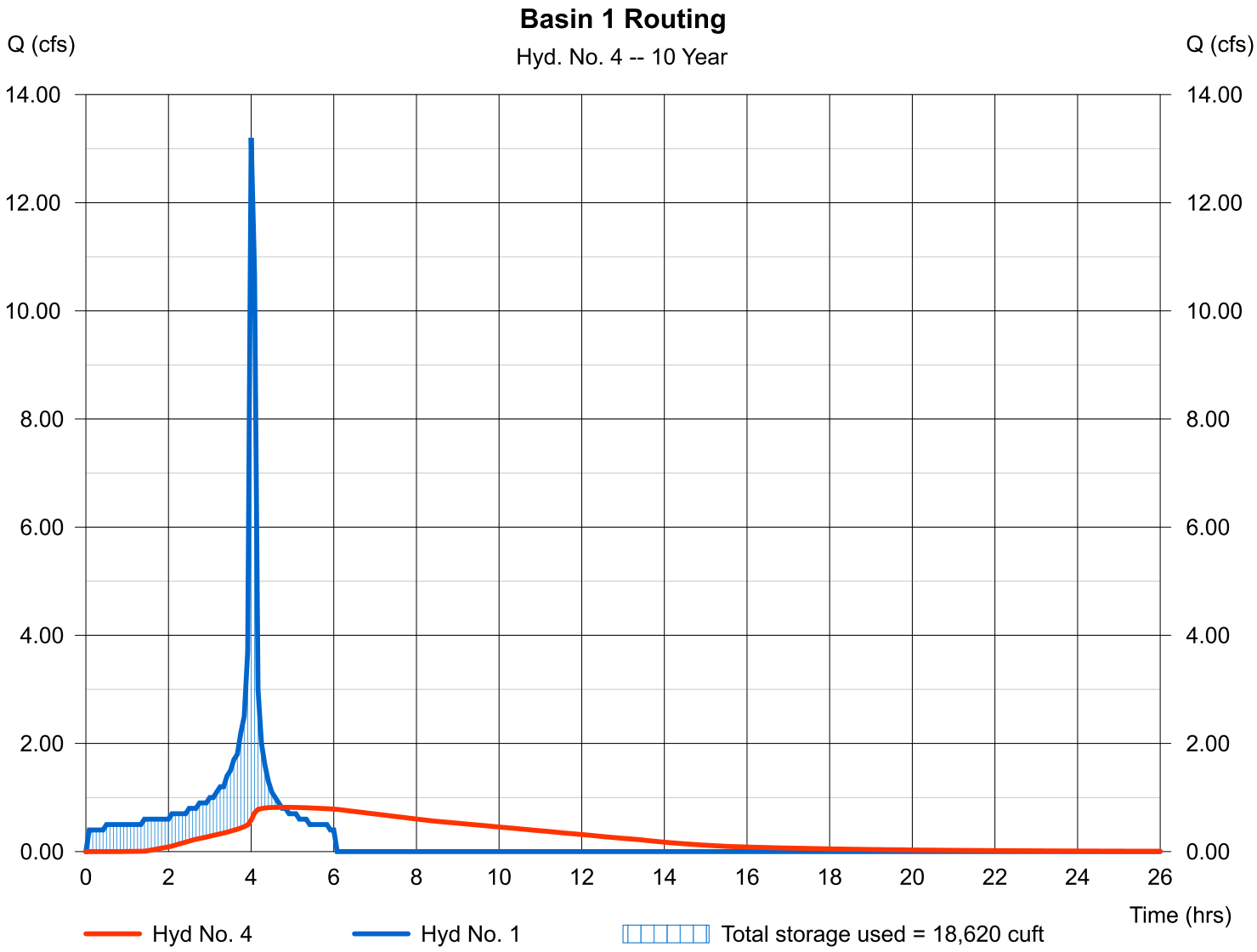
Hydrograph Report

Hyd. No. 4

Basin 1 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.819 cfs
Storm frequency	=	10 yrs	Time to peak	=	4.75 hrs
Time interval	=	5 min	Hyd. volume	=	24,227 cuft
Inflow hyd. No.	=	1 - Basin 1 Inflow	Max. Elevation	=	478.82 ft
Reservoir name	=	Basin 1	Max. Storage	=	18,620 cuft

Storage Indication method used.

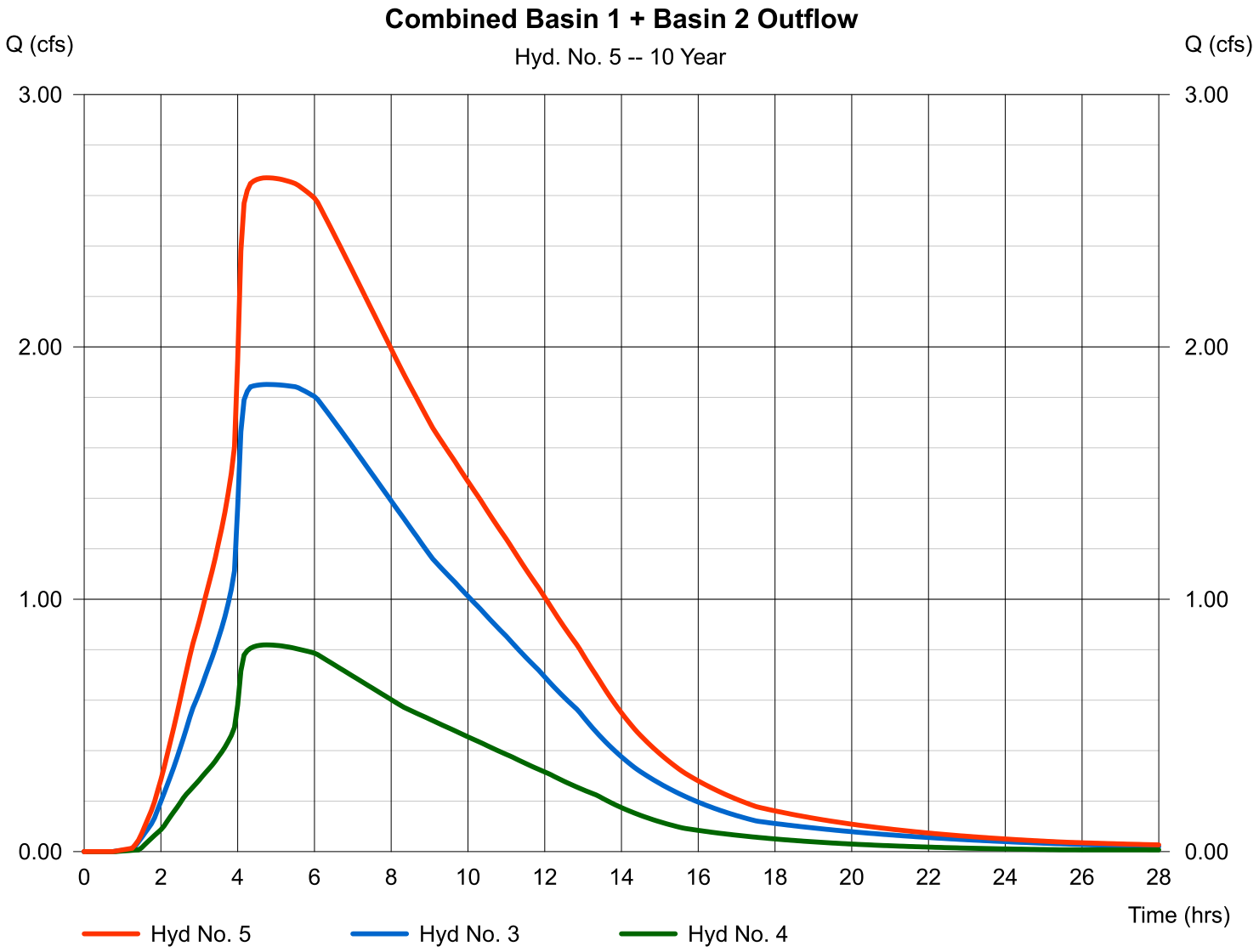


Hydrograph Report

Hyd. No. 5

Combined Basin 1 + Basin 2 Outflow

Hydrograph type	= Combine	Peak discharge	= 2.670 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.75 hrs
Time interval	= 5 min	Hyd. volume	= 79,504 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 0.000 ac

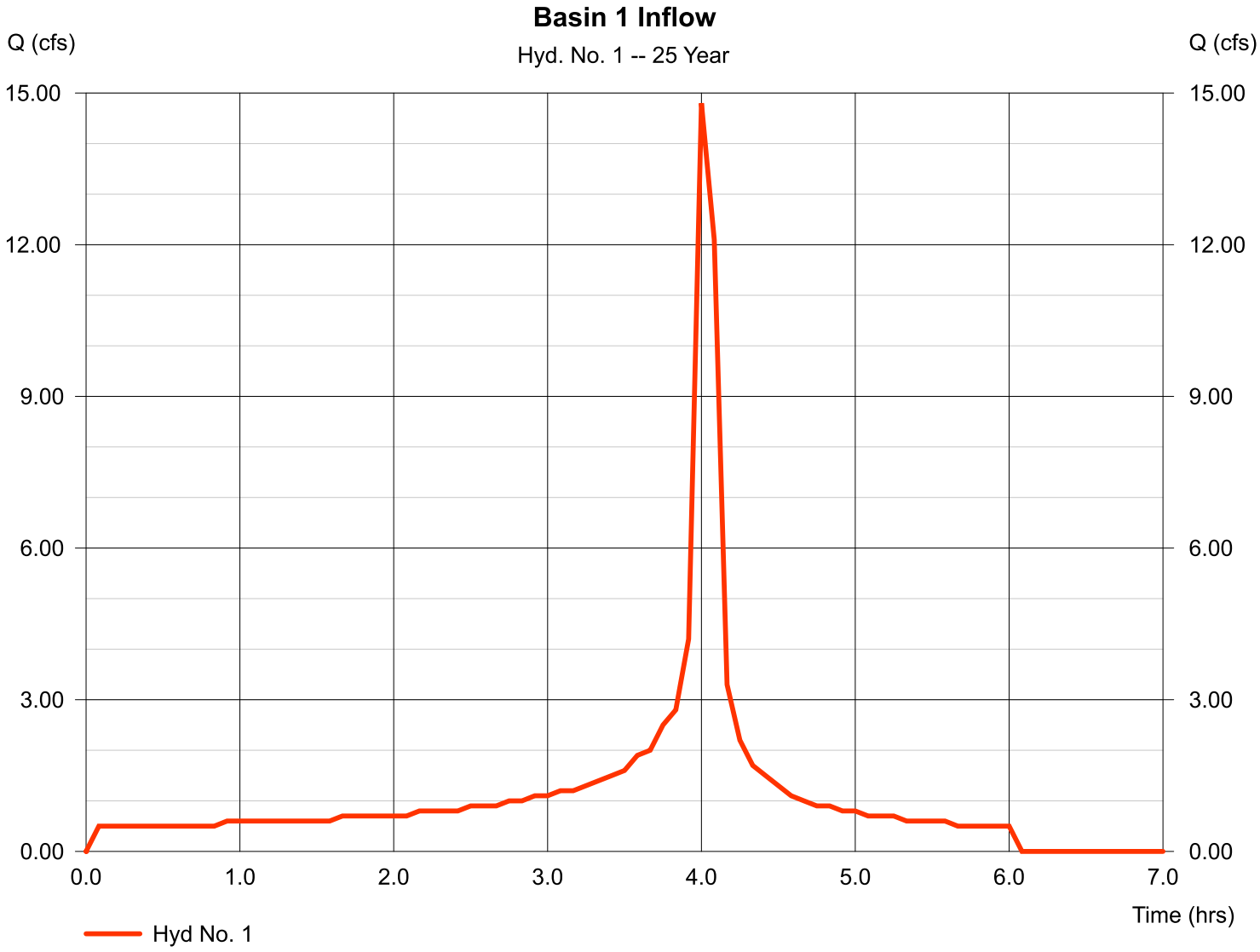


Hydrograph Report

Hyd. No. 1

Basin 1 Inflow

Hydrograph type	= Manual	Peak discharge	= 14.80 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 28,710 cuft

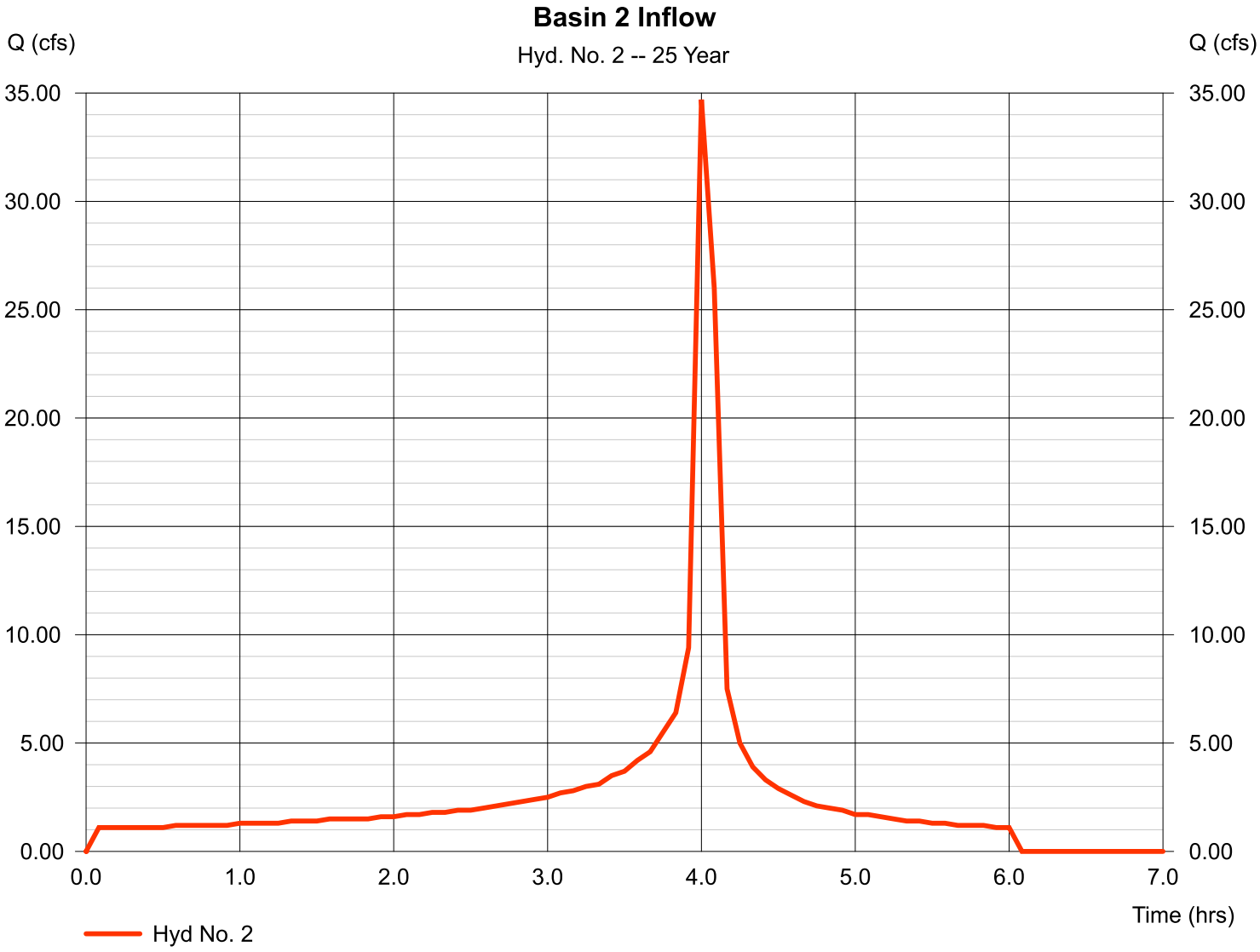


Hydrograph Report

Hyd. No. 2

Basin 2 Inflow

Hydrograph type	= Manual	Peak discharge	= 34.70 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 64,890 cuft



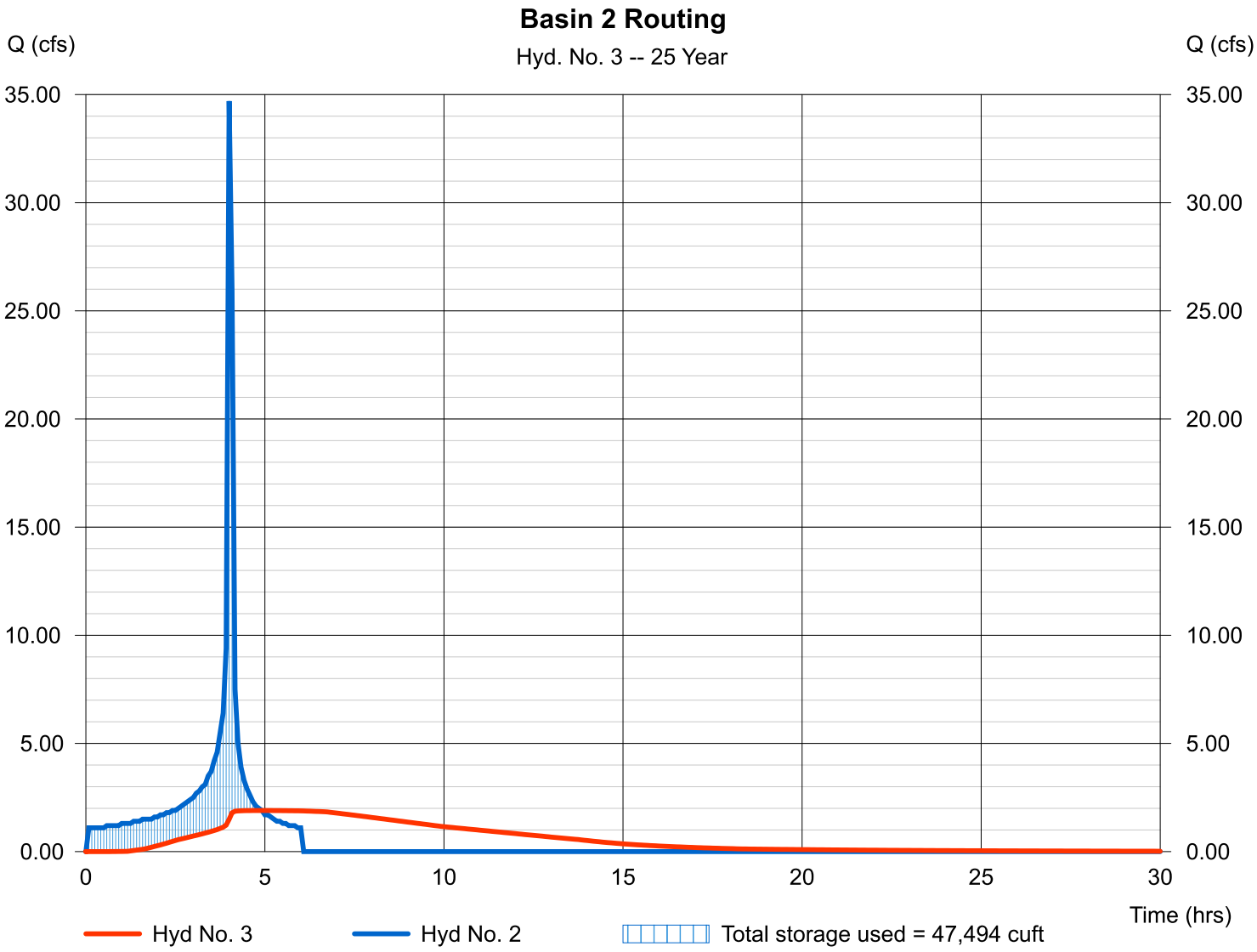
Hydrograph Report

Hyd. No. 3

Basin 2 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	1.899 cfs
Storm frequency	=	25 yrs	Time to peak	=	4.92 hrs
Time interval	=	5 min	Hyd. volume	=	62,267 cuft
Inflow hyd. No.	=	2 - Basin 2 Inflow	Max. Elevation	=	482.56 ft
Reservoir name	=	Basin 2	Max. Storage	=	47,494 cuft

Storage Indication method used.



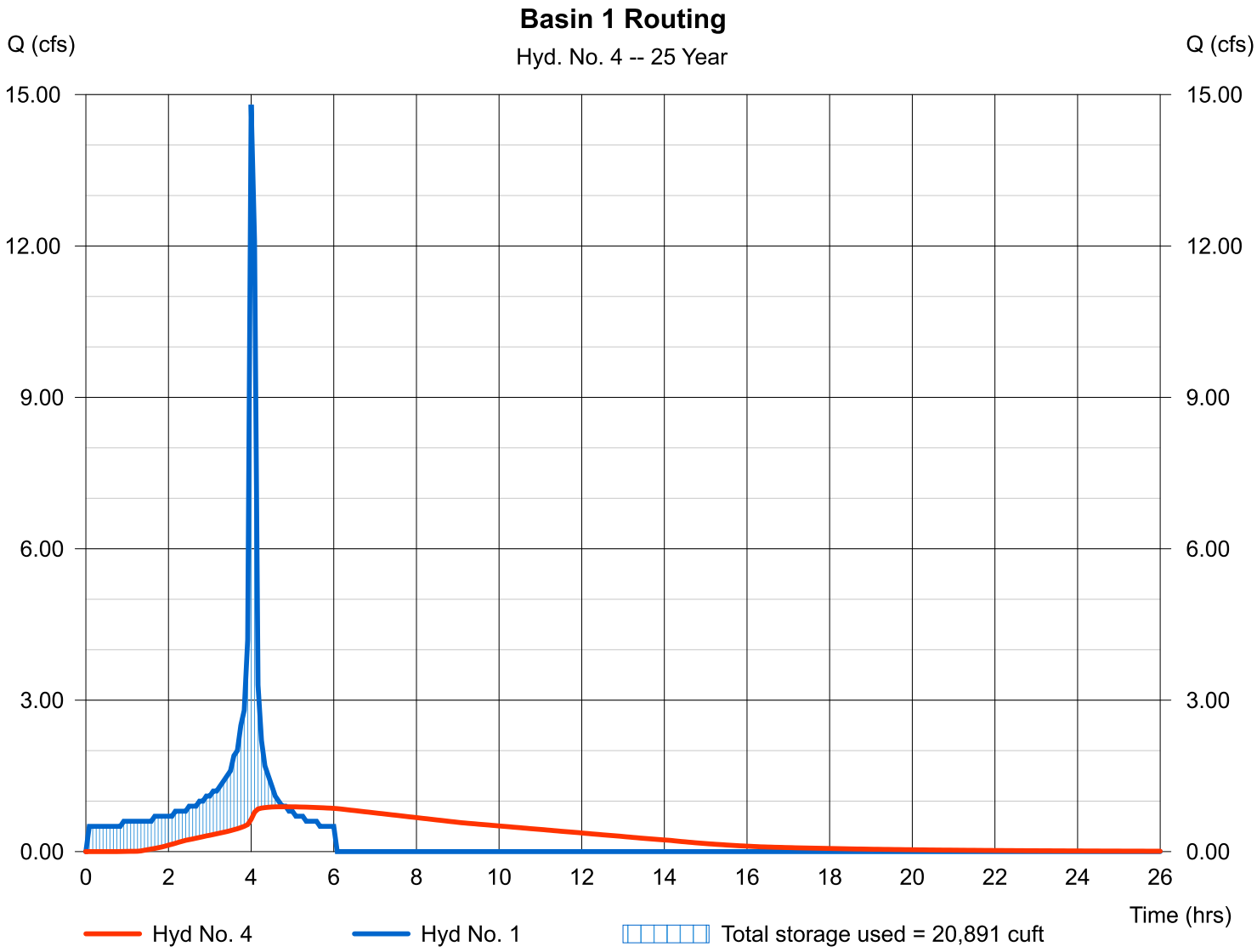
Hydrograph Report

Hyd. No. 4

Basin 1 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.888 cfs
Storm frequency	=	25 yrs	Time to peak	=	4.83 hrs
Time interval	=	5 min	Hyd. volume	=	27,347 cuft
Inflow hyd. No.	=	1 - Basin 1 Inflow	Max. Elevation	=	479.20 ft
Reservoir name	=	Basin 1	Max. Storage	=	20,891 cuft

Storage Indication method used.

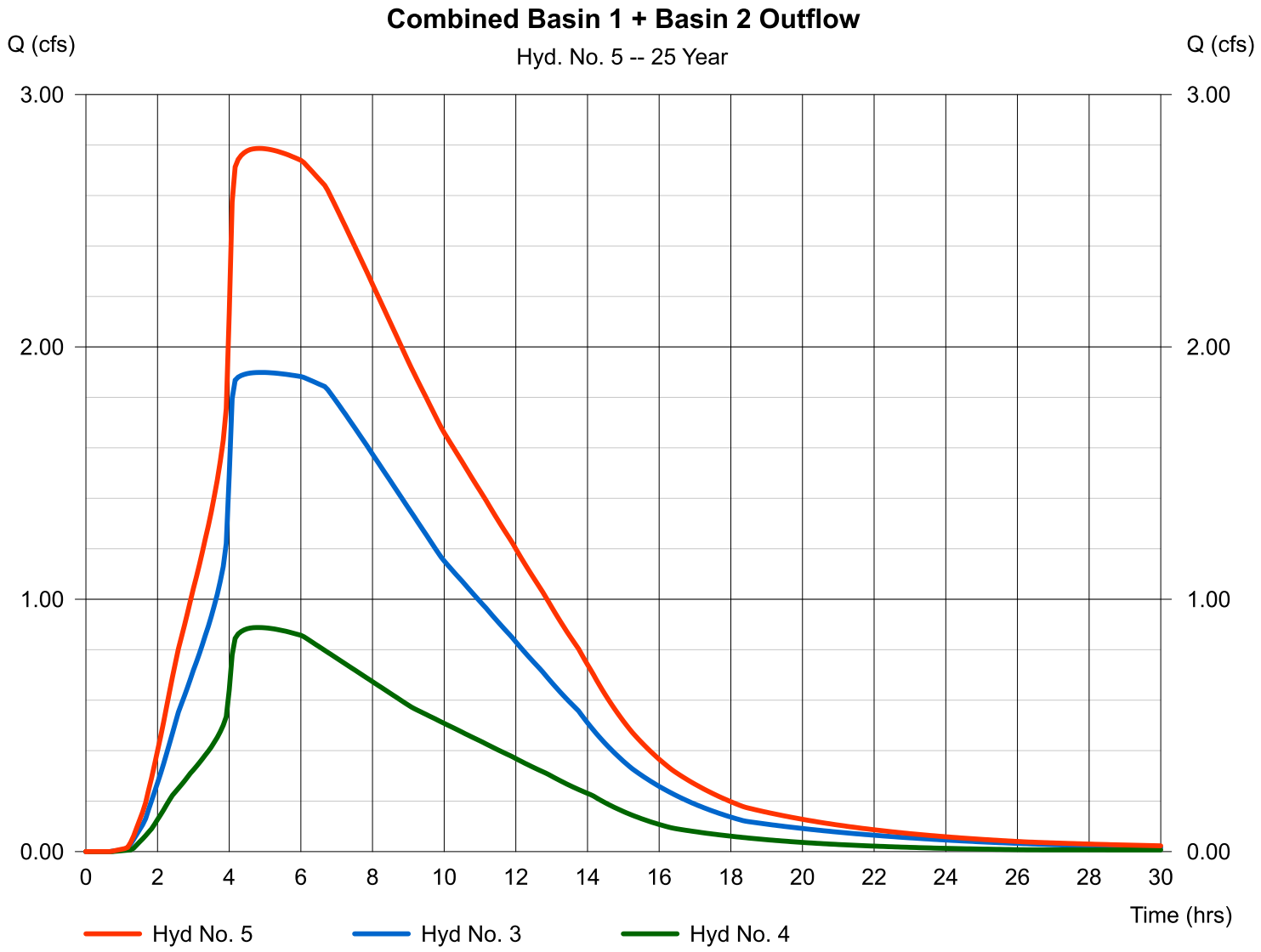


Hydrograph Report

Hyd. No. 5

Combined Basin 1 + Basin 2 Outflow

Hydrograph type	= Combine	Peak discharge	= 2.787 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.83 hrs
Time interval	= 5 min	Hyd. volume	= 89,614 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 0.000 ac

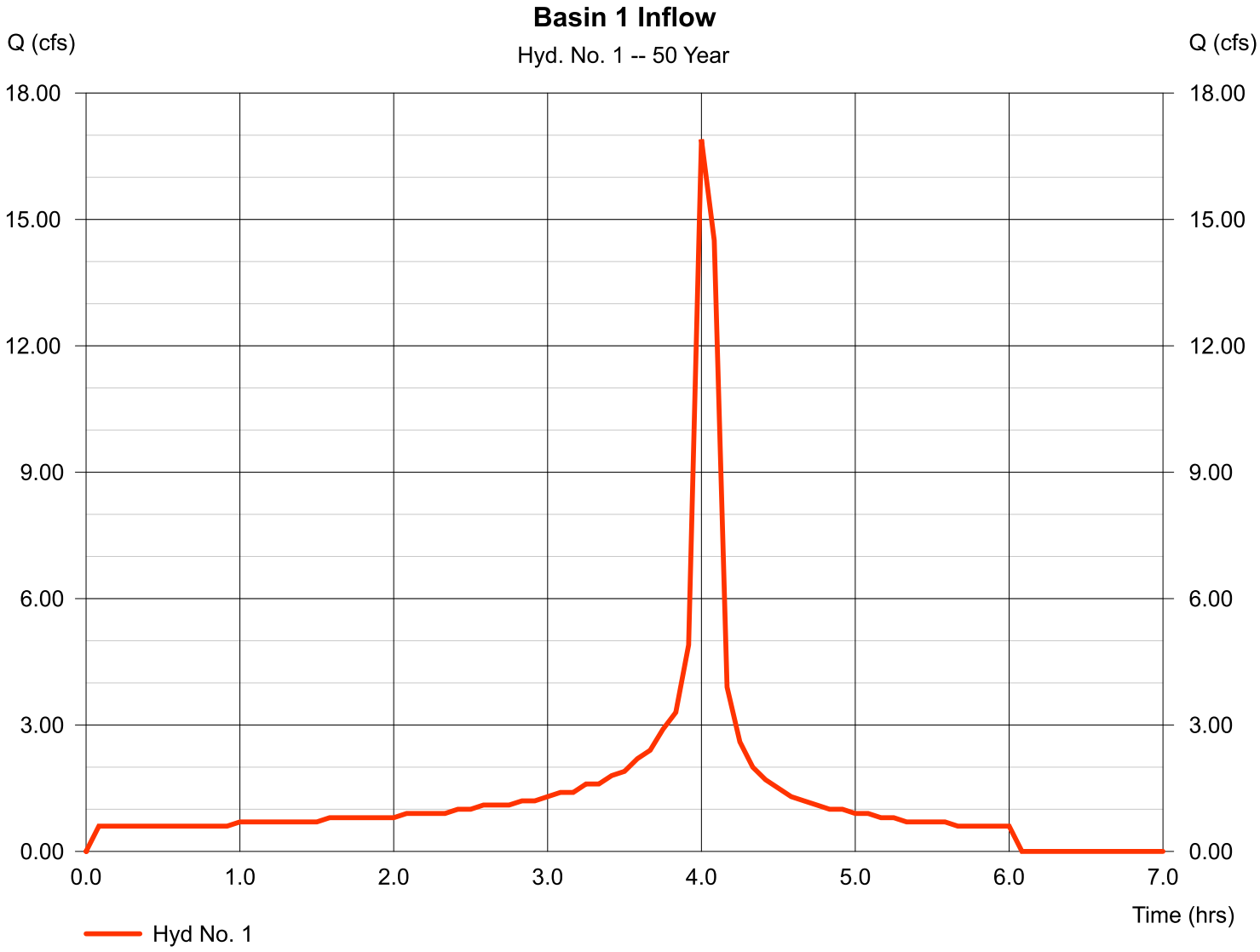


Hydrograph Report

Hyd. No. 1

Basin 1 Inflow

Hydrograph type	= Manual	Peak discharge	= 16.90 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 33,660 cuft

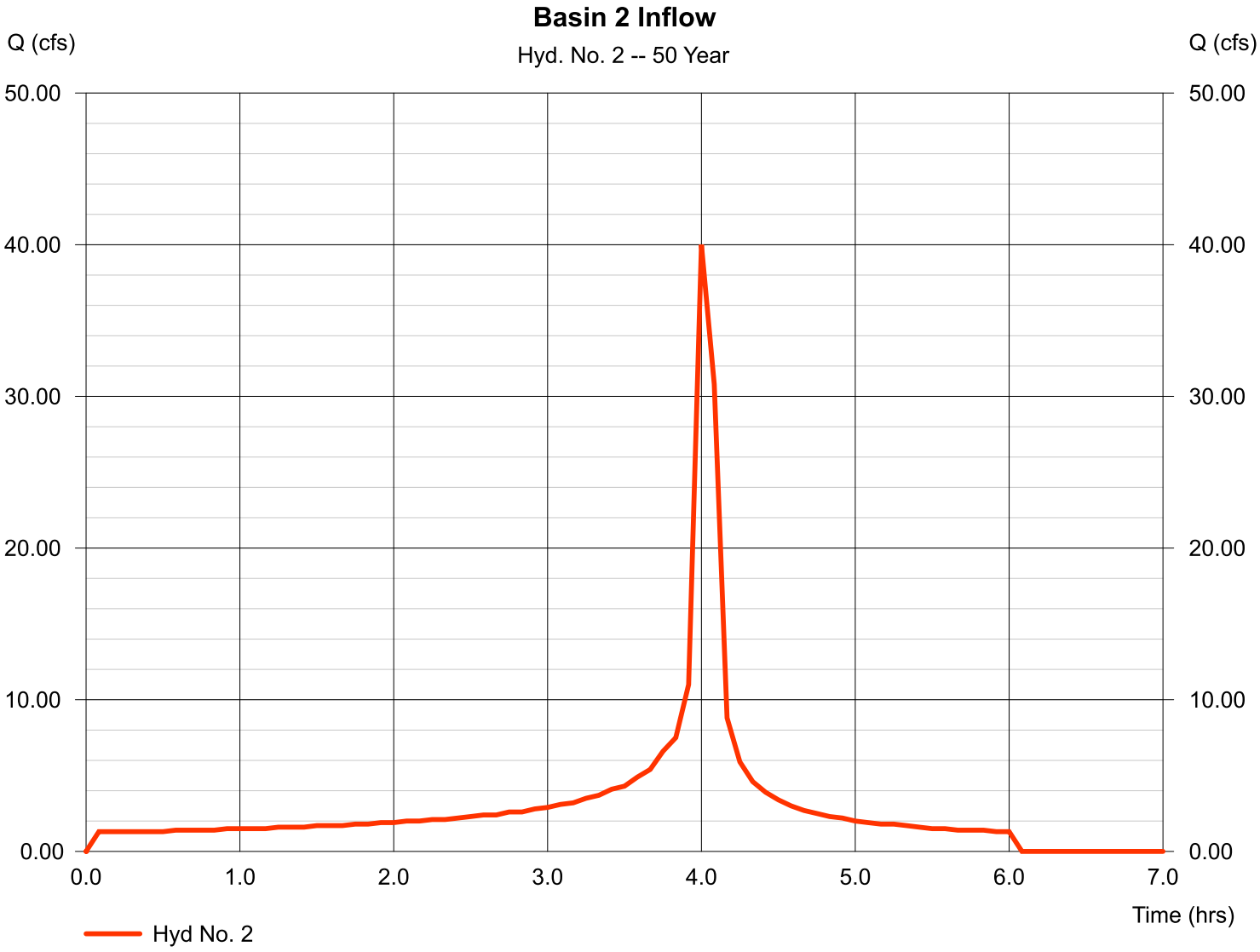


Hydrograph Report

Hyd. No. 2

Basin 2 Inflow

Hydrograph type	= Manual	Peak discharge	= 40.00 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 75,930 cuft



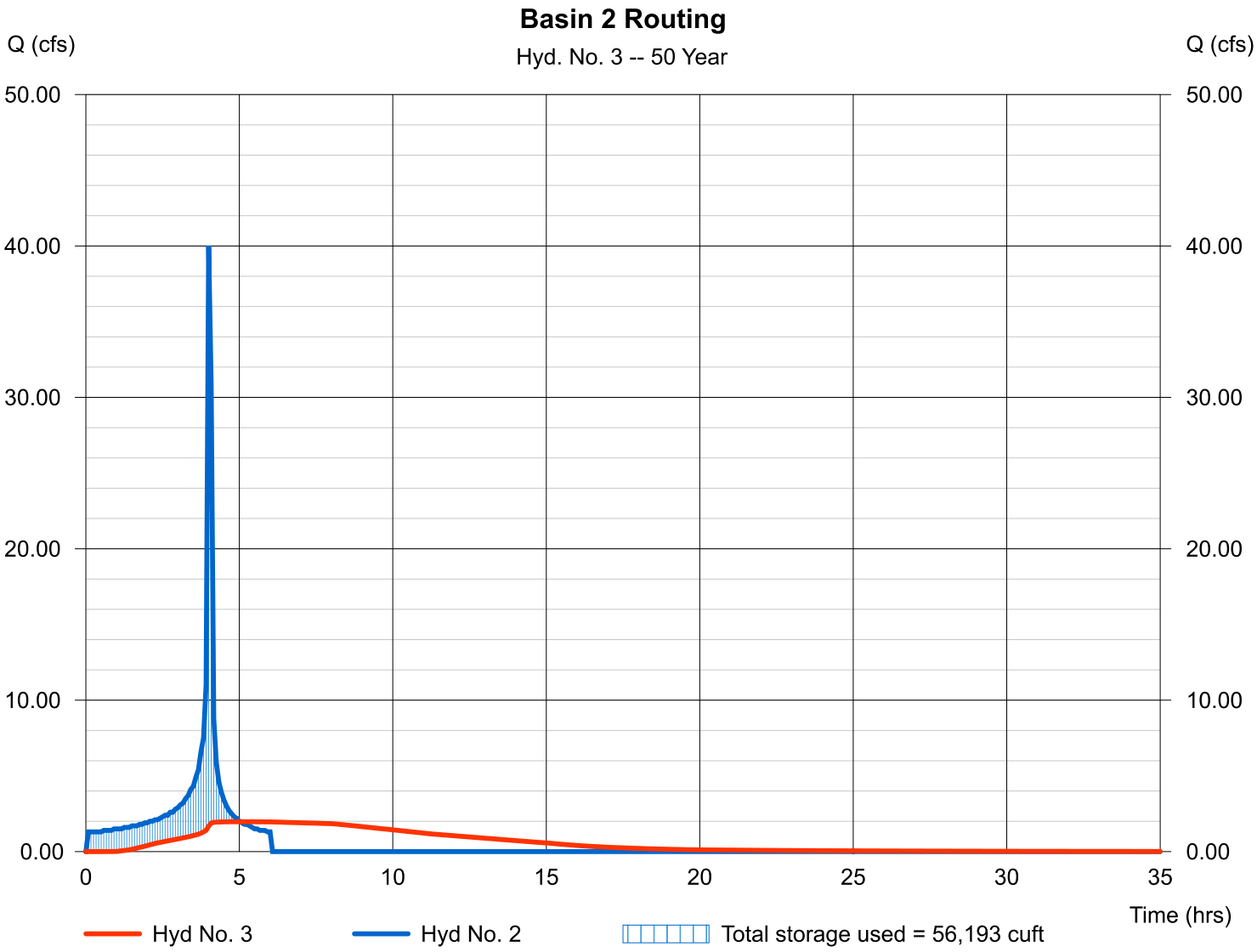
Hydrograph Report

Hyd. No. 3

Basin 2 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	1.973 cfs
Storm frequency	=	50 yrs	Time to peak	=	5.00 hrs
Time interval	=	5 min	Hyd. volume	=	73,307 cuft
Inflow hyd. No.	=	2 - Basin 2 Inflow	Max. Elevation	=	482.78 ft
Reservoir name	=	Basin 2	Max. Storage	=	56,193 cuft

Storage Indication method used.



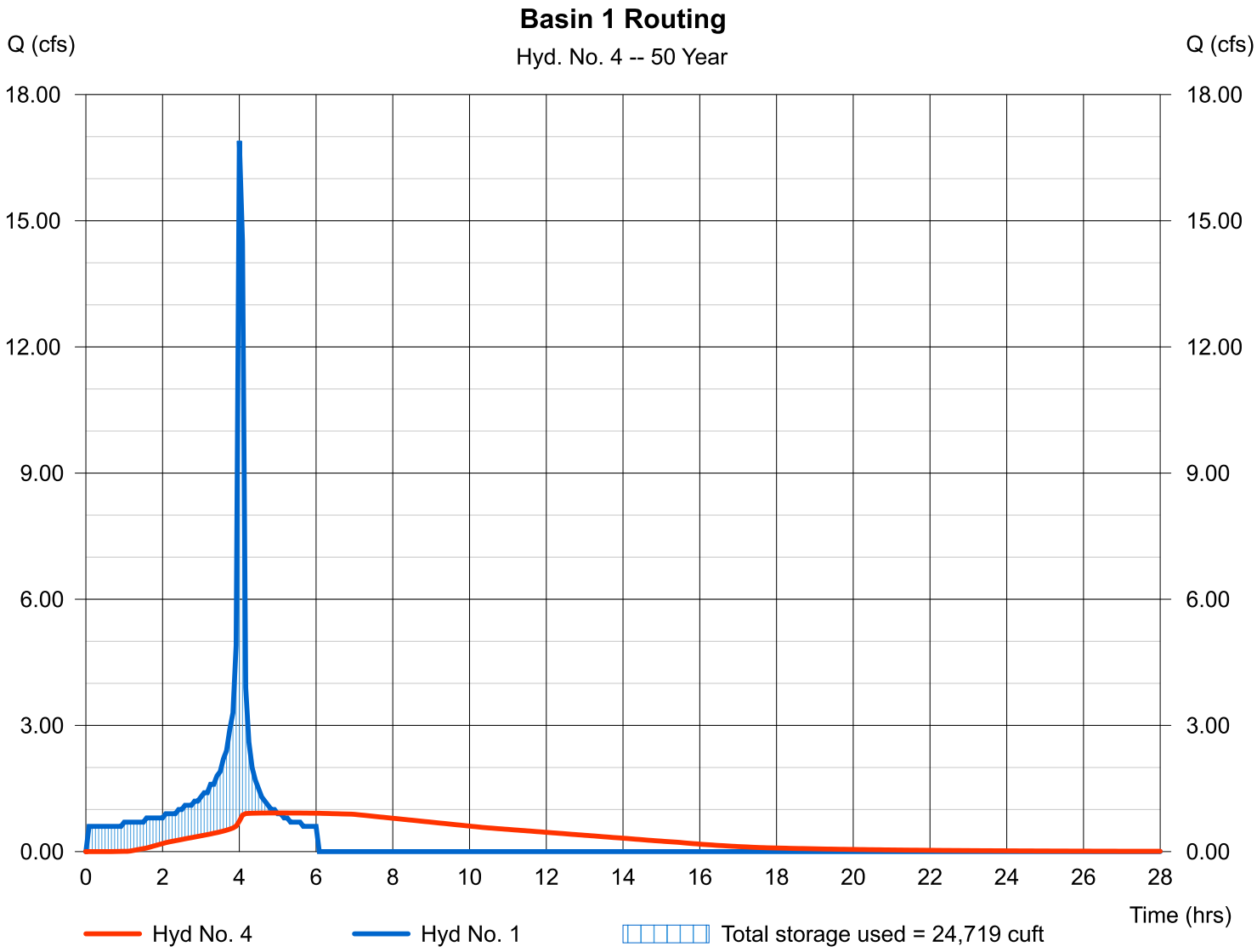
Hydrograph Report

Hyd. No. 4

Basin 1 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.918 cfs
Storm frequency	=	50 yrs	Time to peak	=	5.00 hrs
Time interval	=	5 min	Hyd. volume	=	32,297 cuft
Inflow hyd. No.	=	1 - Basin 1 Inflow	Max. Elevation	=	479.37 ft
Reservoir name	=	Basin 1	Max. Storage	=	24,719 cuft

Storage Indication method used.

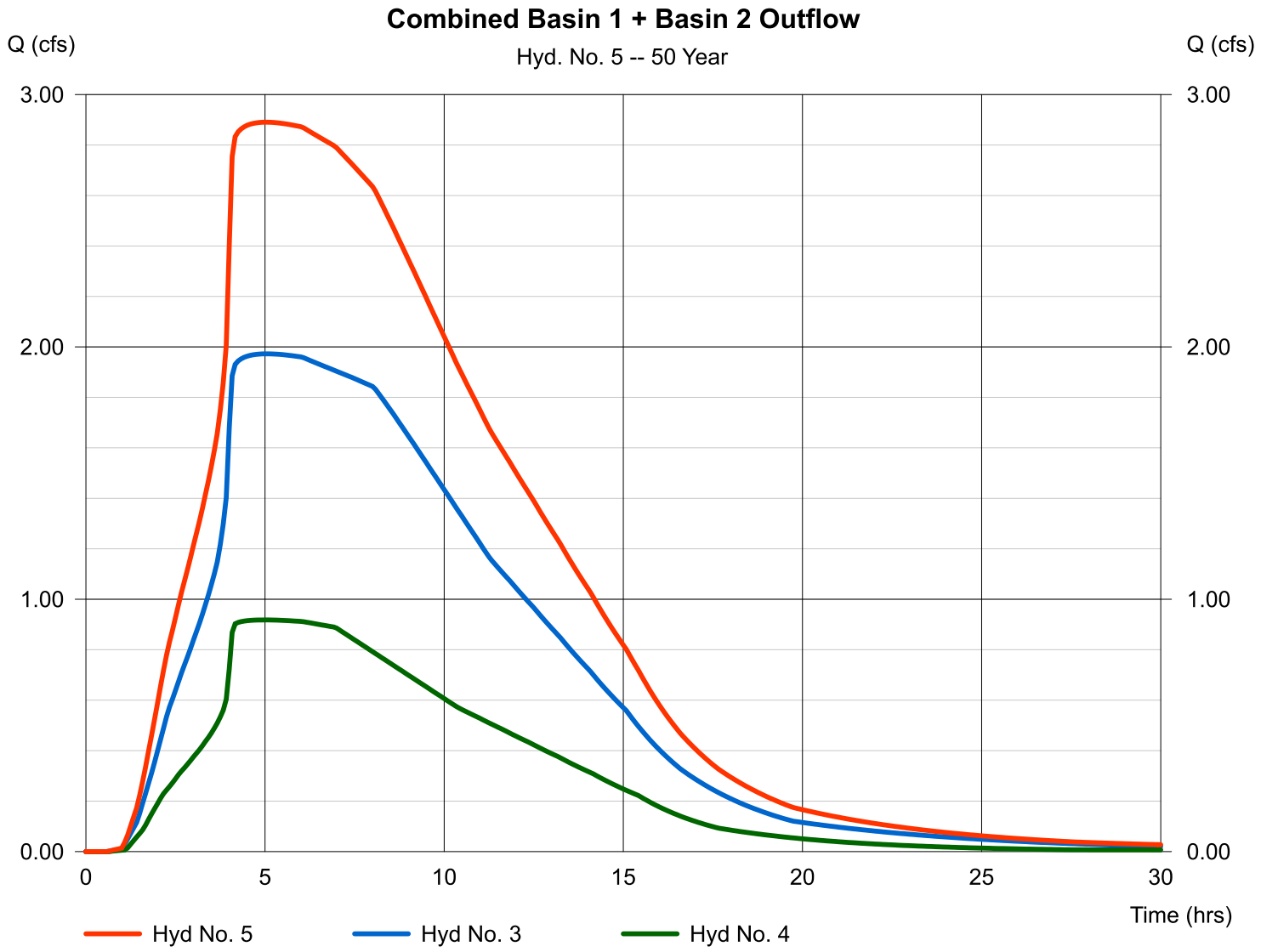


Hydrograph Report

Hyd. No. 5

Combined Basin 1 + Basin 2 Outflow

Hydrograph type	= Combine	Peak discharge	= 2.891 cfs
Storm frequency	= 50 yrs	Time to peak	= 5.00 hrs
Time interval	= 5 min	Hyd. volume	= 105,604 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 0.000 ac

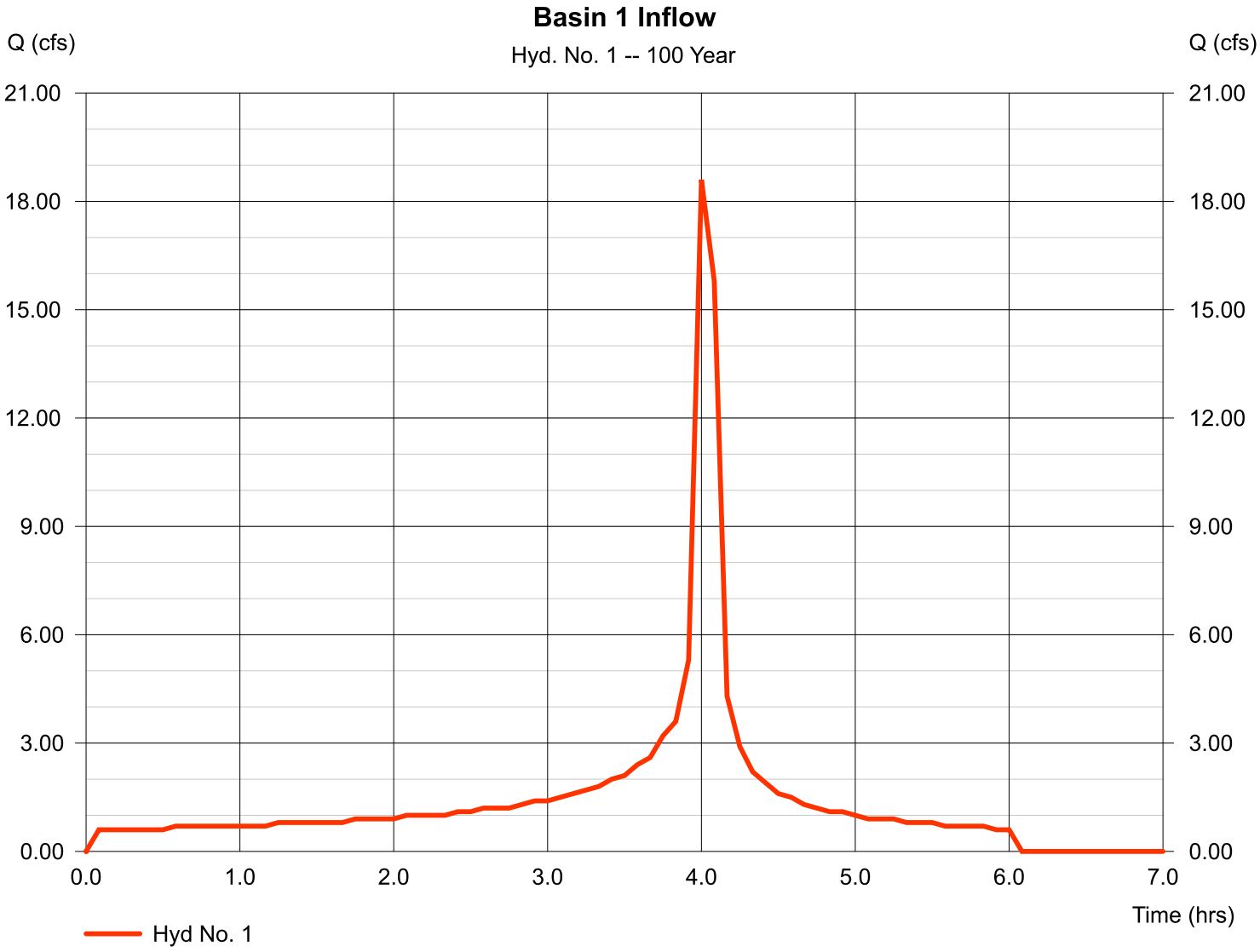


Hydrograph Report

Hyd. No. 1

Basin 1 Inflow

Hydrograph type	= Manual	Peak discharge	= 18.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 36,870 cuft

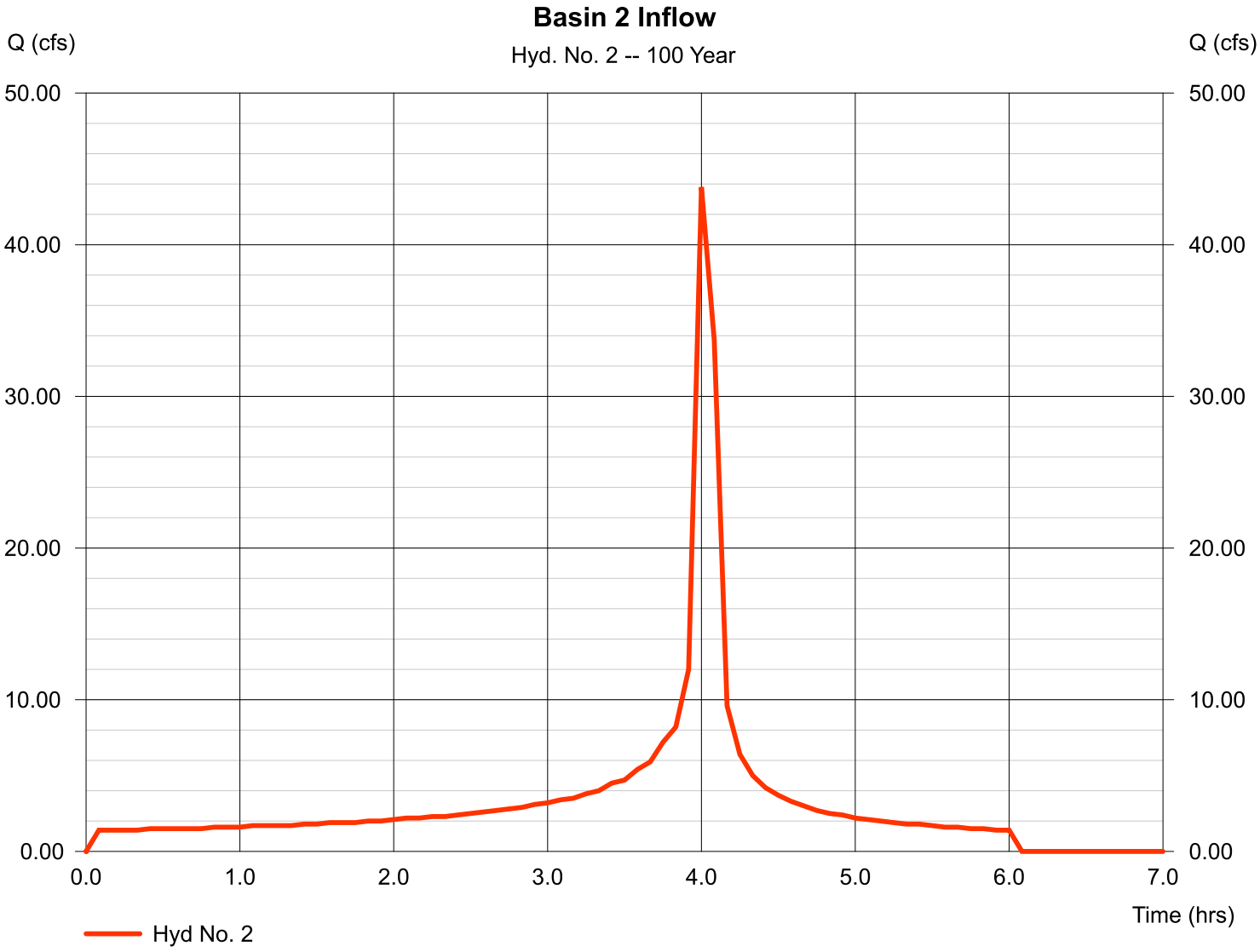


Hydrograph Report

Hyd. No. 2

Basin 2 Inflow

Hydrograph type	= Manual	Peak discharge	= 43.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.00 hrs
Time interval	= 5 min	Hyd. volume	= 83,010 cuft



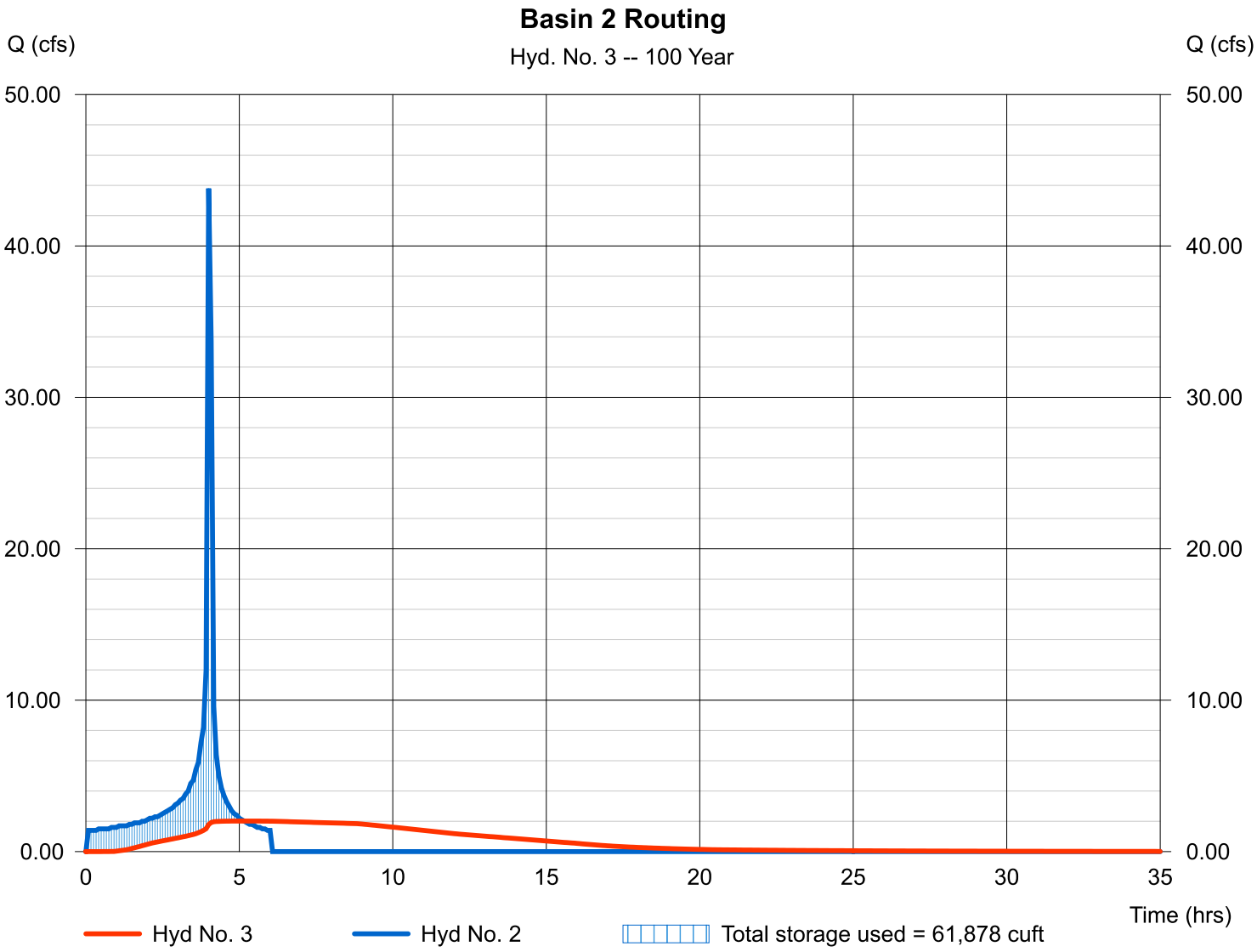
Hydrograph Report

Hyd. No. 3

Basin 2 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	2.017 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.17 hrs
Time interval	=	5 min	Hyd. volume	=	80,387 cuft
Inflow hyd. No.	=	2 - Basin 2 Inflow	Max. Elevation	=	482.92 ft
Reservoir name	=	Basin 2	Max. Storage	=	61,878 cuft

Storage Indication method used.



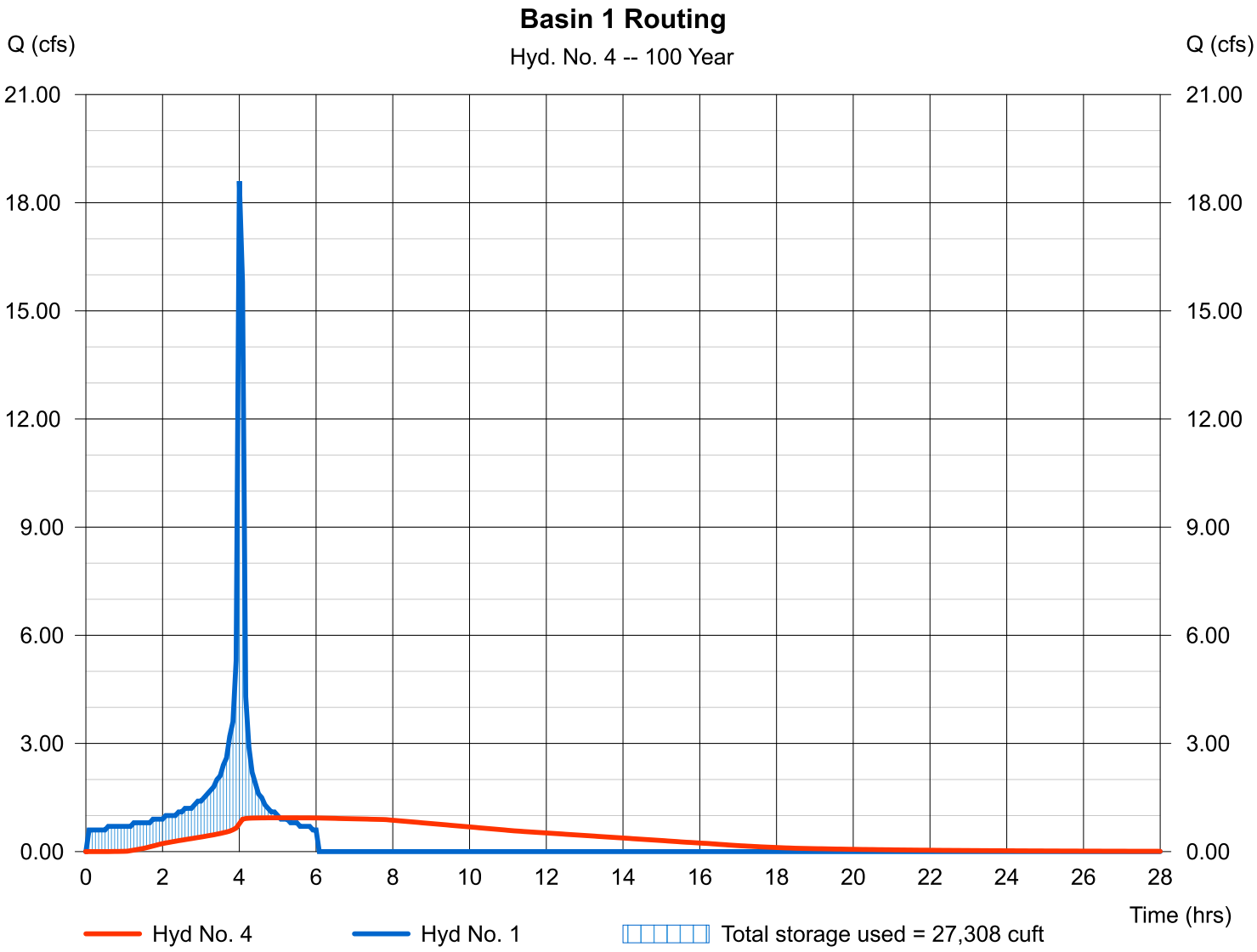
Hydrograph Report

Hyd. No. 4

Basin 1 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.937 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.08 hrs
Time interval	=	5 min	Hyd. volume	=	35,507 cuft
Inflow hyd. No.	=	1 - Basin 1 Inflow	Max. Elevation	=	479.49 ft
Reservoir name	=	Basin 1	Max. Storage	=	27,308 cuft

Storage Indication method used.

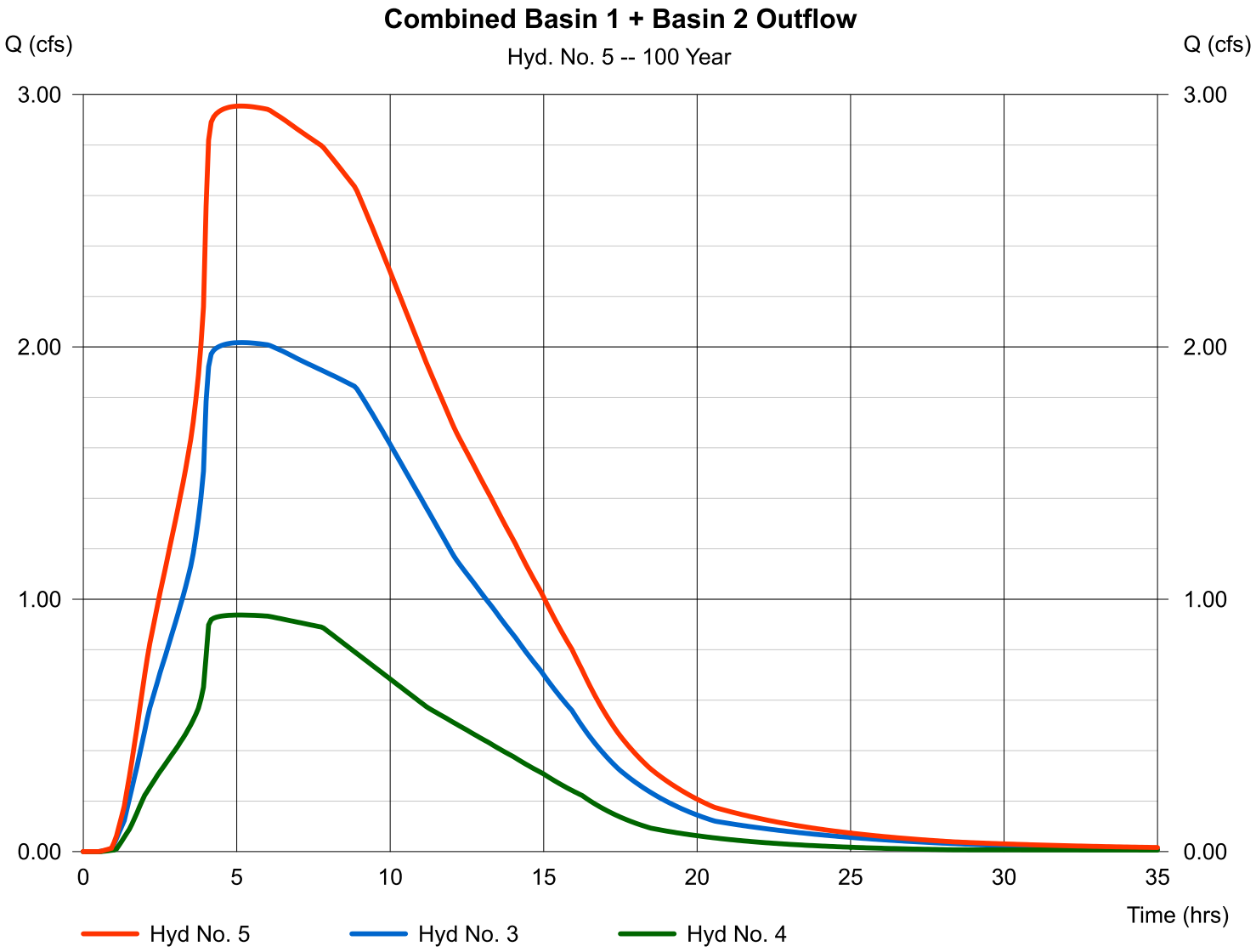


Hydrograph Report

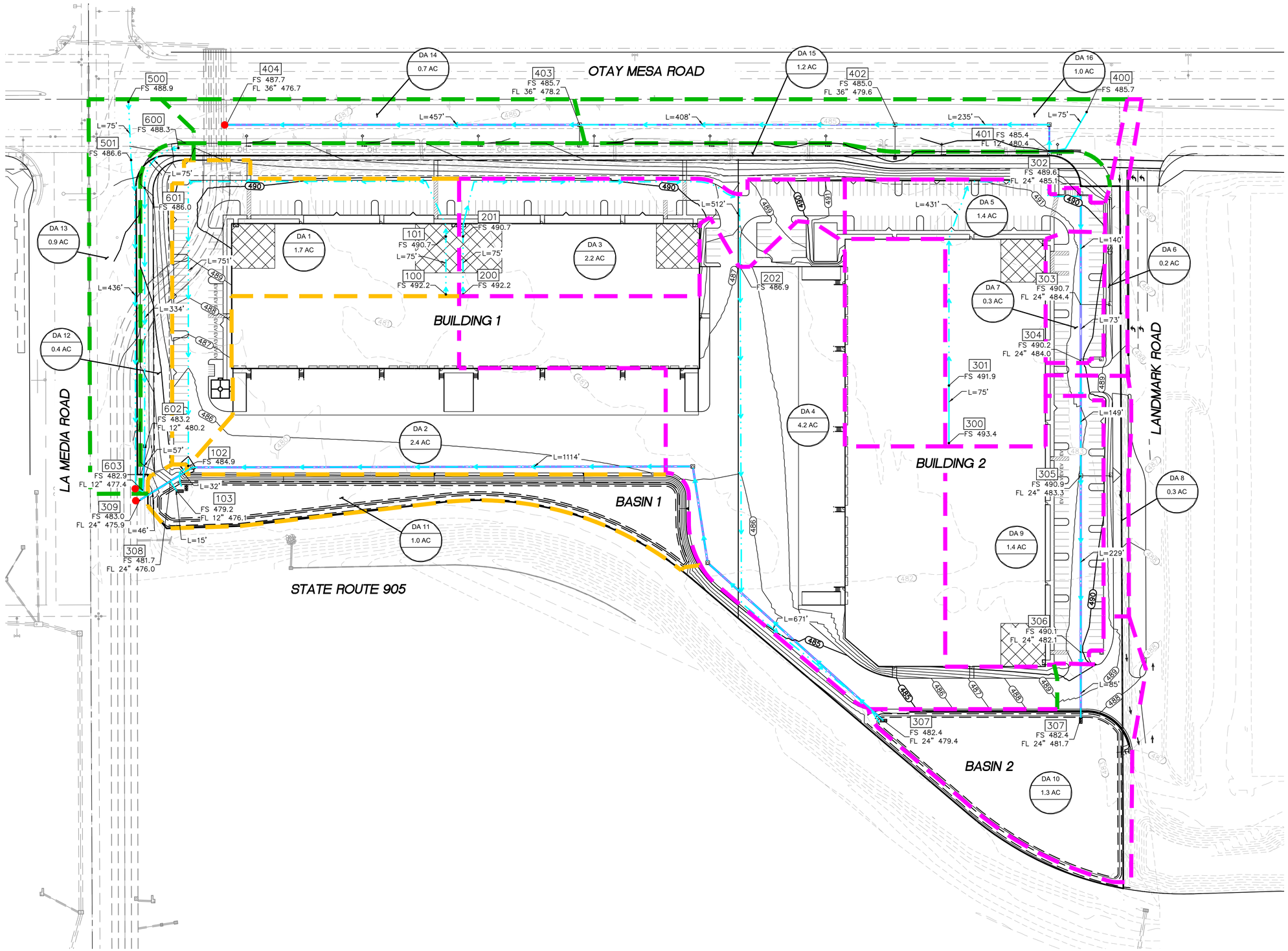
Hyd. No. 5

Combined Basin 1 + Basin 2 Outflow

Hydrograph type	= Combine	Peak discharge	= 2.955 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.08 hrs
Time interval	= 5 min	Hyd. volume	= 115,894 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 0.000 ac



4 PROPOSED HYDROLOGY MAP



LEGEND

- PROJECT BOUNDARY
- DRAINAGE AREA BOUNDARY (OFFSITE)
- DRAINAGE AREA BOUNDARY (BASIN 1)
- DRAINAGE AREA BOUNDARY BASIN 2
- DISCHARGE/POINT OF COMPLIANCE — POC
- NODE — 400
- RUNOFF FLOW PATH
- STORM DRAIN
- EXISTING CONTOUR — XXXX
- PROPOSED CONTOUR — XXXX
- DRAINAGE AREA LABEL — DA X, XX AC

Kimley»Horn

12 March 2020

PROPOSED DRAINAGE EXHIBIT
PLAZA LA MEDIA NORTH - SAN DIEGO, CALIFORNIA